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SAMPLE MOCK PAPERS

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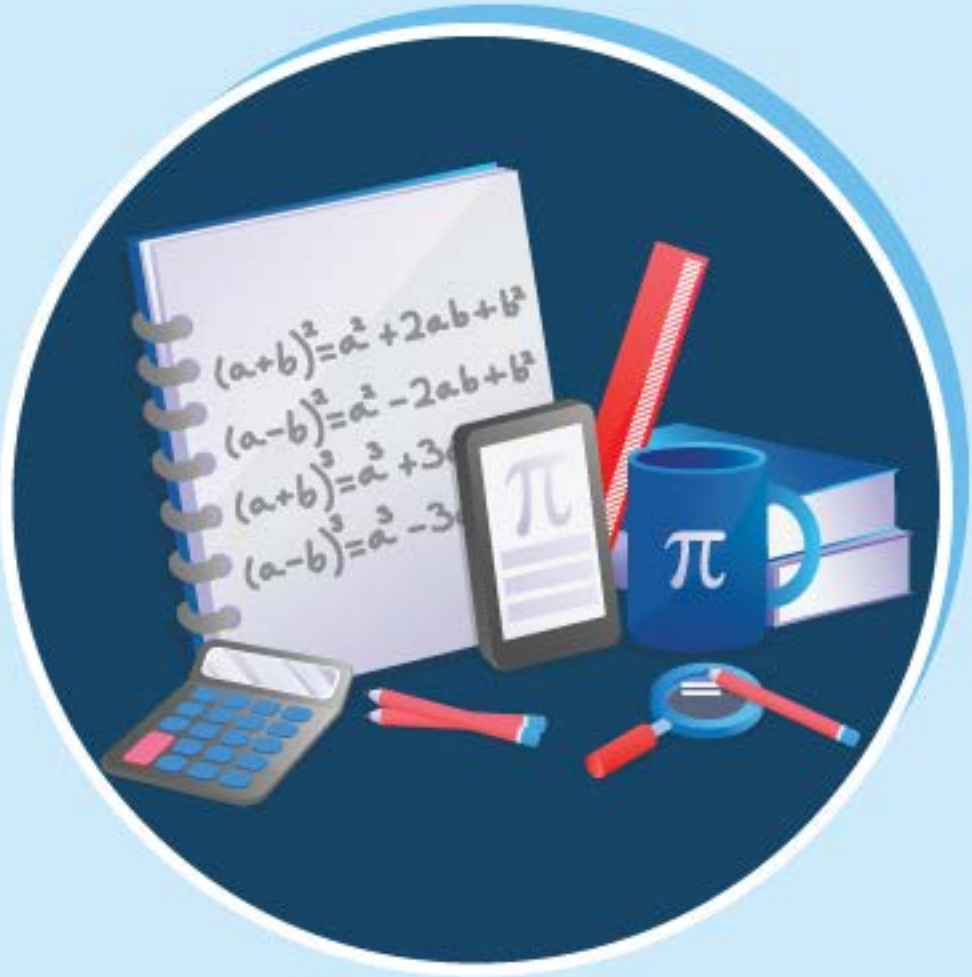
CLASS 9



MATHEMATICS

MOCK PAPER 1

ICSE Board

Class 9 Maths

Mock Paper – 1

Time: 2 ½ hours. **Total Marks: 80**

General Instructions:

1. *Answers to this Paper must be written on the paper provided separately.*
2. *You will not be allowed to write during the first 15 minutes. This time is to be spent in reading the question paper.*
3. *The time given at the head of this Paper is the time allowed for writing the answers.*
4. *Attempt **all** questions from **Section A** and **any four** questions from **Section B**.*
5. *The intended marks for questions or parts of questions are given in brackets [ ]*

Section A

(Attempt all questions from this section.)

Question 1

Choose the correct answers to the questions from the given options. [15]

i)

Which of the following is not an irrational number?

(a) $5 + 2\sqrt{3}$
(b) $\sqrt{23 - 7} + \sqrt{34 + 2}$
(c) $\sqrt{9} + \sqrt{7}$
(d) $\sqrt{51 - 2} - \sqrt{8}$

ii)

A person invests Rs. 20,000 for the year at a certain rate of interest compounded annually. If the amount he receives after 1 year is Rs. 22,400, find the rate of interest per annum.

(a) 10%

(b) 11%

(c) 12%

(d) 13%

iii)

Expand $(x + 9)(x + 11)$.

(a) $x^2 + 20x + 99$

(b) $x^2 + 2x + 99$

(c) $12x + 99$

(d) $x^2 - 2x + 2$

iv)

The factors of $2a^2 + bc - 2ab - ac$ are

(a) $(a + b)$ and $(2a - c)$

(b) $(2a - b)$ and $(c + 2a)$

(c) $(a - c)$ and $(2a - b)$

(d) $(2a - c)$ and $(a - b)$

v)

Which of the following ordered pair satisfies the two equations $2x + y = 35$, $3x + 4y = 65$?

(a) (12, 11)

(b) (14, 7)

(c) (15, 5)

(d) (16, 3)

vi)

The value of $a^m \times a^n$ is equal to

(a) a^{m-n}

(b) a^{mn}

(c) a^{m+n}

(d) $a^{m/n}$

vii)

Which of the following in not one of the congruency criteria?

(a) SSS

(b) AAA

(c) RHS

(d) SAS

viii)

In ΔABC, ∠C = 90°. If BC = 8 cm and AC = 6 cm, then AB =

(a) 2 cm

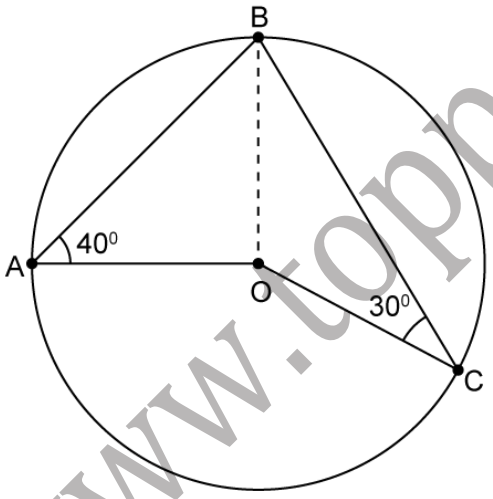
(b) 14 cm

(c) 10 cm

(d) 12 cm

ix)

In the figure, find the measure of angle AOC.



(a) 110°

(b) 150°

(c) 190°

(d) 220°

x)

Which term will be the median if there are 9 numbers arranged in ascending order?

(a) 2nd & 3rd

(b) 3rd & 4th

(c) 4th

(d) 5th

xi)

The class mark for the class 30 – 40 will be

(a) 30

(b) 40

(c) 35

(d) 10

xii)

If a cone and a cylinder has the same radii and same height, then volume of the cone is equal to

(a) one third of the volume of a cylinder

(b) two third of the volume of a cylinder

(c) twice the volume of a cylinder

(d) half of the volume of a cylinder

xiii)

Given $\sec\theta = \frac{13}{12}$, then the value of $\sin\theta$ is

(a) 12/13

(b) 5/12

(c) 1/12

(d) 0

xiv)

Find the values of x and y if (x – 1, y + 3) = (6, 6)

(a) x = 7 and y = 3

(b) x = 3 and y = 7

(c) x = 5 and y = 3

(d) x = 3 and y = 5

xv)

Distance between the points P(5, 2) and Q(9, 5) is equal to

(a) 1 unit

(b) 3 units

(c) 5 units

(d) 6 units

Question 2

i) [4]

Find the amount and the compounded interest on Rs. 64000 for $1\frac{1}{2}$ years at 15% per annum, compounded half-yearly (Without using formula).

ii) [4]

Solve using the method of elimination by equating coefficients:

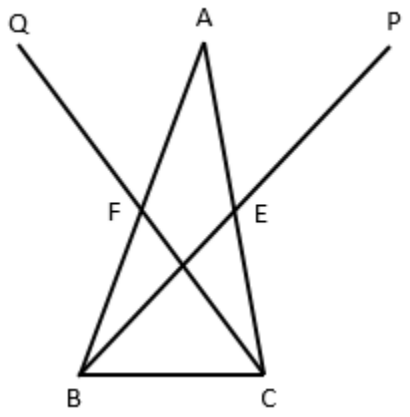
$$4x + \frac{6}{y} = 15,\ 3x - \frac{4}{y} = 7$$

iii) [4]

In triangle ABC, the medians BE and CF are produced to points P and Q, respectively, such that EP = BE and FQ = CF. Prove that

A. Q, A and P are collinear.

B. A is the mid-point of QP.



Question 3

i) [4]

A ladder 15 m long reaches a window which is 9 m above the ground on one side of the street. Keeping its foot at the same point, the ladder is turned to the other side of the street to reach a window 12 m high. Find the width of the street.

ii) [4]

The diagonals of a quadrilateral are of lengths 10 cm and 24 cm. If the diagonals bisect each other at right angles, find the length of each side of the quadrilateral. Name the type of the quadrilateral.

iii) [5]

Factorise:

A. $x^3 + 3x^2 + 3x - 7$

B. $[(674)^2 - (326)^2]$

Section B

(Attempt any four questions from this Section.)

Question 4

i) [3]

If $x = \frac{1}{5+2\sqrt{6}}$ and $y = \frac{1}{5-2\sqrt{6}}$, find the value of $x^2 + y^2$.

ii) [3]

A woman saves Rs. 4,000 every year and invests it at the end of the year at 10% compound interest. Calculate the total amount of her savings at the end of the third year (Without using formula).

iii) [4]

Two chords AB and CD of lengths 5 cm 11cm, respectively, of a circle are parallel to each other and are on opposite sides of its centre. If the distance between AB and CD is 6 cm, find the radius of the circle.

Question 5

i) [3]

If (3a + 4b) = 16 and ab = 4, find the value of $(9a^2 + 16b^2)$.

ii) [3]

Factorise: $4(2a - 3)^2 - 3(2a - 3)(a - 1) - 7(a - 1)^2$.

iii) [4]

The mean of 9 observations was found to be 35. Later on, it was detected that an observation 81 was misread as 18. Find the correct mean of the observations.

Question 6

i) [3]

Solve using cross multiplication: 2x – 5y + 8 = 0, x – 4y + 7 = 0

ii) [3]

Simplify: $\dfrac{5^{n+3} - 6 \times 5^{n+1}}{9 \times 5^n - 2^2 \times 5^n}$

iii) [4]

In a study of diabetic patients in a village, the following observations were noted.

Age (in years)	10–20	20–30	30–40	40–50	50–60	60–70
Number of patients	2	5	12	19	9	4

Represent the above data by a frequency polygon (without using a histogram).

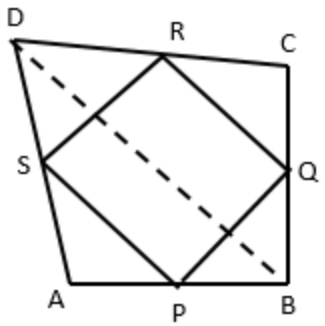
Question 7

i) [3]

The line segment joining the midpoints M and N of parallel sides AB and DC, respectively, of a trapezium ABCD is perpendicular to both sides AB and DC. Prove that AD = BC.

ii) [3]

Prove that the figure obtained by joining the mid-points of the adjacent sides of a quadrilateral is a parallelogram.



iii) [4]

Two sides of a triangular field are 85 m and 154 m in length and its perimeter is 324 m. Find (i) the area of the field and (ii) the length of the perpendicular from the opposite vertex on the side measuring 154 m.

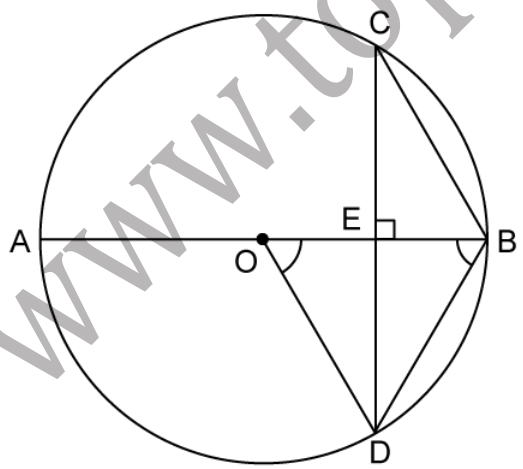
Question 8

i) [3]

Two opposite angles of a parallelogram are (3x – 2) and (50 – x). Find the measure of each angle of the parallelogram.

ii) [3]

In the given figure, O is the centre of the circle, BD = OD and CD ⊥ AB. Find ∠CAB.



iii) [4]

A godown measures 40 m × 25 m × 10 m. Find the maximum number of wooden crates each measuring 1.5 m × 1.25 m × 0.5 m which can be stored in the godown.

Question 9

i) [4]

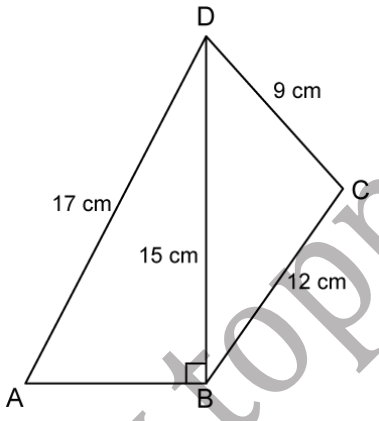
If $\cot\theta = \frac{7}{8}$, evaluate

A. $\frac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)}$

B. $\tan^2\theta$

ii) [6]

Find the perimeter and area of a quadrilateral ABCD in which BC = 12 cm, CD = 9 cm, BD = 15 cm, DA = 17 CM and ∠ABD = 90°.



Question 10

i) An open rectangular cistern when measured from the outside is 1.35 m long, 1.08 m broad and 90 cm deep. It is made of iron which is 2.5 cm thick. Find the capacity of the cistern and the volume of the iron used. [3]

ii) Using the distance formula, show that the points (1, –1), (5, 2) and (9, 5) are collinear. [3]

iii) Draw the graphs of the equations x – y + 1 = 0 and 3x + 2y – 12 = 0. Determine the co-ordinates of the vertices of the triangle formed by these lines and the x-axis, and shade the triangular region. [4]

ICSE

CLASS 9

MATHEMATICS

MOCK PAPER 2

ICSE Board
Class 9 Mathematics
Mock Paper - 2

Time: 2 ½ hours. **Total Marks: 80**

General Instructions:

1. *Answers to this Paper must be written on the paper provided separately.*
2. *You will not be allowed to write during the first 15 minutes. This time is to be spent in reading the question paper.*
3. *The time given at the head of this Paper is the time allowed for writing the answers.*
4. *Attempt **all** questions from **Section A** and **any four** questions from **Section B**.*
5. *The intended marks for questions or parts of questions are given in brackets [ ]*

Section A
(Attempt all questions from this section.)

Question 1

Choose the correct answers to the questions from the given options. [15]

i) Which of the following is a rational number?

(a) $(3+\sqrt{3})(3-\sqrt{3})$

(b) $\sqrt{23-6}+\sqrt{36}$

(c) $\sqrt{64}-2\sqrt{8}$

(d) $4\sqrt{6}-2\sqrt{6}$

ii) What will be the amount on Rs. 10000 invested for 1 year at the rate of 8% per annum compounded annually?

(a) Rs. 11664

(b) Rs. 10800

(c) Rs. 10000

(d) Rs. 800

iii) If a – b = 1 and ab = 6, what is the value of (a + b)?

(a) 7

(b) 6

(c) 5

(d) 1

iv) Find the factors of 3ax − 6ay – 8by + 4bx.

(a) (x – 2y) and (3a + 4b)

(b) (3x – 2y) and (a + 4b)

(c) (3 + 4y) and (ax – b)

(d) (4b – 3a) and (x + 2y)

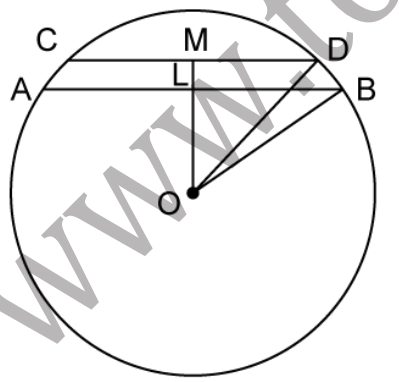
v) 11 pens and 19 pencils together cost Rs. 502, while 19 pens and 11 pencils together cost 758. Which of the following linear equations represent the above situations?
(a) $11x + 19y = 502, 19x + 11y = 758$
(b) $11x - 19y = 502, 19x - 11y = 758$
(c) $11 + 19y = 785, 19x + 11y = 502$
(d) $11x - 9y = 758, 19x - 11y = 502$

vi) Find x if $(81)^x = 3^{12}$
(a) 12
(b) 6
(c) 4
(d) 3

vii) Which of the following corresponding parts are equal for congruent triangles?
(a) Sides
(b) Angles
(c) Medians
(d) All of the above

viii) Which of the following measures of the sides of a triangle does not form a right angled triangle?
(a) 6 cm, 8 cm, 10 cm
(b) 3 cm, 4 cm, 5 cm
(c) 4 cm, 7 cm, 9 cm
(d) 5 cm, 12 cm, 13 cm

ix) In the given circle of radius 5 cm, AB and CD are two parallel chords of lengths 8 cm and 6 cm, respectively. Calculate LB.



(a) 3 cm
(b) 6 cm
(c) 4 cm
(d) 8 cm

x) What will be the median of 9, 5, 4, 7, 2, 3, 1.
(a) 7
(b) 5.5
(c) 4.5
(d) 4

xi) The class mark for the class 60 – 70 will be
(a) 60
(b) 70
(c) 65
(d) 75

xii) A plastic box is made by using the sheet having area 5.45 m^2. What will be the cost of making the box if 1 m^2 of the plastics sheet costs Rs. 20?
(a) Rs. 54
(b) Rs. 75
(c) Rs. 100
(d) Rs. 109

xiii) If sec $(90^o - x) = 2$, then the measure of x is
(a) 0°
(b) 30°
(c) 60°
(d) 90°

xiv) Find the values of x and y if $(3x + 1, 2y - 7) = (10, -11)$.
(a) x = 3 and y = 2
(b) x = 2 and y = 3
(c) x = 2 and y = –3
(d) x = 3 and y = –2

xv) Distance between the points A(–6, –4) and B(9, –12) is equal to
(a) $\sqrt{479}$ units
(b) 17 units
(c) $\sqrt{73}$ units
(d) 8 units

Question 2

i) The difference between the simple interest and the compound interest on a sum of money for 2 years at 12% per annum is Rs. 216. Find the sum. [4]

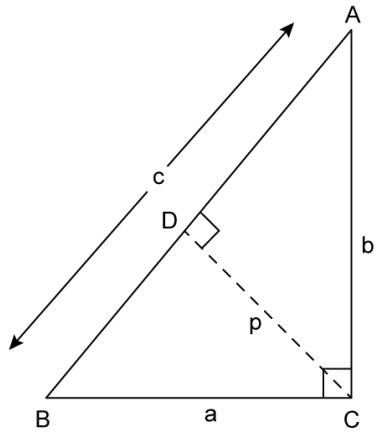
ii) Solve the following system of linear equations using elimination by substitution: [4]

$\frac{3}{4}x - \frac{2}{3}y = 1; \quad \frac{3}{8}x - \frac{1}{6}y = 1$

iii) In a right-angled ΔABC, ∠B = 90° and P is the mid-point of AC. Prove that BP = ½ AC.[4]

Question 3

i) In ΔABC, ∠ACB = 90^0, AB = c unit, BC = a unit, AC = b unit, CD is perpendicular to AB and CD = p unit. [4]



Prove that $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$

ii) Prove that if the diagonals of a parallelogram are equal, then the parallelogram is a rectangle. [4]

iii) Factorise: [5]

A. Evaluate: $\frac{6.67 \times 6.67 \times 6.67 + 5.33 \times 5.33 \times 5.33}{6.67 \times 6.67 - 6.67 \times 5.33 + 5.33 \times 5.33}$

B. $\frac{(18.5)^2 - (6.5)^2}{18.5 + 6.5}$

Section B

(Attempt any four questions from this Section.)

Question 4

i) If $x = 2 - \sqrt{3}$, find the value of $\left(x + \frac{1}{x}\right)^3$. [3]

ii) Calculate the amount and the compound interest on Rs. 125000 for $1\frac{1}{2}$ years at the rate of 12% per annum compounded half-yearly. [3]

iii) $\overline{AB}$ and $\overline{CD}$ are chords of a circle with radius r. AB = 2CD and the perpendicular distance of $\overline{CD}$ from the centre is twice the perpendicular distance of $\overline{AB}$ from the centre.

Prove that $r = \frac{\sqrt{5}}{2}CD$. [4]

Question 5

i) If $\left(x^2 + \frac{1}{25x^2}\right) = 9\frac{2}{5}$, find the value of $\left(x - \frac{1}{5x}\right)$. [3]

ii) Factorise: $x^2 + \frac{1}{x^2} - 2 - 3x + \frac{3}{x}$ [3]

iii) The mean weight of 8 students is 45.5 kg. Two more students having weights 41. 7 kg and 53.3 kg join the group. What is the new mean weight? [4]

Question 6

i) A father is 25 years older than his son. After 5 years, his age will be twice that of his son. Find their present ages. [3]

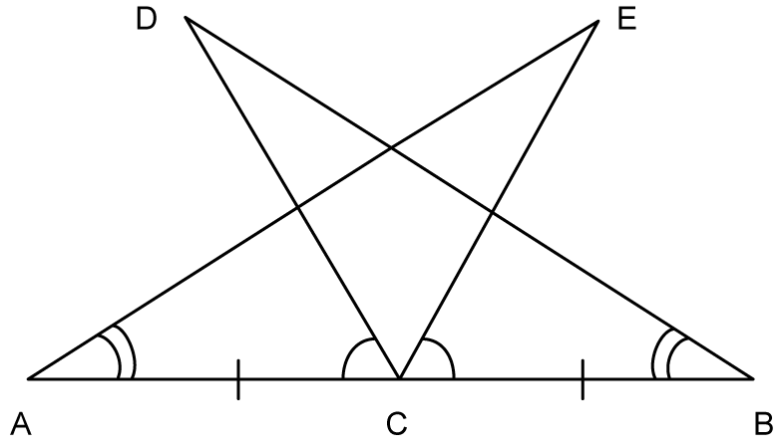
ii) Simplify: $\frac{5 \times (25)^{n+1} - 25 \times 5^{2n}}{5 \times 5^{(2n+3)} - (25)^{n+1}}$ [3]

iii) Draw a frequency polygon for the following frequency distribution: [4]

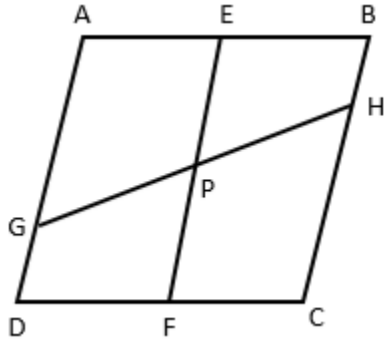
Class-interval	1–10	11–20	21–30	31–40	41–50	51–60
Frequency	8	3	6	12	2	7

Question 7

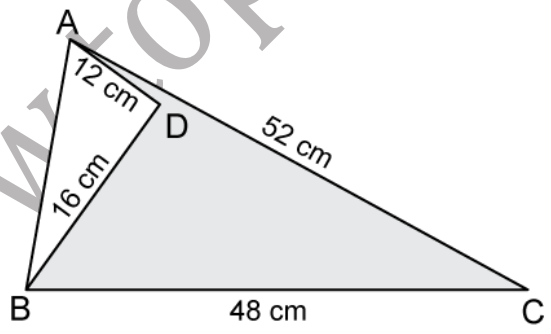
i) In the given figure, C is the midpoint of AB. If ∠DCA = ∠ECB and ∠DBC = ∠EAC, prove that DC = EC. [3]



ii) ABCD is a parallelogram. E is the mid-point of AB and F is the mid-point of CD. GH is any line which intersects AD, EF and BC at G, P and H, respectively. Prove that GP = PH. [3]

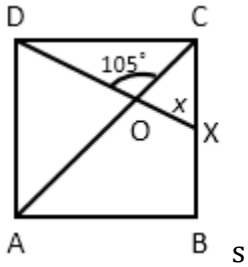


iii) Find the area of the shaded region in the figure given below. [4]



Question 8

i) In the given figure, ABCD is a square. A line segment DX cuts the side BC at X and the diagonal AC at O such that ∠COD = 105° and ∠OXC = x. Find the value of x. [3]



ii) Two circles with centres O and O' intersect at two points A and B. A line PQ is drawn parallel to OO' through A or B intersecting the circles at P and Q. Prove that PQ = 2OO'. [3]

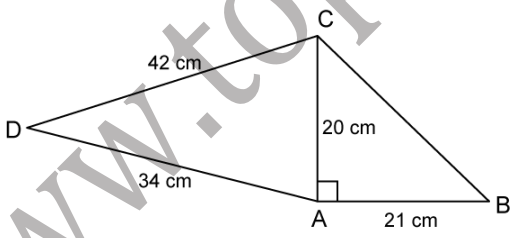
iii) Shanti Sweets Stall placed an order for making cardboard boxes for packing their sweets. Two sizes of boxes were required. The bigger box of dimensions 25 cm × 20 cm × 5 cm and the smaller box of dimensions 15 cm × 12 cm × 5 cm. For all the overlaps, 5% of the total surface area was required extra. If the cost of the cardboard is Rs. 4 for 1000 cm², find the cost of cardboard required for supplying 250 boxes of each kind. [4]

Question 9

i) Without using trigonometric tables, evaluate the following: [3]

$$\frac{3\tan 25^\circ \tan 40^\circ \tan 50^\circ \tan 65^\circ - \frac{1}{2}\tan^2 60^\circ}{4\left(\cos^2 29^\circ + \cos^2 61^\circ\right)}$$

ii) Find the perimeter and area of the quadrilateral ABCD in which AB = 21 cm, ∠BAC = 90°, AC = 20 cm, CD = 42 cm and AD = 34 cm. [6]



Question 10

i) How many planks of dimensions (5 m × 25 cm × 10 cm) can be tired in a pit which is 20 m long, 6 m wide and 80 cm deep? [3]

ii) Find the point on the y-axis which is equidistant from the points A(-3, 2) and B(5, -2). [3]

iii) Solve the below pair of simultaneous equations graphically.
2x + 3y = 2 and x – 2y = 8 [4]

ICSE

CLASS 9

PHYSICS

MOCK PAPER 1

ICSE Board
Class 9 Physics
Mock Paper – 1

Time: 2 Hours. **Total Marks: 80**

General Instructions:

1. Answers to this paper must be written on the paper provided separately.
*2. You will **not** be allowed to write during the first **15** minutes.*
This time is to be spent in reading the question paper.
3. The time given at the head of the paper is the time allotted for writing the answers.
*4. **Section A** is compulsory. Attempt **any four** questions from **Section B**.*
5. The intended marks of questions or parts of questions are given in brackets [ ].

SECTION A (40 Marks)
Attempt *all* Questions from this Section

Question 1 **[15]**

(i) The radius of moon is 3.84 x 10^6 m. It's order of magnitude is
a) 10^5
b) 10^6
c) 10^7
d) 10^8

(ii) The velocity-time equation is represented by
a) v-u= at
b) v=at – u
c) v^2-u^2=2as
d) s=ut+1/2at^2

(iii) In case of accelerated motion along a straight line, the distance travelled by the body is:
a) directly proportional to square of time
b) directly proportional to time
c) inversely proportional to square of time
d) inversely proportional to time

(iv) A body weighs 48 N on the surface of the Earth, its weight at the centre of the Earth will be
a) 24 N
b) 48 N
c) 96 N
d) zero

(v) Which of the following factors affect barometric height at a given place?
a) Barometric height changes with the area of cross-section of barometric tube.
b) Barometric height changes with the angle to which barometer tube is held.
c) Barometric height changes when the shape of the tube is changed.
d) Barometric height changes with change in humidity in air

(vi) In which direction does the buoyant force act on a body immersed in a liquid?
a) Vertically upward
b) Sideways towards the walls of the container
c) Vertically downward
d) None of the above

(vii) Which of the following pair is the one which shows abiotic: biotic component combination?
a) Microorganism: Plant
b) Microorganism: Human being
c) Soil: Temperature
d) Temperature: Microorganism

(viii) If the magnification has a positive sign, the image formed by the concave mirror must be
a) Real and erect
b) Real and inverted
c) Virtual and erect
d) Virtual and inverted

(ix) How is the current flowing in a conductor changed if the resistance of conductor is doubled keeping the potential difference across it the same?
a) doubled
b) one-fourth
c) halved
d) four times

(x) A bulb is connected to a cell. How the resistance of circuit is affected if another identical bulb is connected in series with the first bulb?
a) Resistance is doubled
b) resistance is halved
c) Resistance is four times.
d) resistance is one-fourth.

(xi) The magnetism acquired by a magnetic material when it is kept near (or in contact with) a magnet, is called
a) temporary magnetism
b) induced magnetism
c) permanent magnetism
d) Induction

(xii) State the positions of neutral points when a magnet is placed with its axis in the magnetic meridian and with its north pole pointing towards geographic south.

a) in east-west direction
b) in west-east direction
c) in north-south direction
d) in south-north direction

(xiii) A solid of mass 22 kg is immersed in water. If it loses half of its weight i water, its R.D. will be

a) 1/2
b) 1/4
c) 4
d) 2

(xiv) Population growth can be controlled through

a) Economic measure
b) Technological measures
c) Women empowerment and family planning
d) Economic growth

(xv) An inverted image can be seen by using a convex mirror under what circumstances?

a) Under no circumstances
b) When the object is placed at infinity
c) When the object is at a distance equal to the radius of curvature of the mirror
d) When the distance of the object from the mirror is equal to the focal length of the mirror.

Question 2

(i) [3]

a) Express one day in milliseconds.
b) Why are the passengers' cabins in an aeroplane pressurized?
c) What does a straight-line graph signify?

(ii) Following table gives the distance travelled by a particle at different times.

Time (s)	0	0.25	0.5	0.75	1	1.25	1.5
Distance (cm)	0	2	5	9	16	25	36

Draw a distance-time graph representing the motion of the particle. [2]

(iii) What will be the magnitude and direction of the reaction force acting on a coin of 10 g lying on the surface of the floor? Take g = 9.8 m/s^2 [2]

(iv) Distinguish between fundamental units and derived units. [2]

(v) The earth attracts an apple. Does the apple also attract the earth? If it does, why does the earth not move towards the apple? [2]

(vi) An empty truck and a loaded truck are moving with the same velocity. On applying brakes, which truck will stop first and why? [2]

(vii) In cold countries, ponds freeze only at the surface. Why? [2]

Question 3

(i) Draw a graph of volume and temperature when 5 cm^3 of ice at - 10°C is heated to form water at 10°C. [2]

(ii) A brass disc is fitted strongly in a hole in a steel plate. What will you do (heat or cool) with the system to loosen the brass disc from the hole? $(\alpha_{steel} < \alpha_{brass})$ [2]

(iii) Which mirror forms the image of a wider region? Also, give relevant figure. [2]

(iv) You have learnt that plane and convex mirrors produce virtual images of the objects. Can we get real images under some circumstances? How? [2]

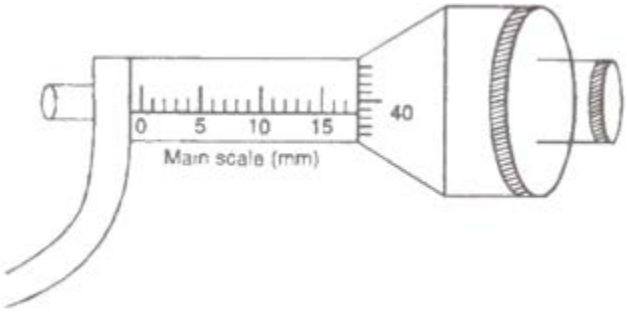
(v) Does the size of the mirror affect the nature of the image? [2]

SECTION B (40 Marks)

Attempt *any four* Questions from this Section

Question 4

(i) Given diagram shows a screw gauge. In one measurement, the final position of the scale is as shown in the diagram. The circular scale has 50 divisions. [3]



i. What is the least count of the screw gauge?
ii. If 40th division of the circular scale coincides with the main scale line, what is the final reading?
iii. What do you mean by back-lash error of a screw gauge?

(ii) In a physical balance, [3]

i. State the principle on which it works.
ii. What is measured by physical balance?
iii. What is the role of a plumb line?
iv. What is the role of base screws?
v. State two requirements for a good balance.

(iii) A weather forecasting plastic balloon of volume 15 m^3 contains hydrogen of density 0.09 kg/m^3. The volume of equipment carried by the balloon is negligible compared to its own volume. The mass of the empty balloon alone is 7.15 kg. The balloon is floating in the air of density 1.3 kg/m^3. Calculate: [4]

i. Mass of hydrogen in the balloon.
ii. Mass of hydrogen and balloon.
iii. If mass of equipment is x kg, write down the total mass of hydrogen, the balloon and the equipment.

iv. Mass of air displaced by balloon.
v. Using law of floatation, calculate the mass of equipment.

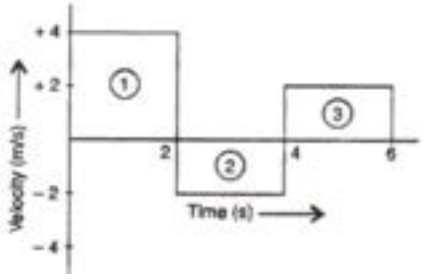
Question 5

(i) An electron moving with the speed of 5×10^4 m/s enters into an electric field and attains a uniform acceleration of 10^{15} m/s^2 in the direction of motion. In how much time, will it attain a speed twice of its initial speed? In this time, how much distance will it cover? [3]

(ii) [4]

i. Explain with the help of an example whether the velocity or the acceleration of a body give the direction of motion.

ii. In the given figure, velocity-time graph of a body moving in a straight line is shown. Find the displacement and the distance travelled by the body in 6 s.



(iii) A body is projected vertically upwards with a velocity of 98 m/s. Find (i) the maximum height attained by the body and (ii) time taken by body to reach the highest point. Take g = 9.8 m/s^2 [3]

Question 6

(i) [4]

i. State Newton's third law of motion.

ii. John pushes a wall with a force of 20 N towards the east, what force will be exerted by the wall on John?

iii. In the following figure, a block of weight 10 N is hanging from a rigid support by a thread. Find:

1. The force exerted by block on the thread.
2. The force exerted by the thread on the block.

(ii) Mention three disadvantages of construction of large dams for generating hydroelectric power. [3]

(iii) A 3 kg stone is weighed first with a physical balance and then by a spring balance at the pole and at the equator. Where will the weight be maximum? [3]

Question 7

(i) Explain the effect of ozone depletion. [3]

(ii) [4]

i. What is the use of thermos flask?
ii. Draw a labeled diagram of thermos flask.
iii. What contribution does the vacuum between the two walls give to the functioning of a thermos flask?
iv. What is the function of the two shining walls of the glass vessel in the thermos flask?

(iii) A test tube made of ordinary glass cracks on plunging into boiling water whereas a red hot test tube made of fused silica can be safely plunged into normal water, why? [3]

Question 8

(i) [4]

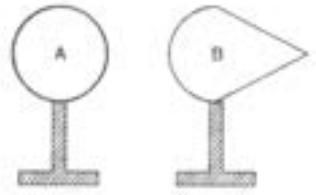
i. Select the luminous objects from the following:
Candle flame, stars, moon, red hot wire of heater, polished surface, and firefly.
i. In a room, the light is not reaching directly, even then it is illuminated. Why?
ii. What will be the colour of the sky for space travellers?

(ii) In what way, a point source should be placed in front of a concave mirror to get the parallel beam and the divergent beam. [3]

(iii) Compare the frequencies of two waves X and Y while velocity and wavelength of X are 5×10^3 m/s and 25 m respectively and for Y, 4×10^3 m/s and 20 m respectively. [3]

Question 9

(i) A and B are two negatively charged and insulated conductors as shown in the figure. State, with reason, which conductor will tend to lose charge. [3]



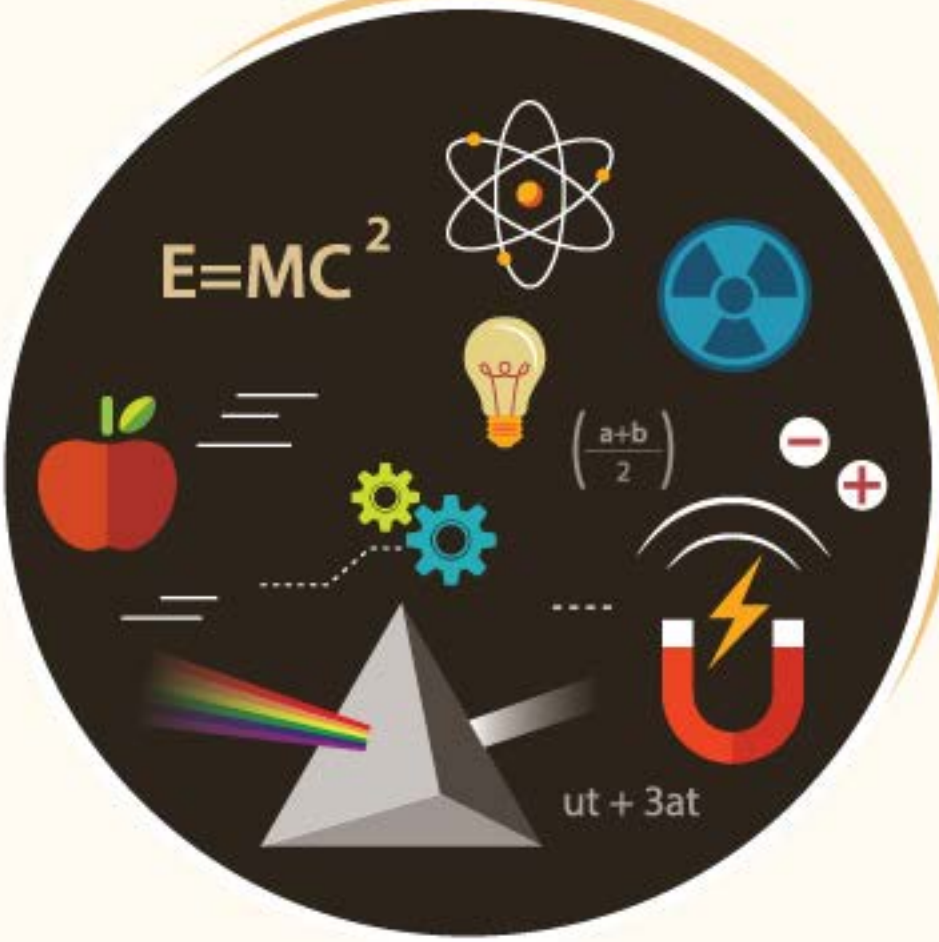
(ii) Draw a labelled diagram of Leclanche cell. Why is it not suitable for continuous use? [3]

(iii) [4]

i. What is the general law of attraction and repulsion between magnetic poles?
ii. What defines the direction of the magnetic field?
iii. The middle region of a bar magnet is:
1. A north pole
2. A north seeking pole
3. Unmagnetized
4. Magnetized
iv. Name two magnetic substances.

ICSE

CLASS 9



PHYSICS

MOCK PAPER 2

ICSE Board
Class 9 Physics
Mock Paper – 2

Time: 2 Hours. **Total Marks: 80**

General Instructions:

1. Answers to this paper must be written on the paper provided separately.

*2. You will **not** be allowed to write during the first **15** minutes.*
This time is to be spent in reading the question paper.

3. The time given at the head of the paper is the time allotted for writing the answers.

*4. **Section A** is compulsory. Attempt **any four** questions from **Section B**.*

5. The intended marks of questions or parts of questions are given in brackets [ ].

SECTION A (40 Marks)
Attempt *all* Questions from this Section

Question 1

(i) The pitch of a screw gauge means
a) The distance moved ahead by it in rotation of circular scale by one division.
b) The length of screw in it.
c) The thickness in it.
d) The separation between two consecutive threads on its screw

(ii) If an object is dropped from a height and it hits the ground with a velocity of 50 m/s, then its initial velocity is taken as
a) Zero
b) 50 m/s
c) -50 m/s
d) 500 m/s

(iii) If a body covers equal distances in equal intervals of time, its motion is:
a) uniform motion
b) non uniform motion
c) static
d) none of the above.

(iv) The physical quantity that remains zero for an object moving with a uniform velocity (in ideal case) is
a) momentum
b) velocity
c) external force
d) mass

(v) Weight of an object is highest at
a) Equator
b) Centre of the Earth
c) Poles
d) Above the Earth's surface

(vi) Calculate the mass of air in a room of dimensions 4.5 m X 3.5 m X 2.5 m if the density of air at N.T.P is 1.3 kgm^{-3}.
a) 51.19 kg
b) 0.03 kg
c) 31.29 kg
d) 50 kg

(vii) Food chains generally consist of only three or four step. Why?
a) Only four trophic levels can be formed.
b) All organisms are covered in these steps
c) Very little usable energy is left after fourth step
d) The food chain will break down

(viii) What will be the angle of reflection if light rays fall normally on a reflecting surface?
a) -180°
b) 180°
c) 90°
d) 0°

(ix) Which one of the following correctly defines the amplitude of a wave:
a) The distance the wave moves in one second.
b) The maximum distance moved by the particles of a medium on either side of the mean position
c) The distance equal to one wavelength.
d) The distance the wave moves in one time period of the wave.

(x) An ammeter is a resistance device and it is always connected in with the circuit.
a) high, series
b) high, parallel
c) low, series
d) low, parallel

(xi) Which amongst the following is best insulator
a) paper
b) carbon
c) graphite
d) ebonite

(xii) A small magnet is suspended by a silk thread from a rigid support such that magnet can freely swing. How will it rest?
a) It will rest with its north pole towards geographic north in a perfect straight line
b) It will rest with its north pole towards geographic south, making some angle with the horizontal.
c) It will rest with its south pole towards geographic north, making some angle with the horizontal.
d) It will rest in geographic north-south direction with north pole towards geographic north, making some angle with the horizontal.

(xiii) Which of the following statement concerning magnetic field is correct?
(1) The part of a bar magnet, at which the magnetic field is the strongest, is called its pole.
(2) A magnetic field is present near a compass needle.
(3) There is no magnetic field inside a current-carrying solenoid.
a) (1) only
b) (2) only
c) (1) and (2) only
d) (2) and (3) only

(xiv) A substance floats in water, but sinks in coconut oil. The density of the substance
a) is less than the density of water and equal to the density of oil
b) is greater than the density of oil and equal to the density of water
c) is less than the density of water and greater than the density of oil
d) cannot be decided based on the given information

(xv) The expression for the magnification of a spherical mirror in terms of focal length (f) and the distance of the object from the mirror (u) is:
a) -f/(u-f)
b) f (u + f)
c) -f/ (u + f)
d) f/ (u - f)

Question 2

(i) Give one example of each of the following forces which [3]
(a) Attract (b) squeeze (c) Stretch

(ii) Enrico Fermi (Italian physicist) suggested that the length of one lecture period (50 min) is nearly equal to one micro-century. Verify it by converting micro-century into minutes. [2]

(iii) Why one cannot suck lemonade on the surface of the moon with a soda straw? [2]

(iv) State the use of graph in physics. [2]

(v) A boy throws a ball vertically upwards. It rises to a height 'h' and then returns to the point from where it was thrown. What is the total distance moved by the ball? Also, find its displacement. [2]

(vi) On what factors does the time period of a simple pendulum depend? [2]

(vii) A particle is moving with a uniform speed on a circular path. Will it be an accelerated motion? Why? [2]

Question 3

(i) Why are taps left dripping at sub-zero temperatures? [2]

(ii) Who is the super-consumer of resources? [2]

(iii) The mass of the moon is approximately 10% of the mass of the earth. What will be the gravitational force of the earth on the moon in comparison to the gravitational force of the moon on the earth? [2]

(iv) It is said that "virtual image cannot be caught on a screen." Yet, when we are seeing a virtual image, we are obviously bringing it onto the screen i.e., the retina of our eyes. Is the said statement wrong? [2]

(v) What is the difference between the virtual images produced by [2]

i. plane mirror
ii. concave mirror
iii. convex mirror

SECTION B (40 Marks)
Attempt *any four* Questions from this Section

Question 4

(i) What is the function of ratchet in a screw gauge? A screw gauge has positive error of 7 divisions such that its main scale is marked in half mm and circular scale has 100 divisions. The spindle of the screw advances by 1 division on one complete revolution. If the screw gauge reading is 9 divisions on the main scale and 67 divisions on the circular scale for the diameter of a wire, calculate [4]

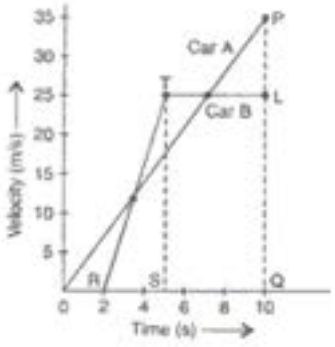
a) Pitch
b) Least count and
c) Corrected diameter.

(ii) A girl standing on an oscillating swing sits down. How does the time period of a swing get affected? What happens to its frequency of oscillation? [3]

(iii) Define the term volume. Mass of a sphere of radius 1.4 m is 500 kg. Calculate the density of the material of the sphere. [3]

Question 5

(i) Given figure shows a velocity-time graph for two cars A and B starting from the same point in the same direction. [4]



Calculate the following:

a) Acceleration of car A.
b) Acceleration of car B between 2s - 5 s.
c) At what time intervals, both cars have same velocity?
d) Which car is ahead after 10 s and how much?

(ii) Derive the first equation of motion. [3]

(iii) A stone dropped from the top of a cliff reaches ground level in 4 s and buries itself 0.8 m into the mud. Calculate, [3]

a) height of cliff
b) final velocity of stone on reaching level and
c) retardation produced by the mud. Take g = 9.8 m/s^2.

Question 6

(i) It is experienced that in our daily life Newton's first law is contradicted. Comment. [3]

(ii) Sound takes 3 s to reach a certain distance from the source placed in air. How much time will it take to reach the same distance when the source is in water?
Take speed of sound in air as 330 m/s and in water as 1650 m/s. [3]

(iii) Define coefficient of linear expansion. Give its SI unit. State the factors on which the thermal expansion of a solid depends.[4]

Question 7

(i) Describe an experiment to demonstrate thermal expansion in gases. [4]

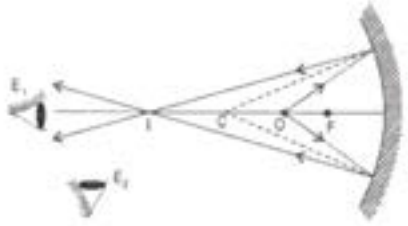
(ii) The mercury falls by 8/15 parts between two standard points on a Celsius thermometer; when the boiling water at 100°C is allowed to cool to room temperature. Calculate room temperature in
(i) Celsius scale (ii) Fahrenheit scale. [3]

(iii) [3]

i. What is the difference in the wavelength of infrared rays emitted from the sun and that radiated from the earth?
ii. How is the size of a degree defined on the Celsius scale and on the Fahrenheit scale?

Question 8

(i) Given figure shows the image I of a point object O. How will you differentiate between point object and its image? [3]



(ii) Give three applications of plane mirrors. [3]

(iii) [4]

a) Distinguish between light wave and sound wave. Give at least three points.
b) Arrange the speed of sound in gases, solids and liquids in ascending order.

Question 9

(i) A glass rod is rubbed with a silk cap. Describe the observations when [4]

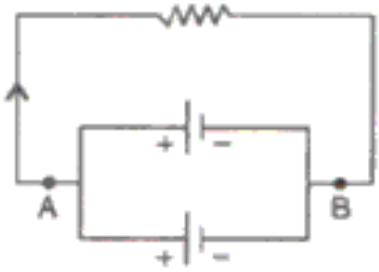
a) The rod is brought near the cap of a neutral gold leaf electroscope and then, it is removed without touching the cap.

b) Keeping the glass rod near the cap of the neutral electroscope; the cap is touched with the figure momentarily while the rod is near it. The rod is then removed.

c) The cap is touched with the rod and the rod is then removed.

Explain each observation on the basis of the movement of free electrons.

(ii) In the given circuit diagram two cells are connected in parallel. Answer the following:[3]



a) What is the potential difference between points A and B if e.m.f. of each cell is 1.5 V?

b) How does the effective voltage of the two cells connected in series compare to their arrangement in parallel?

c) Are the cells in a conventional flash light connected in series or in parallel?

(iii) You are given following three bars exactly similar in size and shape: [3]

a) A permanent magnet

b) A bar of soft iron

c) A bar of non-magnetic substance.

Describe how you will identify each of the bars if only a piece of thread is supplied to you as the extra piece of apparatus.

ICSE

CLASS 9

CHEMISTRY

MOCK PAPER 1

ICSE Board
Class 9 Chemistry
Mock Paper – 1

Time: 2 hours. **Total Marks: 80**

Maximum Marks: 80
Time allowed: Two hours
Answers to this paper must be written on the paper provided separately.
You will not be allowed to write during first 15 minutes.
This time is to be spent in reading the question paper.
The time given at the head of this paper is the time allowed for writing the answers.

Section A *is compulsory. Attempt any four questions from* ***Section B****.*
The intended marks for questions or parts of questions are given in brackets [ ].

SECTION-A
(*Attempt* ***all*** *questions from this Section*)

Question 1
Choose one correct answer to the questions from the given options: [15]

(i) $NH_4OH + FeCl_3 \rightarrow NH_4Cl + Fe(OH)_3$
To balance the above equation, the coefficient for ammonium hydroxide and ammonium chloride will be:
(a) 3 and 2
(b) 2 and 3
(c) 3 and 1
(d) 3 and 3

(ii) In a given reaction, barium hydroxide reacts with ammonium chloride to form product X and Y. Identify X and Y.
$Ba(OH)_2 + NH_4Cl \rightarrow X + Y$
(a) $BaCl_2$ and NH_3
(b) $BaCl_2$ and NH_4OH
(c) $BaCl_2$ and H_2O
(d) NH_4 and H_2O

(iii) Which one of the following metals does not react with water at any conditions?
(a) Gold
(b) Iron
(c) Lead
(d) Potassium

(iv) Valency of magnesium atom is:
(a) 3
(b) 4
(c) 2
(d) 5

(v) Alkali metals form:
(a) Hydrides with hydrogen
(b) Basic oxides with oxygen
(c) Unipositive ions
(d) All of the above

(vi) The reaction which involve a chemical change:
(a) Freezing of water
(b) Weathering of rocks
(c) Ripening of fruits
(d) Copper metal drawn into wires

(vii) Which of the following acids is NOT used in the preparation of hydrogen from metals?
(a) Nitric acid
(b) Hydrochloric acid
(c) Sulphuric acid
(d) None of the above

(viii) The pressure-volume relationship is given by:
(a) Boyle's
(b) Charles'
(c) Daltons'
(d) Gay Lussacs

(ix) The proportion of carbon dioxide in the atmosphere is about:
(a) 0.10%
(b) 78.09%
(c) 0.03%
(d) 0.93%

(x) The formula for magnesium nitride is
(a) MgN
(b) Mg_2N_3
(c) Mg_3N_4
(d) Mg_3N_2

(xi) Which one of the following pollutants is suspended solids of smoke, dust and vapour?
(a) Ozone
(b) Lead
(c) Chlorofluoro carbon
(d) Suspended particulate matter

(xii) Dry hydrogen when passed over a heated metal like Na, K, and Ca reacts to give their corresponding:
(a) Alloy
(b) Hydrides
(c) Ore
(d) Both alloy and ore

(xiii) Which of the following is NOT the characteristic of inner transition elements?
(a) Actinides are radioactive in nature
(b) They show variable valancies
(c) They form coloured ions
(d) They have low melting and boiling points

(xiv) What will be the valency of an element having atomic number Z = 7?
(a) 1
(b) 2
(c) 3
(d) 4

(xv) Which of the following is not a physical property of water?
(a) It is a colourless liquid
(b) On increasing pressure the freezing point of water increases.
(c) Water contract when cooled upto 4°C
(d) The specific heat capacity of water is 1 calorie/(gram°C)

Question 2

(i) [5]

(a) Complete the table:

Element	Mass No.	Atomic No.	p	N	e
A	1	1	1	__	__
B	14	__	7	__	7
C	__	12	12	12	__
D	35	__	17	__	17

(b) Give the electronic configuration of A, B, C and D.
(c) Identify A, B, C and D.
(d) How many valence electrons are present in A, B, C and D?
(e) What is the valency of A, B C and D?

(ii) Match the following: [5]

Column I	Column II
1. Torr	(a) $V_1/T_1 = V_2/T_2$
2. Kelvin	(b) $P_1V_1 = P_2V_2$
3. cm^3	(c) Pressure
4. Boyle's law	(d) Temperature
5. Charle's law	(e) Volume

(iii) Fill in the blanks: [5]

(a) Dalton used symbol ____ for oxygen and symbol ____ for hydrogen.

(b) Symbol represents ____ atom(s) of an element.

(c) Symbolic expression for a molecule is called ____.

(d) Sodium chloride has two radicals. Sodium is a ____ radical, while chloride is ____ radical.

(e) Valency of carbon in CH_4 is ____ , in C_2H_6 is ____, in C_2H_4 is ___ and in C_2H_2 is ___.

(iv) Write the formulae and balance the following chemical equations : [5]

(a) Magnesium + Nitrogen → Magnesium nitride

(b) Magnesium nitride + Water → Magnesium hydroxide + Ammonia

(c) $\text{Copper hydroxide} \xrightarrow{\Delta} \text{Copper oxide} + \text{Water}$

(d) $\text{Potassium chlorate} \xrightarrow{\Delta} \text{Potassium chloride} + \text{Oxygen}$

(e) Zinc sulphide + Oxygen → Zinc oxide + Sulphur dioxide

(v) State the type of chemical reactions of the following: [5]

(a) $NaOH + HCl \rightarrow NaCl + H_2O$

(b) $BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + 2HCl$

(c) $2Fe + 3Cl_2 \rightarrow 2FeCl_3$

(d) $2PbO_2 \xrightarrow{\Delta} 2PbO + O_2$

(e) $C + O_2 \xrightarrow{\Delta} CO_2$

SECTION-B

(Attempt any four questions)

Question 3

(i) Identify the acidic and basic radical in the following: [2]

(i) Ferrous sulphate

(ii) Sodium nitrite

(ii) What do you observe when; [2]

(a) Hydrochloric acid is added to silver nitrate.

(b) Calcium carbonate is heated.

(iii) Classify below salts as deliquescence, hygroscopic, desiccants. [3]

$CuSO_4$, Glauber salt, $FeCl_2$, CuO, $MgCl_2$, Washing soda

(iv) Discuss any three pollutants based on following points. [3]
(a) Origin
(b) Harmful effect

Question 4

(i) Explain closed physical contact with an example: [2]
(ii) Draw a neat and labelled diagram of Bohr's model of an atom. [2]
(iii) What are causes of water pollution? [3]
(iv) In Period 3 of the Periodic table, element B is placed to the left of element A. On the basis of this information, choose the correct word from the brackets to complete the following statements: [3]
(a) The element B would have (lower /higher) metallic character than A.
(b) The element A would probably have (lesser / higher) electron affinity than B.
(c) The element A would have (greater /smaller) atomic size than B.

Question 5

(i) Draw an orbital diagram of bonding between two oxygen atoms. [2]

(ii) Write an example with balanced reaction of: [2]
(a) Thermal decomposition
(b) Electrical decomposition

(iii) Hydrogen may be prepared in the laboratory by the action of a metal on an acid. [3]
(a) Which of the metals copper, zinc, magnesium or sodium would be the most suitable?
(b) Which of the acids dilute sulphuric, concentrated sulphuric, dilute nitric acid and concentrated nitric acid would you choose? Explain why you would not use the acids you reject.
(c) How would you modify your apparatus to collect dry hydrogen? Which drying agent would you employ for this purpose?
(iv) Complete the following two reactions. Write similarity and difference regarding the type of reaction between below two reactions. [3]
(a) $NaOH + HCl \rightarrow$
(b) $Na_2SO_4 + BaCl_2 \rightarrow$

Question 6

(i) State the valency and formula of the following ions: [2]
(a) Ammonium ion
(b) Cupric ion

(ii) Write two impacts of acid rain. [2]

(iii) Explain similarities of hydrogen each with group 1 and group 17 elements based on following points : [3]
(a) Electronic configuration
(b) Ion formation
(c) Valency

(iv) A gas is enclosed in a vessel at standard temperature. At what temperature will the volume of a gas enclosed be $\frac{1}{6}$th of its initial volume at constant pressure? [3]

Question 7

(i) Deduce the molecular formula of the following conversions: [2]
(a) Potassium dichromate
(b) Lead chromate

(ii) Give an example with explanation: [2]
Change of state

(iii) Identify the element present in the following groups and periods: [3]
(a) Group 1, Period 5
(b) Group 11, Period 2
(c) Group 16, Period 2

(iv) Define solubility. Explain factors affecting solubiity? [3]

Question 8

(i) The following questions are related to the long form of the periodic table. [2]
(a) State the modern periodic law.
(b) In which group are halogens placed in the long form of the periodic table?

(ii) [2]
(a)1 atmosphere =_____ cm. Hg =_____ mm Hg
(b)A _____ in the pressure at a constant temperature increases the volume of a gas.

(iii) Explain with balanced reaction the action of cold water on: [3]
(a) Potassium
(b) Sodium
(c) Calcium

(iv) What is the effect of chlorofluorocarbon on ozone layer? Explain in detail. [3]

ICSE

CLASS 9

CHEMISTRY

MOCK PAPER 2

ICSE Board
Class 9 Chemistry
Mock Paper – 2

Time: 2 Hours. **Total Marks: 80**

Answers to this paper must be written on the paper provided separately.
You will not be allowed to write during first 15 minutes.
This time is to be spent in reading the question paper.
The time given at the head of this paper is the time allowed for writing the answers.

Section A *is compulsory. Attempt any four questions from* ***Section B****.*
The intended marks for questions or parts of questions are given in brackets [ ].

SECTION-A

(*Attempt* ***all*** *questions from this Section*)

Question 1

Choose one correct answer to the questions from the given options: [15]

(i) If the temperature of the gas increases, the volume of the gas:
(a) Increases
(b) Decreases
(c) Remains the same
(d) Can increase or decrease

(ii) The number of electrons in an atom of sodium is 11. Its electronic configuration is:
(a) 2, 5, 4
(b) 2, 8, 1
(c) 2, 9
(d) 2, 2, 6

(iii) Which one of the following pollutants is produced by combustion of coal, petrol and diesel?
(a) Sulphur dioxide
(b) Lead
(c) Suspended particulate matter
(d) Carbon monoxide

(iv) A substance which gets oxidized in a redox reaction is a:
(a) Oxidising agent
(b) Reducing agent
(c) Both oxidizing and reducing agent
(d) None of these

(v) The reaction between iron filings and sulphur powder is an example of:
(a) Endothermic reaction
(b) Redox reaction
(c) Decomposition reaction
(d) Combination reaction

(vi) What is the chemical formula of potassium plumbite?
(a) K_4PbO_4
(b) K_2PbO_2
(c) K_3PbO_3
(d) K_2PbO_3

(vii) Which of the following need to be constant for Charles' law?
(a) Pressure
(b) Volume
(c) Temperature
(d) None of the above

(viii) Which of these substances is a good reducing agent?
(a) NaOCl
(b) HI
(c) $FeCl_3$
(d) KBr

(ix) The addition of certain unwanted chemical substances in the air causing harmful effects is called as:
(a) Air pollution
(b) Toxicity
(c) Epidemic
(d) Ozone depletion

(x) The element which is virtually inactive towards water is:
(a) Au
(b) Al
(c) Ag
(d) Both A and C

(xi) The canal rays led to the discovery of which subatomic particle?
(a) Beta rays
(b) Electrons
(c) Neutrons
(d) Protons

(xii) Which one of the following solutions is used for the removal of carbon dioxide gas in the purification of hydrogen gas?
(a) Caustic potash solution
(b) Lead nitrate solution
(c) Silver nitrate solution
(d) Sulphuric acid

(xiii) X (atomic mass = 37), Y (atomic mass = 81), and Z are three members of Dobereiner's triads. Atomic mass Z = ?
(a) 120
(b) 125
(c) 130
(d) 135

(xiv) What is blue vitriol?
(a) $CuSO_4.5H_2O$
(b) $FeSO_4.5H_2O$
(c) $CuSO_4.7H_2O$
(d) $FeSO_4.7H_2O$

(xv) The type of reaction for chemical equation $AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$ is:
(a) Combination
(b) Double decomposition
(c) Displacement
(d) Decomposition

Question 2

(i) The table given below shows the mass number and atomic number of five elements A, B, C, D and E. [5]

Element	Mass number	Atomic number
A	35	17
B	23	11
C	12	6
D	16	8
E	40	18

(a) To which group and period does element A belong?
(b) Choose from A, B, C, D and E, metal, non-metal and inert gas.
(c) Give the electronic configuration of elements A, B, C, D and E.

(ii) Match the following: [5]

Compound	Formula
1. Aluminate	(a) KOH
2. Chromate	(b) $CaCO_3$
3. Caustic Potash	(c) CrO_4^{-2}
4. Lime stone	(d) SiO_2
5. Silica	(e) AlO_2^{-2}

(iii) Fill in the blanks: [5]

(a) Pollutants such as NO_2, SO_2 and SO_3 dissolved in the moisture of air are the cause of _____.

(b) Excessive release of carbon dioxide in the atmosphere is the cause of _____ effect which produces global warming.

(c) The ozone layer prevents the harmful _____ radiation of the sun from reaching the earth.

(d) Decrease of the concentration of ozone in the stratosphere is the cause of formation of _____ holes.

(e) Ozone depletion is mainly caused by the active _____ atoms generated from CFC in the presence of UV radiation.

(iv) Find the valency of the given elements: [5]

(a) An element A atomic number 7 mass numbers 14

(b) B electronic configuration 2,8,8

(c) C electrons 13, neutrons 14

(d) D Protons 18 neutrons 22

(e) E Electronic configuration 2,8,8,1

(v) [5]

(a) Fill in the blanks.

1. K = °C + _____

2. 1 dm3 = _____cm3

3. 1 torr = _____mm of Hg

(b) Define:

1. Boyles' law
2. Charles' law

SECTION-B

(Attempt any four questions)

Question 3

(i) Write a note on greenhouse effect. [2]

(ii) What are displacement reactions? Explain with example. [2]

(iii) Define the following: [3]
(a) Solution
(b) Crystallisation
(c) Hard water

(iv) MSO_4 is a sulphate of a metal. Write the formula of its: [1]
(a) Hydroxide
(b) Nitrate
(c) Oxide

Question 4

(i) Explain below two characteristics of chemical reaction with example: [2]
(a) Formation of precipitate
(b) Change of state

(ii) In the formation of compound XY2, an atom X gives one electron to each Y atom. What is the nature of the bond in XY2? Draw the electron–dot structure of this compound. [2]

(iii) Explain why: [3]
(a) Water is an excellent liquid to use in cooling systems.
(b) A solution is always clear and transparent.
(c) Lakes and rivers do not suddenly freeze in the winters.

(iv) Which element from the following has the highest ionization energy? [3]
(a) P, Na, Cl
(b) F, O, Ne
(c) Ne, He, Ar
Explain your choice.

Question 5

(i) Deduce the molecular formula of the following: [2]
(a) Calcium nitrate
(b) Sodium chloride

(ii) Give reason: In the manufacture of ammonia molybdenum is added. [2]

(iii) How to prepare hydrogen using acid and metals. Write the reaction of acids with below metals. [3]
(a) Mg
(b) Al
(c) Zn

(iv) Complete the following reaction with balanced equation. Write type of the reaction. [3]
(a) $CuCO_3 \xrightarrow{\Delta}$
(b) $Zn(NO_3)_2 \xrightarrow{\Delta}$
(c) $AgOH \xrightarrow{\Delta}$

Question 6

(i) What are isobars? Explain with example. [2]

(ii) Give a balanced chemical equation for the action of heat on the following: [2]
(a) Silver oxide
(b) Red lead

(iii) The volume occupied by a certain gas was found to be 5.6 dm^3 at 2 atmospheric pressure. If the pressure is increased by 20%, find the new volume of the gas? [3]

(iv) Why is the position of Hydrogen in the periodic table anomalous? [3]

Question 7

(i) Give the valency and the formulae of the following radicals: [2]
(a) Nitride
(b) Bicarbonate

(ii) What is meant by photochemical reaction? [2]

(iii) Fill in the blanks: [3]
(a) In the long form of the periodic table, the elements are arranged in the ascending order of _____.
(b) The number of shells is equal to the number of _____.
(c) _____ metals are present in Group 1 of the periodic table.

(iv) Explain why? [3]
(a) Washing soda loses its weight when exposed to the atmosphere.
(b) When distilled water is kept in a sealed glass bottle for a long time, it leaves an etching on the surface of the glass.
(c) Common salt becomes wet during the rainy season.

Question 8

(i) [2]

(a)Name the incomplete period.

(b)What common feature is seen at the end of the 2nd and 3rd period?

(ii) 100 cm^3 of a gas at 27°C is cooled to 20°C at constant pressure. Calculate the volume of gas at 20°C. [2]

(iii) Explain with balanced chemical reaction of reaction of hydrogen with: [3]

(a) Chlorine

(b) Potassium

(c) Fe2O3

(iv) Write effects of global warming. [3]

ICSE

CLASS 9

BIOLOGY

MOCK PAPER 1

ICSE Board
Class 9 Biology
Mock Paper – 1

Time: 2 hours. **Total Marks: 80**

General Instructions:

1. *Answers to this paper must be written on the paper provided separately*
2. *You will be not allowed to write during first 15 minutes*
3. *This time is to be spent in reading the question paper.*
4. *The time given at the head of this paper is the time allowed for writing the answers.*

Section A is compulsory. Attempt any four questions from Section B
The intended marks for questions or parts of questions are given in brackets [ ]

SECTION A
(Attempt all questions from this Section.)

Question 1
Name the following by choosing the correct answers to the questions from the given options. (Do not copy the question, Write the correct answer only.) [10]

(i) The structure which prevents food from entering the trachea during swallowing is
1. Epiglottis
2. Pharynx
3. Larynx
4. Salivary gland

(ii) Which one of the following is found both in the cells of a mango plant and monkey?
1. Chloroplasts
2. Centrioles
3. Cell wall
4. Cell membrane

(iii) Tendons and ligaments are examples of
1. Fibrous connective tissue
2. Cartilage
3. Muscular tissue
4. Adipose tissue

(iv) Which one of the following is a characteristic of self-pollinated flowers?
1. Flowers are large and showy
2. Flowers remain closed and do not open
3. Stigma and anthers mature at the same time
4. Pollen is produced in very large quantities

(v) Anaerobic respiration normally occurs in
1. Grass
2. Cactus
3. Coconut
4. Baker's yeast

(vi) Which bacteria is rod shaped?
1. Coccus
2. Spirillum
3. Bacillus
4. Vibrio

(vii) The ultimate end structures of the respiratory system in humans are the
1. Alveoli
2. Bronchioles
3. Tracheoles
4. Bronchi

(viii) If for some reason, the sebaceous glands fail to function, then
1. The body will not be able to regulate the body temperature
2. The skin will turn darker with more melanin
3. The hair will fail to grow
4. The skin will turn dry and rough

(ix) Which one of the following categories of vertebrae are correctly matched?
1. Cervical - 7
2. Thoracic - 10
3. Lumbar- 4
4. Sacral- 4

(x) Pylorus is an opening from the
1. Oesophagus into stomach
2. Mouth cavity into stomach
3. Stomach into intestine
4. Intestine into rectum

(xi) Marasmus is caused due to the deficiency of
1. Proteins
2. Carbohydrates
3. Fats
4. All of these

(xii) A flower is said to be complete when
1. It has corolla and calyx
2. It has corolla and gynoecium
3. It has androecium and gynoecium
4. It has all the four whorls

(xiii) Which of the following plant parts is correctly matched with one of its stated characteristics?
1. Mango seed- aleurone layer
2. Bean seed- endosperm
3. Maize grain- coleoptile
4. Wheat grain- exalbuminous

(xiv) A plant cell can be distinguished from an animal cell by the
1. Absence of centrosome
2. Presence of cell membrane
3. Presence of vacuoles
4. None of these

(xv) One common function is performed by
1. Stomata and veins
2. Stomata and lenticels
3. Lenticels and sepals
4. Lenticels and hydathodes

Question 2

(i) **Name the following:** [5]
(a) The basic unit of life
(b) Causative agent of AIDS
(c) The space present between the incisors and premolars
(d) A substance which contains an anti-toxin
(e) A measure taken to maintain health and prevent the spread of a disease

(ii) **State whether the following statements are True or False.** [5]
(a) Coconut is a dry fruit.
(b) Insects have two pairs of legs.
(c) Fungi reproduce by producing spores.
(d) Intercostal muscles help in internal respiration.
(e) Inflammation increases blood supply.

(iii) **Match the items given in Column I with the most appropriate ones in Column II and rewrite the correct matching pairs.** [5]

Column I	Column II
(a) Ribosomes	1. Cell division
(b) Vacuoles	2. Protein synthesis
(c) Cell membrane	3. Regulates growth of the cell
(d) Centrioles	4. Store excess water
(e) Nucleus	5. Entry and exit of substances in and out of the cell
	6. Respiration of the cell
	7. Turgidity to the cell

(iv) **Choose the odd one out from the following terms and name the category to which the others belong:** [5]

(a) Frog, Lizard, Snake, Tortoise
(b) Chloroplast, Centrosome, Mitochondria, Cell wall
(c) Collenchyma, Sclerenchyma, Parenchyma, Cartilage
(d) Lysol, Carbolic acid, Benzoic acid, Formalin
(e) Pine, *Chlamydomonas*, *Amoeba*, *Paramoecium*

(v) **State two differences between each of the following pairs.** [5]

(a) Prokaryotic and Eukaryotic cell
(b) Respiration and Breathing
(c) Parenchyma and Sclerenchyma
(d) Striated and Unstriated muscles
(e) Active immunity and Passive Immunity

SECTION B

(Attempt any four questions from this section.)

Question 3

(i) What happens to the energy liberated in respiration? [1]
(ii) It is said that protoplasm cannot be analysed chemically. Why? [2]
(iii) Can you consider cluster of eggs as a tissue? Why? [2]
(iv) What are the advantages of the following in the flower? [2]
a) Long and feathery stigma
b) Smooth and light pollen
(v)
c) Germinated grams are considered highly nutritive. What is the reason?
d) Sometimes the potatoes kept in a basket during the late rainy season start giving out small shoots. Is it germination? If yes, give reason. [3]

Question 4

(i) Rearrange the following categories of classification in their proper sequence starting with the highest. [1]
Species, Family, Genus, Class, Order, Phylum

(ii) Why is spore formation in bacteria not considered as a form of reproduction? [2]

(iii) Define and give an example of balanced diet. [2]

(iv) How is thorough chewing of food helpful in digestion? [2]

(v) What are antagonistic muscles? Describe briefly. [3]

Question 5

(i) Name one modified sweat gland and any one modified sebaceous gland. [1]

(ii) How would you know that air you breathe out is warmer? [2]

(iii) Do you think cells of an elephant would be larger than the cells of rat? [2]

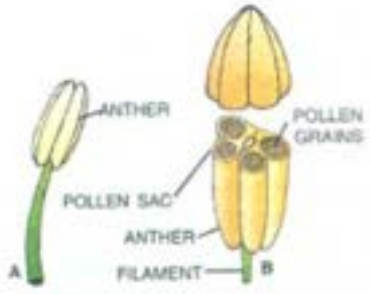
(iv) Name one body part where ciliated epithelium is found in humans. What is its function? [2]

(v)

a) Which major organ of a flower does the figure A represent?

b) What is the sex of the contents of pollen sacs in B?

c) How will the contents of the pollen sacs come out? [3]



Question 6

(i) Why does gaseous exchange continue in the lungs even during expiration? [1]

(ii) How does our skin provide protection to our body against excessive loss of heat in severe cold? [2]

(iii) Do the muscles pull the structures or push them? [2]

(iv) What is roughage? Give two examples. [2]

(v) Give any three roles of microorganisms in industrial production. [3]

Question 7

(i) One should breathe by nose and never by mouth. Give reason. [1]

(ii) Why is it important to know how the germs leave body of a patient? [2]

(iii) Name any three vaccines and the diseases for which they provide immunity. [2]

(iv) State two functions of World Health Organisation. [2]

(v) Describe the usefulness of incineration of wastes and also mention the precautions required in it. [3]

Question 8

(i) What is the difference between an organ and organelle? [1]

(ii) Why is it usually difficult to demonstrate respiration in green plants? [2]

(iii) What is goose flesh? How is it brought about? [2]

(iv) Mention two ways in which the ileum of the mammal is adapted for the absorption of digested food. [2]

(v) Describe the advantages and disadvantages of cross-pollination to the plant. [3]

ICSE

CLASS 9

BIOLOGY

MOCK PAPER 2

ICSE Board
Class 9 Biology
Mock Paper - 2

Time: 2 hours. **Total Marks: 80**

General Instructions:

1. *Answers to this paper must be written on the paper provided separately*
2. *You will be not allowed to write during first 15 minutes*
3. *This time is to be spent in reading the question paper.*
4. *The time given at the head of this paper is the time allowed for writing the answers.*

Section A *is compulsory. Attempt any* ***four questions*** *from* ***Section B.***
The intended marks for questions or parts of questions are given in brackets [ ]

SECTION A
(Attempt all questions from this Section.)

Question 1

Name the following by choosing the correct answers to the questions from the given options. (Do not copy the question, Write the correct answer only.) [15]

(i) Bacteria are no more classified as plants primarily because
1. these are unicellular
2. these are microscopic
3. many of them are parasitic
4. they have no chlorophyll

(ii) The cell organelle that helps in the respiration of the cell is
1. Mitochondria
2. Lysosome
3. Ribosome
4. Centrosome

(iii) Annual rings are the number of
1. Internodes in a stem
2. Rings of vascular bundles in a monocot stem
3. Bark layers in a woody stem
4. Layers of xylem in a stem

(iv) The part of the flower that give rise to the seed is
1. Ovary
2. Placenta
3. Ovule
4. Pollen grain

(v) Exine and intine are parts of
1. Embryo sac
2. Pollen grain
3. Stigma
4. Seed

(vi) Kingdom Animalia are mainly grouped under two categories
1. Bilaterally symmetrical and radially symmetrical
2. Coelomate and acoelomate
3. Aquatic and terrestrial
4. Vertebrates and invertebrates

(vii) Which of the following are fat-soluble vitamins?
1. A, D and E
2. B, C and D
3. B, D and E
4. A, B and C

(viii) Gastric juice contains
1. HCl and Pepsin
2. Pepsin and trypsin
3. Trypsin and HCl
4. Amylopsin and Pepsin

(ix) External ear (pinna) is supported by
1. Bone
2. Cartilage
3. Tendon
4. Capsule

(x) Which of the following pairs includes two abnormal conditions of skin pigmentation?
1. Leucoderma, Ringworm
2. Albinism, Leucoderma
3. Baldness, Albinism
4. Rickets, Baldness

(xi) During respiration, there is
1. gain in dry weight
2. loss in dry weight
3. no change in dry weight
4. increase in the overall weight

(xii) No urination due to shortage of water in the body is a typical symptom of
1. Typhoid
2. Malaria
3. Dysentery
4. Cholera

(xiii) World Health Day is celebrated on
1. August 29
2. January 30
3. April 7
4. May 8

(xiv) The headquarters of World Health Organisation are located at
1. Geneva
2. Berlin
3. Paris
4. New York

(xv) The most rapidly increasing and much harmful waste today is
1. Plastics
2. Pesticides
3. Municipal sewage
4. Electronic waste

Question 2

(i) **Name the following:** [5]

(a) A flower which contains all the four whorls
(b) A plant in which male and female flowers are present on the same plant
(c) The disease caused by HIV
(d) A condition of united sepals
(e) A cell organelle concerned with synthesis of proteins

(ii) **Arrange and rewrite the terms in each group in the correct order so as to be in a logical sequence beginning with the term that is underlined.** [5]

(a) Cervical, Lumbar, Sacrum, Thoracic, Coccyx
(b) Nostrils, Alveoli, Larynx, Pharynx, Bronchioles
(c) Pollen grain, Embryo sac, Stigma, Ovary, Pollen tube
(d) Pharynx, Oesophagus, Duodenum, Stomach, Rectum
(e) Cell wall, Cytoplasm, Nucleolus, Cell membrane, Nuclear membrane

(iii) **Match the items given in Column I with the most appropriate ones in Column II and rewrite the correct matching pairs.** [5]

Column I	Column II
(a) Penicillin	1. Animal cells
(b) Cell wall	2. Bryophyta
(c) Plants without roots, stem and leaves	3. Antibiotic
(d) Centrosome	4. Plant cells
(e) Moss	5. Thallophyta
	6. Pteridophyta
	7. Pain killer

(iv) **Choose the odd one out from the following terms and name the category to which the others belong:** [5]

(a) Yeast, Rhizopus, Mucor, Spirogyra
(b) Butterfly, Housefly, Ant, Crab
(c) Egg, Larva, Nymph, Pupa
(d) Beri-beri, Scurvy, Goitre, Mumps
(e) Mouth, Stomach, Liver, Small intestine

(v) **State one point of difference between each of the following pairs:** [5]

(a) Cold-blooded and warm-blooded animals
(b) Self-pollination and cross-pollination
(c) Snake and earthworm
(d) Infectious and non-infectious diseases
(e) Inspired air and expired air

SECTION B

(Attempt any four questions from this section.)

Question 3

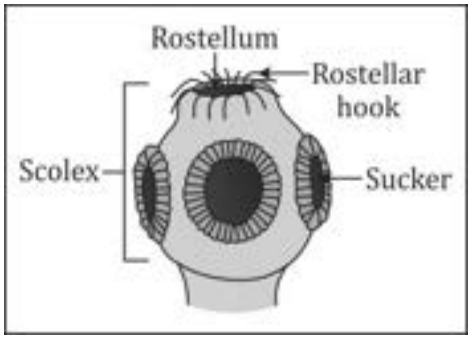
(i) Name two minerals present in the teeth. [1]

(ii) Name any one body part where ciliated epithelium is found in humans? What is its function? [2]

(iii) Mention any two contrivances in flowers which favour cross-pollination. [2]

(iv) Give any two differences between embryo and seed. [2]

(v) The given figure shows the head of an animal. [3]



(a) Name the animal.
(b) Is it a parasite or free-living?
(c) State the importance of suckers for the animal.

Question 4

(i) Give the scientific names of man, domestic cat, and peepal tree [1]
(ii) How does a muscle contract? [2]
(iii) Why is it generally advised that every living room in the house should get direct sunlight at least for a short time? [2]
(iv) What is the role of incisors and canines? [2]
(v) What are the end-products of the digestion of: starch, proteins and fats respectively? [3]

Question 5

(i) Name any two parts of your body where the supporting skeleton is made of cartilage instead of bone. [1]
(ii) An otherwise normal healthy young man started perspiring, while it was intensely cold outside. What could have been one reason for it? [2]
(iii) What is wrong in the statement "We breathe in oxygen and breathe out carbon dioxide"? [2]
(iv) Suggest any two methods of controlling flies. [2]
(v) Suppose a person develops the disease diphtheria. Comment upon the principle of the treatment he should receive. [3]

Question 6

(i) Name the causative germ of AIDS. How is this disease transmitted? [1]
(ii) State any two functions of Red Cross. [2]
(iii) Broken glass utensils are a kind of non-biodegradable waste. [2]
(iv) Give any two differences between organ and organelle. [2]
(v) Name the three kinds of muscles found in the human body. In each case, name one region in the body where they are found. [3]

Question 7

(i) The androecium of pea flower is diadelphous. Give reason. [1]
(ii) Draw the structure of a mitochondrion. [2]
(iii) Give any two examples each of endospermic (albuminous) seeds, and non-endospermic (exalbuminous) seeds. [2]
(iv) Explain why respiration is said to be the reverse of photosynthesis. Give any two reasons. [2]
(v) Why are scientific names of living beings considered better than their common names? [3]

Question 8

(i) In what respect do you consider bacteria as simple organisms? [1]

(ii) Where can the mold *Rhizopus* be most easily found? [2]

(iii) Taking the examples of whole grain *atta*, fruit and green leafy vegetables, describe how roughage in our diet is useful. (Any two points) [2]

(iv) Why is there no enzyme to digest vitamins? [2]

(v) Some people in old age complain of stiff joints. What do you think could be a possible reason for it? [3]

ICSE

CLASS 9

ENGLISH LITERATURE

MOCK PAPER 1

ICSE Board
Class 9 English Literature
Mock Paper – 1

Time: 3 Hours. **Total Marks: 80**

General Instructions:

Answers to this Paper must be written on the paper provided separately.
You will not be allowed to write during the first 10 minutes.
This time is to be spent reading the question paper.
The time given at the head of this Paper is the time allowed for writing the answers.
Attempt all questions. The intended marks for questions or parts of questions are given in brackets [ ].

SECTION A

Question 1.

Choose the correct options for the following questions:

i. What do the bangles symbolize?
(a) Joy and happiness in women's life
(b) Sound and cheerfulness
(c) Shape and colour of nature
(d) Women's identity in the house

ii. What does the line "and seeds and buds of days to be" indicate?
(a) The new blooming flowers
(b) The beginning of future
(c) Younger generation
(d) The new year

iii. To what are the bangles compared?
(a) Morning mist
(b) Flowering buds
(c) Newborn leaves
(d) All of the above

iv. Which of the following statements is not true about Maggie?
(a) She was well-behaved and well-mannered.
(b) Maggie was hopelessly diseased.
(c) Society believed her to be a burden.
(d) She always spoke to Mr. Thompson in a disrespectful manner.

v. The expression "cold within" means:
(a) Lack of feelings
(b) Lack of warm human spirit
(c) Low temperature of body and heat
(d) Feeling cold

vi. How did Mr. Oliver sense something was wrong in the story "A Face in the Dark"?
(a) The boy appeared to be crying
(b) The boy was dancing
(c) There was a strong wind
(d) The boy's head was held high

vii. Which type of poem is "Television" by Roald Dahl?
(a) Dramatic monologue
(b) Didactic poem
(c) Sonnet
(d) Ballad

viii. Muni was a _____
(a) Cattle grazer
(b) Landowner
(c) Farmer
(d) Shop keeper

ix. What does the poem "After Blenheim" tell us about Kaspar?
(a) He was a learned person and knew the reason for the war.
(b) He was an arrogant man who could not understand the implications of war.
(c) He was a soldier who was proud of his country's victory
(d) He was an old farmer who was unsure of his country's victory

x. With what did the chief Seattle compare the people of Washington?
(a) Birds
(b) Insects
(c) Trees
(d) Grass

xi. As Act II closes, what is the inscription on the casket that has yet to be tried?
(a) "Who chooseth me must give and hazard all he hath."
(b) "Who chooseth me shall gain what many men desire"
(c) "Who chooseth me shall get as much as he deserves."
(d) "Pick me! Pick me!"

xii. What word best describes how Portia feels about her fate as it relates to getting a husband?
(a) excited
(b) frustrated
(c) calm
(d) sad

xiii. What are the two primary reasons Shylock says he hates Antonio?
(a) Antonio has spit on him and helped Jessica run away with Lorenzo.
(b) Antonio helped Jessica run away with Lorenzo and he is a Christian.
(c) Antonio is a Christian and hinders his business by lending money at no interest.
(d) Antonio has spit on him and kicked him.

xiv. What does Shylock refer to many times during his conversation with Antonio and Bassanio?
(a) The Old Testament.
(b) His hatred of Christians.
(c) His love of the Jewish people.
(d) The present rates of interest.

xv. Who is referred to as the devil in the line "lest the devil crosses my prayer"?
(a) Shylock
(b) Antonio
(c) Tubal
(d) Bassanio

xvi. Why does Jessica say she is ashamed?
(a) she doesn't want to be seen with Christians
(b) she is dressed like a boy
(c) she is a girl going out at night
(d) she is running away from her father

SECTION B

(Answer one or more questions from this Section)

DRAMA

(The Merchant of Venice by William Shakespeare)

Question 2.

Read the extract given below and answer the questions that follow:

Why, look you, how you storm!
I would be friends with you and have your love,
Forget the shames that you have stain'd me with,
Supply your present wants, and take no do it
Of usance for my moneys, and you'll not hear me:
This is kind I offer,

i. Where does this scene take place? Who is the speaker? To whom is he talking? [3]

ii. What are the 'shames' which the speaker says have stained him? [3]

iii. What are the 'present wants'? Who is in need of the 'present wants'? Why? What offer does the speaker present in order to supply the 'present wants'? [3]

iv. Explain "This is kind I offer." What does the speaker propose to do immediately after this? [3]

v. What do you think of Antonio and Shylock with regard to the signing of the bond? [4]

Question 3.

Read the following extract and answer the questions that follow:
SHYLOCK: What says that fool of Hagar's offspring, ha?
JESSICA: His words were 'Farewell mistress;' nothing else.
SHYLOCK: The patch is kind enough, but a huge feeder;
Snail-slow in profit, and he sleeps by day
More than the wild-cat: drones hive not with me;
Therefore I part with him, and part with him
To one that would have him help to waste
His borrowed purse. Well, Jessica, go in;
Perhaps I will return immediately:
Do as I bid you; shut doors after you:
Fast bind, fast find;
A proverb never stale in thrifty mind.

Exit
JESSICA:
Farewell; and if my fortune be not crost,
I have a father, you a daughter, lost.

i. Who does Shylock refer to as "Hagar's offspring"? Why? [3]
ii. Did Jessica reply with the truth? Why? [3]
iii. What reason does Shylock give for parting with 'him'? [3]
iv. What does Shylock mean by "To one that would have him help to waste his borrowed purse"? [3]
v. What advice does Shylock give as he leaves the house? What is Jessica's reply? [4]

SECTION C

(Answer one or more questions from this Section.)

PROSE - SHORT STORIES

(Treasure Trove – A Collection of ICSE Poems and Short Stories)

Question 4.

Read the extract given below and answer the questions that follow:
"What are you doing out here, boy?" asked Mr. Oliver sharply, moving closer so that he could recognize the miscreant. But even as he approached the boy, Mr. Oliver sensed that something was wrong. The boy appeared to be crying.
(Face in the Dark- Ruskin Bond)

i. Who was Mr. Oliver? How did he usually spend his evenings? [3]
ii. Mention any three facts about the school at which he worked. [3]
iii. Where did Mr. Oliver find the boy? How could he tell that the boy was 'weeping'? What made Mr. Oliver feel uneasy? [3]
iv. What did Mr. Oliver see when the boy finally looked up? What was Mr. Oliver's immediate reaction? [3]
v. To whom does Mr. Oliver turn for help? What does he discover about this person? Mention any two effective methods that the author has used to create an eerie atmosphere in the story 'A Face in the Dark'. [4]

Question 5.

Read the extract given below and answer the questions that follow:

It was my business to cross the bridge, explore the bridgehead beyond and find out to what point the enemy had advanced. I did this and returned over the bridge. There were not so many carts now and very few people on foot, but the old man was still there.

(Old Man at the Bridge- Ernest Hemingway)

(i) Describe the old man seated near the bridge. [3]
(ii) Describe the scene at the bridge at the beginning of the story. [3]
(iii) What was the narrator's duty? [3]
(iv) Why did the old man have to leave his home? Why was he the last one to leave town? [3]
(v) How does Hemingway show us the effect of war on the lives of common people through the story of the Old Man at the Bridge? [4]

SECTION D

(Answer one or more questions from this Section)

POETRY

(Treasure Trove – A Collection of ICSE Poems and Short Stories)

Question 6.

Read the following extract and answer the questions that follow:
The third one sat in tattered clothes.
He gave his coat a hitch.
Why should his log be put to use
To warm the idle rich?

i. What do you know about the third man's position in life? [3]
ii. Who is he prejudiced against? [3]
iii. Explain his prejudice in general terms, as is common in society. [3]
iv. Compare and contrast the views of the third and fourth man in the poem. [3]
v. By withholding his log, what did this man achieve? Was the outcome favourable? [4]

Question 7.

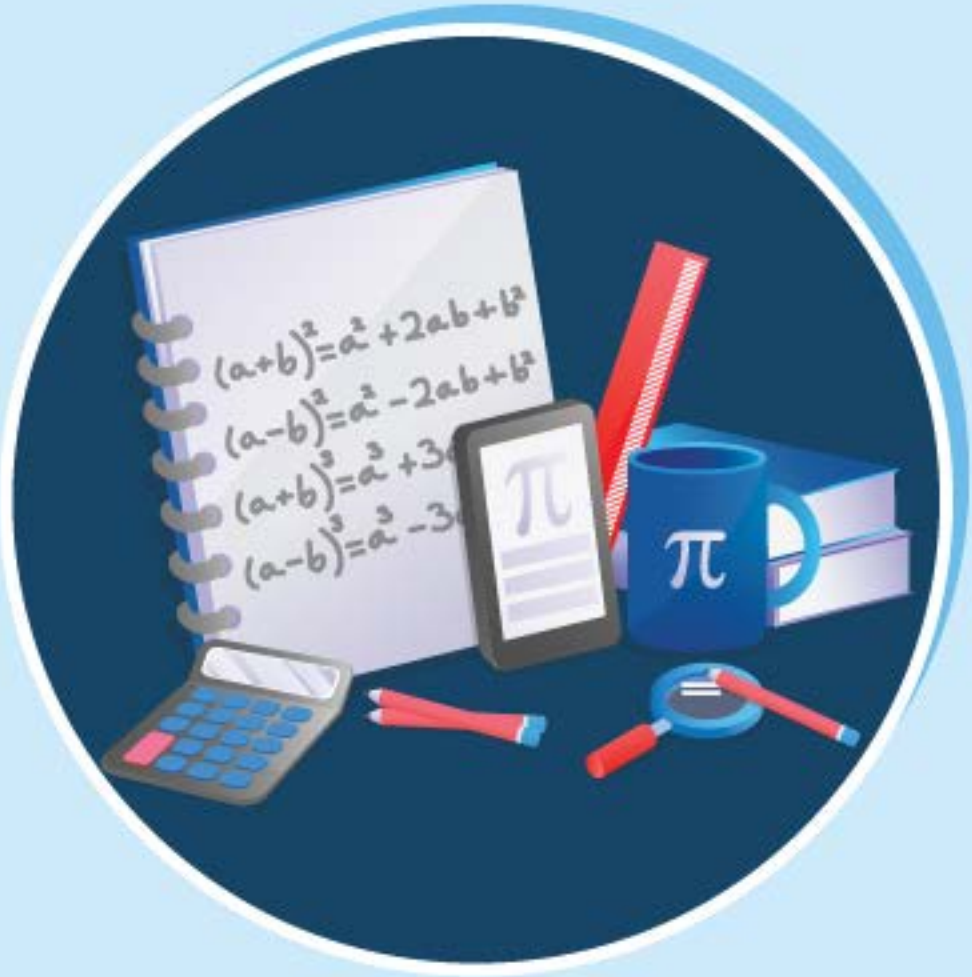
Read the following extract and answer the questions that follow:

Fear not, because we promise you
That, in about a week or two
Of having nothing else to do,
They'll now begin to feel the need
Of having something to read.
And once they start -- oh boy, oh boy!
You watch the slowly growing joy
That fills their hearts.
They'll grow so keen
They'll wonder what they'd ever seen
In that ridiculous machine,
That nauseating, foul, unclean,
Repulsive television screen!
And later, each and every kid
Will love you more for what you did.

i. What promise does the poet make? [3]
ii. What will children do when they have no TV? What changes will happen within them then? [3]
iii. What will the children wonder? Why? [3]
iv. According to the poet, why would the children love their parents even more? [3]
v. What does the poet advise parents to do? How will their children react initially? What the happy outcome is? [4]

ICSE

CLASS 9



MATHEMATICS

MOCK PAPER 1

SOLUTIONS

ICSE Board

Class 9 Maths

Mock Paper – 1

Section A

Solution 1

i)

Correct option: (b)

Explanation:

$\sqrt{23-7}+\sqrt{34+2}=\sqrt{16}+\sqrt{36}=4+6=10$, which is a rational number

ii)

Correct option: (c)

Explanation:

For the 1st year:

P = Rs. 20,000 and A = Rs. 22,400

I = A – P = 22400 – 20000 = Rs. 2400

$\Rightarrow$ Rate of interest p. a. = $\frac{I\times 100}{P\times T}\% = \frac{2400\times 100}{20000\times 1}\% = 12\%$

iii)

Correct option: (a)

Explanation:

Using the identity, $(x + a)(x + b) = x^2 + (a + b)x + ab$

$(x + 9)(x + 11) = x^2 + (9 + 11)x + (9\times 11) = x^2 + 20x + 99$

iv)

Correct option: (d)

Explanation:
$2a^2 + bc - 2ab - ac$
$= 2a^2 - 2ab - ac + bc$
$= 2a(a - b) - c(a - b)$
$= (2a - c)(a - b)$

v)

Correct option: (c)

Explanation:

At (15, 5)

$2x + y = 30 + 5 = 35$

$3x + 4y = 45 + 20 = 65$

∴ The ordered pair (15, 5) satisfies both the equations.

vi)

Correct option: (c)

Explanation:

$a^m \times a^n = a^{m+n}$

vii)

Correct option: (b)

Explanation:

AAA is not the congruency criteria because here all the corresponding angles are congruent but none of the corresponding sides are congruent.

viii)

Correct option: (c)

Explanation:

In ΔABC, $\angle C = 90^0$.

∴ By Pythagoras' theorem,

$\Rightarrow AB^2 = AC^2 + BC^2$

$\Rightarrow AB^2 = 6^2 + 8^2 = 36 + 64 = 100$

Taking the square root on both sides, we get

AB = 10 cm

ix)

Correct option: (d)

Explanation:

In ΔABC,

$\angle ABC + \angle BAC + \angle BCA = 180^o$

$\angle ABC = 180^o - 70^o$

$\angle ABC = 110^o$

We know that the angle subtended by an arc of a circle at its centre is twice the angle subtended by the same arc at a point on the circumference.

$\therefore \angle AOC = 2\ \angle ABC = 220^o$

x)

Correct option: (d)

Explanation:

When number of terms is odd, middle value becomes the median.

Since, number of terms = 9

So, the median = $[(9+1)/2]^{th}$ term = 5th term

xi)

Correct option: (c)

Explanation:

Class mark = (Upper class limit + Lower class limit)/2

= (40 + 30)/2

= 35

xii)

Correct option: (a)

Explanation:

Volume of a cone with radius r and height h is given by

$V = \frac{1}{3}\pi r^2 h$

Volume of a cylinder with radius r and height h is given by

$V_1 = \pi r^2 h$

$\therefore V = \frac{1}{3}V_1$

So, the volume of cone is equal to one third of the volume of a cylinder.

xiii)

Correct option: (b)

Explanation:

Since, cos θ = 1/sec θ = 12/13

Now, $\sin^2\theta + \cos^2\theta = 1$

$\Rightarrow \sin^2\theta = 1 - \cos^2\theta$

$\Rightarrow \sin^2\theta = 1 - 144/169$

$\Rightarrow \sin^2\theta = 25/144$

Taking square root on both the sides

$\Rightarrow \sin\theta = 5/12$

xiv)

Correct option: (a)

Explanation:

Two ordered pairs are equal.

So, their first components are equal and their second components are separately equal.

Since, (x – 1, y + 3) = (6, 6)

⇒ x – 1 = 6 and y + 3 = 6

⇒ x = 7 and y = 3

xv)

Correct option: (c)

Explanation:

$PQ = \sqrt{(5-9)^2 + (2-5)^2} = \sqrt{(-4)^2 + (-3)^2} = \sqrt{16+9} = \sqrt{25} = 5$ units

Solution 2

i)

Time = $1\frac{1}{2}$ years = 3 half years

For the first half year:

P = Rs. 64000, R = 15% and N = $\frac{1}{2}$ year

$$\text{Interest} = \frac{P \times R \times N}{100} = \frac{64000 \times 15 \times 1}{100 \times 2} = \text{Rs. } 4800$$

$\Rightarrow$ Amount at the end of the first half year = P + I = 64000 + 4800 = Rs. 68800
For the second half year:

P = Rs. 68800, R = 15% and N = $\frac{1}{2}$ year

$$\text{Interest} = \frac{P \times R \times N}{100} = \frac{68800 \times 15 \times 1}{100 \times 2} = \text{Rs. } 5160$$

Amount at the end of the second half year = P + I = 68800 + 5160 = Rs. 73960
For the third half year:

P = Rs. 73960, R = 15% and N = $\frac{1}{2}$ year

$$\text{Interest} = \frac{P \times R \times N}{100} = \frac{73960 \times 15 \times 1}{100 \times 2} = \text{Rs. } 5547$$

Amount at the end of the third half year = P + I = 73960 + 5547 = Rs. 79507

Compound interest for $1\frac{1}{2}$ years = Final amount – Initial principal

= 79507 – 64000

= Rs. 15507

ii)

$4x + \frac{6}{y} = 15$ ...(i)

$3x - \frac{4}{y} = 7$ ...(ii)

Multiplying (i) by 3 and (ii) by 4, we get

$12x + \frac{18}{y} = 45$ ...(iii)

$12x - \frac{16}{y} = 28$ ...(iv)

Subtracting (iv) from (iii), we get

$\frac{18}{y} + \frac{16}{y} = 45 - 28$

$\Rightarrow \frac{18+16}{y} = 17$

$\Rightarrow \frac{1}{y} = \frac{17}{34}$

$\Rightarrow y = 2$

Putting y = 2 in the equation (i), we get

$4x + \frac{6}{y} = 15$

$\Rightarrow 4x + \frac{6}{2} = 15$

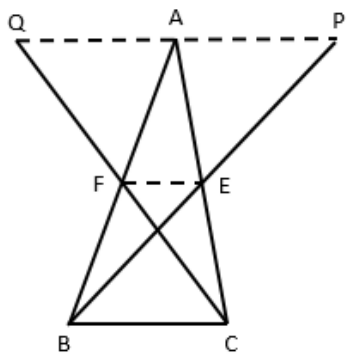
$\Rightarrow 4x + 3 = 15$

$\Rightarrow 4x = 12$

$\Rightarrow x = 3$

Hence, the solution is x = 3 and y = 2.

iii)



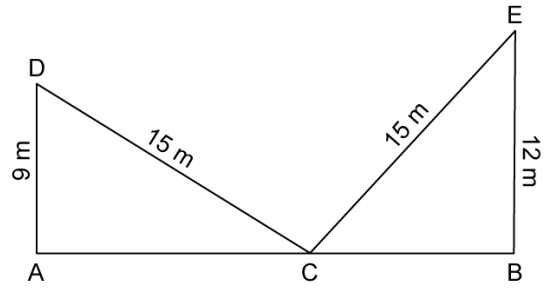
Given: EP = BE and FQ = CF, E and F are the mid-points of BP and CQ, respectively.
Construction: Join AP, AQ and FE.
In ΔABP, F is the mid-point of AB and E is the mid-point of BP; hence, FE || AP and FE = ½ AP.
In ΔACQ, E is the mid-point of AC and F is the mid-point of CQ; hence, FE || QA and FE = ½ QA.

A.
As FE || AP and FE || QA; hence, QA and AP lie along the same straight line.
Hence, Q, A and P are collinear.

B.
As FE = ½ AP and FE = ½ QA
$\Rightarrow$ ½ AP = ½ QA
$\Rightarrow$ AP = QA
$\Rightarrow$ A is the mid-point of QP.

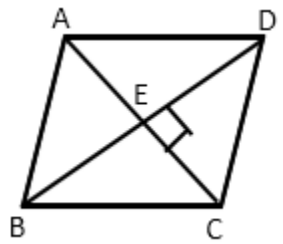
Solution 3

i)



In ΔACD, $\angle A = 90^0$
By Pythagoras' theorem, we get
$CD^2 = AD^2 + AC^2$
$\Rightarrow AC^2 = CD^2 - AD^2 = 15^2 - 9^2 = 225 - 81 = 144$
$\Rightarrow AC^2 = 144$
Taking the square root on both sides, we get
AC = 12 m
Similarly, in ΔBCE, $\angle B = 90^0$
By Pythagoras' theorem, we get
$CE^2 = BC^2 + BE^2$
$\Rightarrow BC^2 = CE^2 - BE^2 = 15^2 - 12^2 = 225 - 144 = 81$
$\Rightarrow BC^2 = 81$
Taking the square root on both sides, we get
BC = 9 m
Width of the street = AB = AC + BC = 12 + 9 = 21 m

ii)



ABCD is the given quadrilateral whose diagonal AC = 10 cm and diagonal BD = 24 cm.

Diagonals bisect each other at right angles at point E.

∴ BE = ½ BD = ½ (24) = 12 cm

∴ CE = ½ AC = ½ (10) = 5 cm

In right-angled triangle BEC,

$BC^2 = BE^2 + CE^2$

$\therefore BC^2 = 12^2 + 5^2$

$\therefore BC^2 = 144 + 25$

$\therefore BC^2 = 169$

∴ BC = 13 cm

∴ Length of each side of the quadrilateral = 13 cm

∴ Since the diagonals bisect each other at right angles and AB = BC = CD = AD = 13 cm

Therefore, it is a rhombus.

iii)

A.

$x^3 + 3x^2 + 3x - 7$

$= (x^3 + 3x^2 + 3x + 1) - 8$

$= (x + 1)^3 - (2)^3$

$= [(x + 1) - 2][(x + 1)^2 + 2(x + 1) + 2^2]$

$= (x - 1)(x^2 + 2x + 1 + 2x + 2 + 4)$

$= (x - 1)(x^2 + 4x + 7)$

B.

$[(674)^2 - (326)^2]$

$= (674 + 326)(674 - 326)$ since $a^2 - b^2 = (a + b)(a - b)$

$= 1000 \times 348$

$= 348000$

Section B

Solution 4

i)

We know that $x^2+y^2 = x+y\ ^2-2xy$ .....(i)

$$x+y=\frac{1}{5+2\sqrt{6}}+\frac{1}{5-2\sqrt{6}}$$

$$=\frac{5-2\sqrt{6}\ +\ 5+2\sqrt{6}}{5+2\sqrt{6}\ \ 5-2\sqrt{6}}$$

$$=\frac{10}{25-24}$$

$$=10$$

$$xy=\frac{1}{5+2\sqrt{6}}\times\frac{1}{5-2\sqrt{6}}$$

$$=\frac{1}{25-24}$$

$$=1$$

Sustituting the values in (i), we get

$$x^2+y^2 = x+y\ ^2-2xy=100-2=98$$

ii)

For the 1st year:

P = 4000, R = 10% and N = 1

$$I=\frac{P\times R\times N}{100}=\frac{4000\times 10\times 1}{100}=400$$

Amount = P + I = 4000 + 400 = Rs. 4400

For the 2nd year:

P = 4000 + 4400 = 8400, R = 10% and N = 1

$$I=\frac{P\times R\times N}{100}=\frac{8400\times 10\times 1}{100}=840$$

Amount = P + I = 8400 + 840 = Rs. 9240

For the 3rd year:

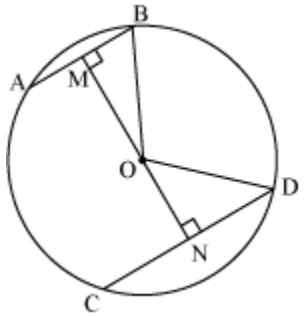
P = 4000 + 9240 = 13240, R = 10% and N = 1

$$I = \frac{P \times R \times N}{100} = \frac{13240 \times 10 \times 1}{100} = 1324$$

Amount = P + I = 13240 + 1324 = Rs. 14564

iii)

Draw OM ⊥ AB and ON ⊥ CD. Join OB and OD



$$BM = \frac{AB}{2} = \frac{5}{2}$$ (Perpendicular from the centre bisects the chord)

$$ND = \frac{CD}{2} = \frac{11}{2}$$

Let ON be *x*, so OM will be 6 – *x*

In ΔMOB,

$$OM^2 + MB^2 = OB^2$$

$$(6-x)^2 + \left(\frac{5}{2}\right)^2 = OB^2$$

$$36 + x^2 - 12x + \frac{25}{4} = OB^2 \text{ ..... } (1)$$

In ΔNOD,

$$ON^2 + ND^2 = OD^2$$

$$x^2 + \left(\frac{11}{2}\right)^2 = OD^2$$

$$x^2 + \frac{121}{4} = OD^2 \text{ ..... } (2)$$

We have OB = OD (radii of the same circle)

So, from equations (1) and (2),

$$36+x^2-12x+\frac{25}{4}=x^2+\frac{121}{4}$$

$$12x=36+\frac{25}{4}-\frac{121}{4}$$

$$=\frac{144+25-121}{4}$$

$$=\frac{48}{4}=12$$

$$\Rightarrow x=1$$

From equation (2),

$$(1)^2+\left(\frac{121}{4}\right)=OD^2$$

$$OD^2=1+\frac{121}{4}=\frac{125}{4}$$

$$OD = \frac{5}{2}\sqrt{5}$$

So, the radius of the circle is $\frac{5}{2}\sqrt{5}$ cm.

Solution 5

i)

We know that $(x+y)^2 = x^2 + y^2 + 2xy$

Here, x = 3a and b = 4b

$$\therefore (3a+4b)^2=(3a)^2+(4b)^2+2\times 3a\times 4b$$

$$=9a^2+16b^2+24ab$$

$$\Rightarrow 9a^2+16b^2+24ab=(3a+4b)^2$$

$$\Rightarrow 9a^2+16b^2=(3a+4b)^2-24ab$$

$$=(16)^2-24\times 4$$

$$=256-96=160$$

ii)

$4(2a - 3)^2 - 3(2a - 3)(a - 1) - 7(a - 1)^2$

Putting $(2a - 3) = x$ and $(a - 1) = y$,

$4x^2 - 3xy - 7y^2$

$= 4x^2 + 4xy - 7xy - 7y^2$

$= 4x(x + y) - 7y(x + y)$

$= (x + y)(4x - 7y)$

$= [(2a - 3) + (a - 1)]\,[4(2a - 3) - 7(a - 1)]$

$= (3a - 4)(8a - 12 - 7a + 7)$

$= (3a - 4)(a - 5)$

iii)

Here, mean of 9 observations = 35

We know that

$$\text{Mean} = \frac{\text{sum of all the observations}}{\text{number of observations}}$$

$\Rightarrow$ Sum of all the observations = Mean × number of observations

$= 35 \times 9$

$= 315$

It was detected that an observation 81 was misread as 18.

$\Rightarrow$ Sum of all the observations (correct value) = 315 – 18 + 81 = 378

$$\therefore \text{Correct mean} = \frac{\text{sum of all the observations(Correct value)}}{\text{number of observations}}$$

$$= \frac{378}{9}$$

$= 42$

Therefore, the correct mean is 42.

Solution 6

i)

Comparing $a_1x + b_1y + c_1 = 0$ with $2x - 5y + 8 = 0$ and $a_2x + b_2y + c_2 = 0$ with $x - 4y + 7 = 0$, we get

$\therefore a_1 = 2, b_1 = -5, c_1 = 8$ and $a_2 = 1, b_2 = -4, c_2 = 7$

We know that,

$$\frac{x}{b_1c_2 - b_2c_1} = \frac{y}{c_1a_2 - c_2a_1} = \frac{1}{a_1b_2 - a_2b_1}$$

$$\Rightarrow x = \frac{b_1c_2 - b_2c_1}{a_1b_2 - a_2b_1} \text{ and } y = \frac{c_1a_2 - c_2a_1}{a_1b_2 - a_2b_1}$$

Substituting the values, we get

$$\Rightarrow x = \frac{(-5)\times 7 - (-4)\times 8}{2\times(-4) - 1\times(-5)} \text{ and}$$

$$y = \frac{8\times 1 - 7\times 2}{2\times(-4) - 1\times(-5)}$$

$$\Rightarrow x = \frac{-35 + 32}{-8 + 5} \text{ and } y = \frac{8 - 14}{-8 + 5}$$

$$\Rightarrow x = \frac{-3}{-3} \text{ and } y = \frac{-6}{-3}$$

$$\Rightarrow x = 1 \text{ and } y = 2$$

Hence, the solution is x = 1 and y = 2.

ii)

$$\frac{5^{n+3} - 6\times 5^{n+1}}{9\times 5^n - 2^2\times 5^n}$$

$$= \frac{5^n \times 5^3 - 6\times 5^n \times 5^1}{9\times 5^n - 2^2\times 5^n}$$

$$= \frac{5^n \times 5(5^2 - 6)}{5^n(9 - 2^2)}$$

$$= \frac{5(5^2 - 6)}{9 - 4}$$

$$= \frac{5(5^2 - 6)}{5}$$

$$= 25 - 6$$

$$= 19$$

iii) The given frequency distribution is as below:

Age (in years)	10–20	20–30	30–40	40–50	50–60	60–70
Number of patients	2	5	12	19	9	4

STEPS:

1. Find the class mark (mid-value) of each of the given class intervals.
2. The class mark of a class interval = $\frac{\text{lower limit+ upper limit}}{2}$

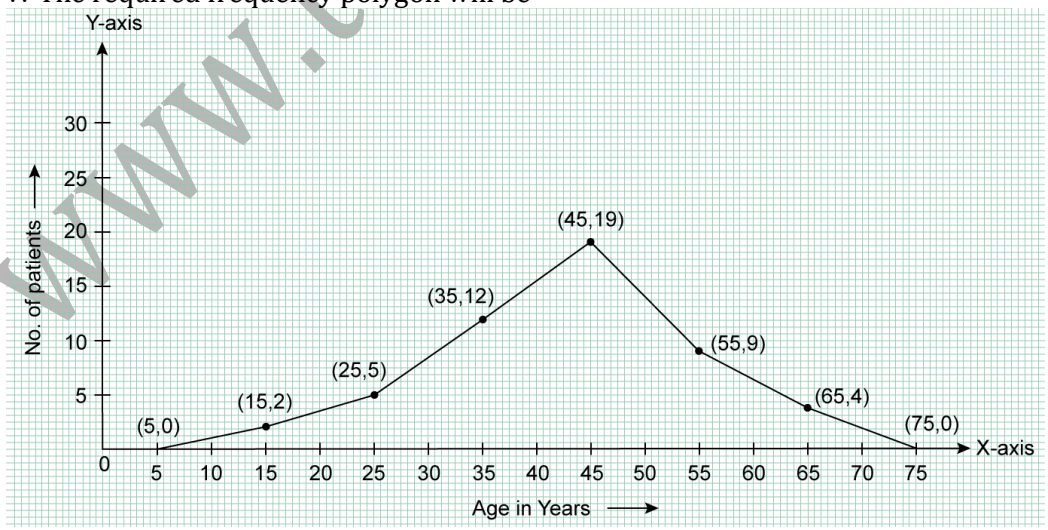
The frequency distribution table with class marks is given below:

Class Intervals	Class Marks	Frequency
0–10	5	0
10–20	15	2
20–30	25	5
30–40	35	12
40–50	45	19
50–60	55	9
60–70	65	4
70–80	75	0

3. In the above table, we have taken imaginary class intervals 0–10 at beginning and 70–80 at the end, each with frequency zero.
4. On a graph paper, take class marks along the x-axis and the corresponding frequencies along the y-axis.
5. On this graph paper, plot the points (5, 0), (15, 2) … (65, 4) and (75, 0).
6. Draw line segments joining the consecutive points marked in step (5).

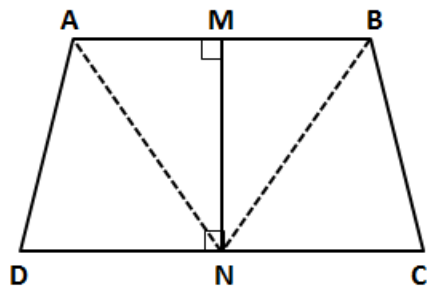
Note: Join the class mark of the class interval just before the first class and the class mark of the class interval just after the last class. This completes the required **Frequency Polygon**.

∴ The required frequency polygon will be



Solution 7

i) Construction: Join AN and BN.



In ΔANM and ΔBNM,
AM = BM (M is the mid-point of AB)
∠AMN = ∠BMN (Each 90°)
MN = MN (common)
∴ ΔANM ≅ ΔBNM (by SAS congruence)
⇒ AN = BN (c.p.c.t.) ... (i)
And ∠ANM = ∠BNM (c.p.c.t.)
⇒ 90° – ∠ANM = 90° – ∠BNM
⇒ ∠AND = ∠BNC ... (ii)
In ΔAND and ΔBNC,
AN = BN [From (i)]
∠AND = ∠BNC [From (ii)]
DN = CN (N is the mid-point of DC)
∴ ΔAND ≅ ΔBNC (by SAS congruence)
⇒ AD = BC (c.p.c.t.)

ii)

Given: P, Q, R and S are the mid-points of the sides AB, BC, CD and DA, respectively, of quadrilateral ABCD.

To prove: PQRS is a parallelogram.

Construction: Join BD

Proof:

In ΔABD,

PS || BD and PS = ½ BD (i)∵ mid-point theorem

In ΔBCD,

QR || BD and QR = ½ BD (ii) ∵ mid-point theorem

⇒ PS || QR and PS = QR from (i) and (ii)

⇒ PQRS is a parallelogram.

iii)

One side of a triangular field $= 85$ m

Second side of a triangular field $= 154$ m

Let the third side of a triangular field be x m

Perimeter = 324 m

$\therefore \quad 85\text{m} + 154\text{m} + x\text{m} = 324$ m

$\Rightarrow x = 324 - 239 \Rightarrow x = 85$ m

$\therefore$ The third side $= 85$ m

Let $a = 85$ m, $b = 154$ m and $c = 85$ m

Now, semiperimeter $(S) = \frac{1}{2}(a+b+c)$

$$= \left(\frac{85+154+85}{2}\right)$$

$$= \frac{324}{2} = 162 \text{ m}$$

$\therefore$ area of the triangle $= \sqrt{S(S-a)(S-b)(S-c)}$

$$= \sqrt{162(162-85)(162-154)(162-85)}$$

$$= \sqrt{162 \times 77 \times 8 \times 77}$$

$$= \sqrt{2 \times 9 \times 9 \times 7 \times 11 \times 2 \times 2 \times 2 \times 7 \times 11}$$

$$= \sqrt{11 \times 11 \times 9 \times 9 \times 7 \times 7 \times 2 \times 2 \times 2 \times 2}$$

$$= 11 \times 9 \times 7 \times 2 \times 2 = 2772 \text{ m}^2$$

$\therefore$ area of triangle $= 2772 \text{ m}^2$

Also, area of triangle $= \frac{1}{2} \times \text{base} \times \text{height}$

$$2772 = \frac{1}{2} \times 154 \times h = 77h$$

$\therefore \quad 77h = 2772$

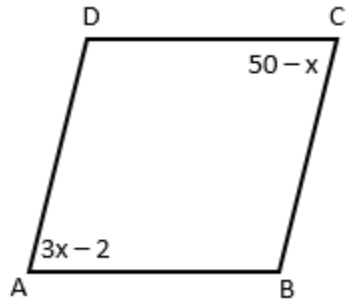
$\therefore \quad h = \frac{2772}{77} = 36$ m

Therefore, the length of the perpendicular from the opposite vertex to the side measuring 154 m is 36 m.

Solution 8

i)

ABCD is a parallelogram.



$\angle A = \angle C$ $\because$ Opposite angles of a parallelogram

$\Rightarrow 3x - 2 = 50 - x$

$\Rightarrow 4x = 52$

$\Rightarrow x = 13$

$\therefore$ The opposite angles are $\angle A = 3x - 2 = 37^\circ$ and $\angle C = 50 - x = 37^\circ$

$\angle A + \angle B = 180^\circ$ $\because$ Adjacent angles of a parallelogram are supplementary

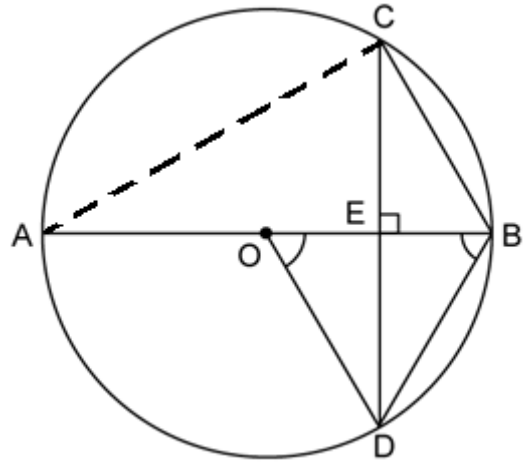
$\Rightarrow 37^\circ + \angle B = 180^\circ$

$\Rightarrow \angle B = 143^\circ$

Hence, the angles of a parallelogram are $37^\circ, 143^\circ, 37^\circ, 143^\circ$.

ii)

Construction: Join AC



Given, BD = OD

Now, OD = OB (radii of the same circle)

$\Rightarrow$ BD = OD = OB

$\Rightarrow \Delta ODB$ is an equilateral triangle.

$\Rightarrow \angle ODB = 60°$

We know that the altitude of an equilateral triangle bisects the vertical angle.

$$\Rightarrow \angle BDE = \angle ODE = \frac{1}{2}\angle ODB = \frac{1}{2} \times 60° = 30°$$

Now, $\angle CAB = \angle BDC$ (angles in the same segment)$\Rightarrow \angle CAB = \angle BDE = 30°$

iii)

Length (l_1) of the godown = 40 m

Breadth (b_1) of the godown = 25 m

Height (h_1) of the godown = 10 m

Volume of godown = $l_1 \times b_1 \times h_1$ = (40 × 25 × 10) m^3 = 10000 m^3

Length (l_2) of a wooden crate = 1.5 m

Breadth (b_2) of a wooden crate = 1.25 m

Height (h_2) of a wooden crate = 0.5 m

Volume of a wooden crate = $l_2 \times b_2 \times h_2$ = (1.5 × 1.25 × 0.5) m^3 = 0.9375 m^3

Let n wooden crates be stored in the godown.

Volume of n wooden crates = volume of the godown

0.9375 × n = 10000

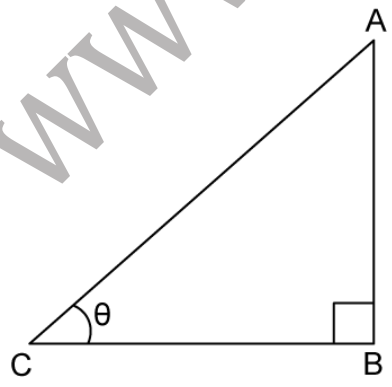
$$n = \frac{10000}{0.9375} = 10666.66$$

Thus, 10666 wooden crates can be stored in the godown.

Solution 9

i)

Let us consider a right-angled triangle ΔABC right-angled at point B.



$$\cot\theta = \frac{\text{Side adjacent to } \angle\theta}{\text{Side opposite to } \angle\theta} = \frac{BC}{AB}$$

$$= \frac{7}{8}$$

If BC is 7 K, AB will be 8 K, where K is a positive integer.

Now applying Pythagoras' theorem in ΔABC,

$AC^2 = AB^2 + BC^2$

$= (8\ K)^2 + (7\ K)^2$

$= 64\ K^2 + 49\ K^2$

$= 113\ K^2$

$\therefore AC = \sqrt{113}\ K$

$$\sin\theta = \frac{\text{Side opposite to } \theta}{\text{hypotenuse}} = \frac{AB}{AC}$$

$$= \frac{8K}{\sqrt{113}K} = \frac{8}{\sqrt{113}}$$

$$\cos\theta = \frac{\text{Side adjacent to } \theta}{\text{hypotenuse}} = \frac{BC}{AC}$$

$$= \frac{7K}{\sqrt{113}\ K} = \frac{7}{\sqrt{113}}$$

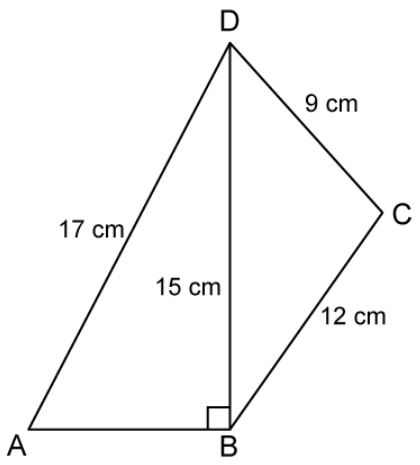
A. $$\frac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)} = \frac{(1-\sin^2\theta)}{(1-\cos^2\theta)}$$

$$= \frac{1-\left(\frac{8}{\sqrt{113}}\right)^2}{1-\left(\frac{7}{\sqrt{113}}\right)^2} = \frac{1-\frac{64}{113}}{1-\frac{49}{113}}$$

$$= \frac{\frac{49}{113}}{\frac{64}{113}} = \frac{49}{64}$$

B. $\tan^2\theta = \left(\frac{1}{\cot\theta}\right)^2 = \left(\frac{8}{7}\right)^2 = \frac{64}{49}$

ii)



In ΔABD, by Pythagoras' theorem,

$AB^2 = AD^2 - BD^2 = 17^2 - 15^2 = 289 - 225 = 64\ cm^2$

$\Rightarrow AB = 8$ cm

$\therefore$ Perimeter of quadrilateral ABCD = AB + BC + CD + AD

= 8 + 12 + 9 + 17

= 46 cm

Now,

$$A(\Delta ABD) = \frac{1}{2} \times AB \times BD = \frac{1}{2} \times 8 \times 15 = 60\ cm^2$$

In ΔBCD, BC = 12 cm, CD = 9 cm and BD = 15 cm

Let a = 12 cm, b = 9 cm and c = 15 cm

$$\text{Semi-perimeter, } s = \frac{a+b+c}{2} = \frac{12+9+15}{2}$$

$$= \frac{36}{2} = 18 \text{ cm}$$

$$\therefore \text{ Area of } \Delta BCD = \sqrt{s(s-a)(s-b)(s-c)}$$

$$= \sqrt{18(18-12)(18-9)(18-15)}$$

$$= \sqrt{18 \times 6 \times 9 \times 3}$$

$$= \sqrt{6 \times 3 \times 6 \times 9 \times 3}$$

$$= 6 \times 3 \times 3$$

$$= 54\ cm^2$$

Thus, the area of quadrilateral ABCD = A(ΔABD) + A(ΔBCD)

$= (60 + 54)\ cm^2 = 114\ cm^2$

Solution 10

i)

External length of the cistern = 1.35 m = 135 cm

External breadth of the cistern = 1.08 m =108 cm

External height of the cistern = 90cm

∴ External volume of the cistern = (135 × 108 × 90) cm^3

= 1312200 cm^3

Internal length of the cistern = (135 – 2 × 2.5) cm

= (135 - 5) cm = 130 cm

Internal breadth of the cistern = (108 – 2 × 2.5) cm

= (108 – 5) cm = 103 cm

Internal height of the cistern = (90 – 2.5) cm = 87.5 cm

∴ Capacity of the cistern = Internal volume of the cistern

= (130 × 103 × 87.5) cm^3

= 1171625 cm^3

Volume of the iron used = External volume of the cistern – Internal volume of the cistern

= (1312200 – 1171625) cm^3

= 140575 cm^3

ii)

Let the points be A(1, –1), B(5, 2) and C(9, 5).

Distance between the given points $=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$AB=\sqrt{(5-1)^2+(2+1)^2}=\sqrt{16+9}=\sqrt{25}=5$ units

$BC=\sqrt{(9-5)^2+(5-2)^2}=\sqrt{16+9}=\sqrt{25}=5$ units

$AC=\sqrt{(9-1)^2+(5+1)^2}=\sqrt{64+36}=\sqrt{100}=10$ units

Here, AB + BC = 5 + 5 = 10 = AC

⇒ The points A(1, –1), B(5, 2) and C(9, 5) are collinear.

iii)

A. x – y + 1 = 0

⇒ x = y – 1

When x = 0 ⇒ y = 1

When x = 1 $\Rightarrow$ y = 2

When x = 2 $\Rightarrow$ y = 3

X	0	1	2
Y	1	2	3

i. Plot the points (0, 1), (1, 2) and (2, 3).

ii. Draw a straight line AB passing through the plotted points.

B. 3x + 2y – 12 = 0 $\Rightarrow$ $x = \frac{12-2y}{3}$

When x = 0,

$\Rightarrow 0 = \frac{12-2y}{3}$

$\Rightarrow 2y = 12$

$\Rightarrow y = 6$

When y = 0,

$\Rightarrow x = \frac{12-2(0)}{3} = \frac{12}{3} = 4$

When x = 2,

$\Rightarrow 2 = \frac{12-2y}{3}$

$\Rightarrow 2y = 6$

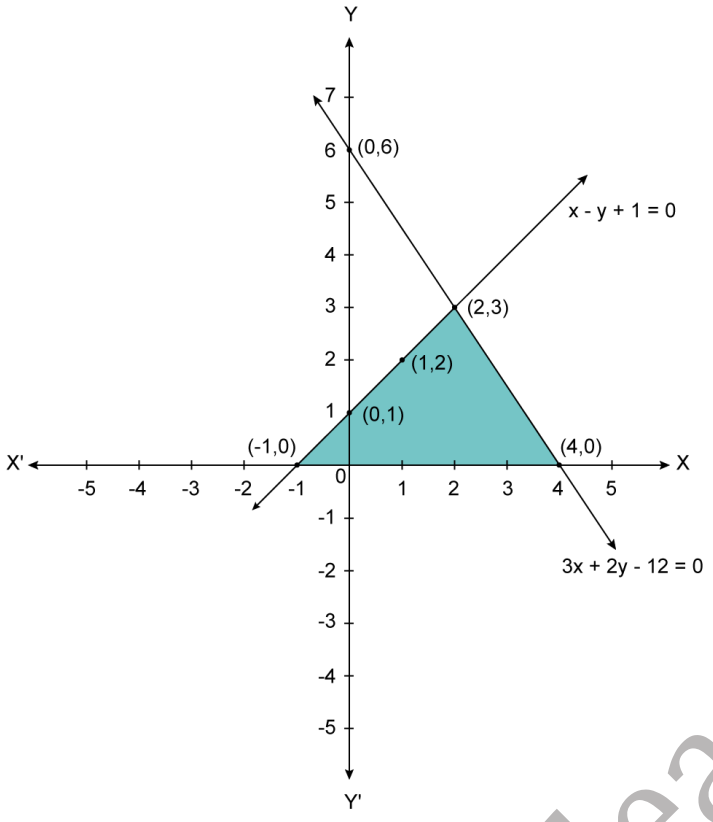
$\Rightarrow y = 3$

X	0	4	2
Y	6	0	3

i. Plot the points (0, 6), (4, 0) and (2, 3).

ii. Draw a straight line CD passing through the plotted points.

The triangle formed by the two lines and the x-axis can be shown by the shaded part as



From the graph, it can be observed that the co-ordinates of the vertices of the triangle so formed are (2, 3), (–1, 0), and (4, 0).

ICSE

CLASS 9

MATHEMATICS

MOCK PAPER 2

SOLUTIONS

ICSE Board
Class 9 Mathematics
Mock Paper – 2

Section A

Solution 1

i) Correct option: (a)

Explanation:

$(3+\sqrt{3})(3-\sqrt{3}) = 9 - 3 = 6$, which is a rational number.

ii) Correct option: (b)

Explanation:

$$\text{Amount} = P\left(1+\frac{R}{100}\right)^n$$
$$= 10000\left(1+\frac{8}{100}\right)^1$$
$$= \text{Rs. } 10800$$

iii) Correct option: (c)

Explanation:

Given: $a - b = 1$ and $ab = 6$

Now, $(a + b)^2 = a^2 + b^2 + 2ab = (a - b)^2 + 4ab = 1 + 24 = 25$

Therefore, $a + b = 5$

iv) Correct option: (a)

Explanation:

$3ax - 6ay - 8by + 4bx$

$= 3a(x - 2y) + 4b(x - 2y)$

$= (x - 2y)(3a + 4b)$

So, the factors are $(x - 2y)$ and $(3a + 4b)$.

v) Correct option: (a)

Explanation:

Let the cost of one pen be Rs. x and the cost of one pencil be Rs. y.

The first situation can be represented as

$11x + 19y = 502$

The second situation can be represented as

$19x + 11y = 758$

vi) Correct option: (d)
Explanation:
$(81)^x = 3^{12}$
$(3^4)^x = 3^{12}$
$3^{4x} = 3^{12}$
$\Rightarrow 4x = 12$
$\Rightarrow x = 3$

vii) Correct option: (d)
Explanation:
For two congruent triangles, all its corresponding parts are equal.

viii) Correct option: (c)
Explanation:
Here, $4^2 + 7^2 = 16 + 49 = 65$
But $9^2 = 81 \neq 65$
Hypotenuse is the longest side.
So, the sides measuring 4 cm, 7 cm, 9 cm does not form a right angled triangle.

ix) Correct option: (c)
Explanation:
Given: AB = 8 cm, CD = 6 cm
Since, the perpendicular from the centre of a circle to a chord bisects the chord.
$\Rightarrow$ LB = ½ AB = 4 cm

x) Correct option: (d)
Explanation:
Arranging in ascending order: 1, 2, 3, 4, 5, 7, 9
So, the median = 4

xi) Correct option: (c)
Explanation:
Class mark = (Upper class limit + Lower class limit)/2 = (60 + 70)/2 = 65

xii) Correct option: (d)
Explanation:
Cost of the sheet of area 1 m^2 = Rs. 20
Cost of the sheet of area 5.45 m^2 = Rs. (5.45 × 20) = Rs. 109
So, the cost of making the box of area 5.45 m^2 is Rs. 109.

xiii) Correct option: (b)
Explanation:
We know that, sec $(90^o - x)$ = cosec x
$\Rightarrow$ cosec x = 2
$\Rightarrow$ cosec x = cosec 30°
$\Rightarrow x = 30^o$

xiv) Correct option: (d)
Explanation:
When two ordered pairs are equal, their first components are equal and their second components are separately equal.
Since, $(3x + 1, 2y - 7) = (10, -11) \Rightarrow 3x + 1 = 10$ and $2y - 7 = -11$
$\Rightarrow 3x = 9$ and $2y = -4$
$\Rightarrow x = 3$ and $y = -2$

xv) Correct option: (b)
Explanation:
$AB = \sqrt{(9-(-6))^2 + (-12-(-4))^2} = \sqrt{(15)^2 + (-8)^2} = \sqrt{225 + 64} = \sqrt{289} = 17$ units

Solution 2
i) Here, $n = 2$ years, $R = 12\%$ and $CI - SI = 216$

$$\text{Compound interest} = P\left(1 + \frac{R}{100}\right)^n - P$$

$$= P\left[\left(1 + \frac{R}{100}\right)^n - 1\right]$$

$$= P\left[\left(1 + \frac{12}{100}\right)^2 - 1\right]$$

$$= P\left[\left(\frac{112}{100}\right)^2 - 1\right]$$

$$= \frac{2544P}{10000} \quad \text{... (i)}$$

$$\text{Simple interest} = \frac{P \times R \times N}{100} = \frac{P \times 12 \times 2}{100} = \frac{24P}{100} \quad \text{...(ii)}$$

$CI - SI = 216$ ... (given)

$$\frac{2544P}{10000} - \frac{24P}{100} = 216 \quad \text{... from (i) and (ii)}$$

$$\Rightarrow \frac{2544P - 2400P}{10000} = 216$$

$$\Rightarrow \frac{144P}{10000} = 216$$

$\Rightarrow P = 15000$

ii)

$$\frac{3}{4}x - \frac{2}{3}y = 1$$

$$\Rightarrow \frac{9x - 8y}{12} = 1$$

$$\Rightarrow 9x - 8y = 12$$

$$\Rightarrow x = \frac{12 + 8y}{9} \qquad .....(i)$$

$$\frac{3}{8}x - \frac{1}{6}y = 1$$

$$\Rightarrow \frac{18x - 8y}{48} = 1$$

$$\Rightarrow 18x - 8y = 48 \quad .....(ii)$$

Putting the value of x from (i) in equation (ii), we get

$$18x - 8y = 48$$

$$\Rightarrow 18\left(\frac{12 + 8y}{9}\right) - 8y = 48$$

$$\Rightarrow 2(12 + 8y) - 8y = 48$$

$$\Rightarrow 24 + 16y - 8y = 48$$

$$\Rightarrow 8y = 24$$

$$\Rightarrow y = 3$$

Put $y = 3$ in the equation (i), we get

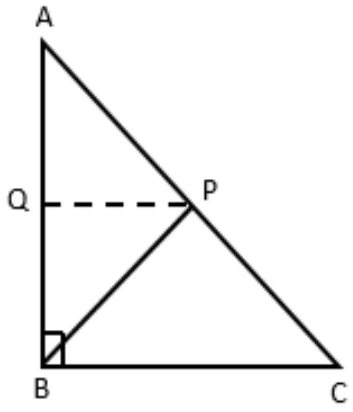
$$x = \frac{12 + 8y}{9}$$

$$\Rightarrow x = \frac{12 + 8 \times 3}{9}$$

$$\Rightarrow x = \frac{36}{9} = 4$$

Hence, the solution is $x = 4$ and $y = 3$.

iii) Given: In ΔABC, $\angle B = 90^\circ$ and P is the mid-point of AC.
To prove: BP = ½ AC
Construction: Draw a straight line parallel to BC through P to meet AB in Q.



Proof:
PQ || BC
P is the mid-point of AC.
$\Rightarrow$ Q bisects AB
In ΔAQP and ΔBQP,

$AQ = QB$	$\because$ Q is the mid-point of AB
$\angle AQP = \angle BQP = 90^\circ$	$\because$ BC is perpendicular to AB and QP || BC; hence, QP is perpendicular to AB
$QP = QP$	$\because$ common
$\Rightarrow \Delta AQP \cong \Delta BQP$	$\because$ SAS
$\Rightarrow BP = AP$	$\because$ c.p.c.t.
$\Rightarrow BP = ½ AC$	$\because$ P is the mid-point of AC

Solution 3

i) In ΔABC, $\angle ACB = 90^0$
By Pythagoras' theorem, we get
$AB^2 = AC^2 + BC^2$
$\Rightarrow c^2 = b^2 + a^2$ ... (i)
Since CD is perpendicular to AB,
$\Rightarrow$ Area of a $\Delta ABC = \frac{1}{2} \times AB \times CD$ ... (ii)
Since $\angle ACB = 90^0$,
$\Rightarrow$ Area of $\Delta ABC = \frac{1}{2} \times BC \times AC$ ... (iii)
From (ii) and (iii), we get

$$\frac{1}{2} \times AB \times CD = \frac{1}{2} \times BC \times AC$$

$$\Rightarrow \frac{1}{2} cp = \frac{1}{2} ab$$

$$\Rightarrow c = \frac{ab}{p}$$

Substituting the value of c in equation (i), we get
$c^2 = b^2 + a^2$

$$\Rightarrow \left(\frac{ab}{p}\right)^2 = b^2 + a^2$$

$$\Rightarrow \frac{1}{p^2} = \frac{b^2 + a^2}{a^2b^2}$$

$$\Rightarrow \frac{1}{p^2} = \frac{b^2}{a^2b^2} + \frac{a^2}{a^2b^2}$$

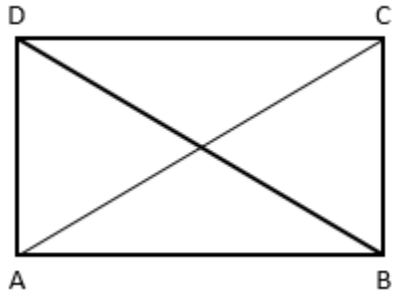
$$\Rightarrow \frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$$

Hence proved.

ii)

Given: Parallelogram ABCD, AC = BD

To prove: $\angle A = 90^\circ$



Proof:

In ΔABC and ΔBAD,

$AB = AB$	Common
$BC = AD$	$\because$ Opposite sides of parallelogram
$AC = BD$	given
$\Rightarrow \Delta ABC \cong \Delta BAD$	$\because$ SSS congruence
$\Rightarrow \angle B = \angle A$	(i) $\because$ c.p.c.t.
$\angle B + \angle A = 180^\circ$	(ii) $\because$ Co-interior angles
$\Rightarrow 2\angle A = 180^\circ$	from (i) and (ii)
$\Rightarrow \angle A = 90^\circ$	

iii)

A.

$$\frac{6.67 \times 6.67 \times 6.67 + 5.33 \times 5.33 \times 5.33}{6.67 \times 6.67 - 6.67 \times 5.33 + 5.33 \times 5.33}$$

$$= \frac{(6.67)^3 + (5.33)^3}{(6.67)^2 - 6.67 \times 5.33 + (5.33)^2}$$

Since $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

$$= \frac{(6.67 + 5.33)\cancel{\left[(6.67)^2 - 6.67 \times 5.33 + (5.33)^2\right]}}{\cancel{(6.67)^2 - 6.67 \times 5.33 + (5.33)^2}}$$

$= 12$

B.

$$\frac{(18.5)^2 - (6.5)^2}{18.5 + 6.5}$$

$$\frac{(18.5)^2 - (6.5)^2}{18.5 + 6.5}$$

$$= \frac{(18.5 - 6.5)\cancel{(18.5 + 6.5)}}{\cancel{(18.5 + 6.5)}} \qquad \text{since } a^2 - b^2 = (a - b)(a + b)$$

$$= (18.5 - 6.5)$$

$$= 12$$

Section B

Solution 4

i)

Here $x = 2 - \sqrt{3}$

$$\Rightarrow \frac{1}{x} = \frac{1}{2 - \sqrt{3}}$$

$$= \frac{1}{2 - \sqrt{3}} \times \frac{2 + \sqrt{3}}{2 + \sqrt{3}} \quad \text{(Rationalising the denominator)}$$

$$= \frac{2 + \sqrt{3}}{4 - 3} \qquad \left[\because (a - b)(a + b) = a^2 - b^2\right]$$

$$= 2 + \sqrt{3}$$

Now,

$$\left(x + \frac{1}{x}\right) = \left(2 - \sqrt{3}\right) + \left(2 + \sqrt{3}\right) = 4$$

$$\Rightarrow \left(x + \frac{1}{x}\right)^3 = 4^3$$

$$\Rightarrow \left(x + \frac{1}{x}\right)^3 = 64$$

ii)

Given: P = Rs. 125000, R = 12% per annum = 6% half-yearly

Time $= 1\frac{1}{2}$ years = 3 half year $\Rightarrow n = 3$

$$\Rightarrow \text{Amount} = P\left(1 + \frac{R}{100}\right)^n$$

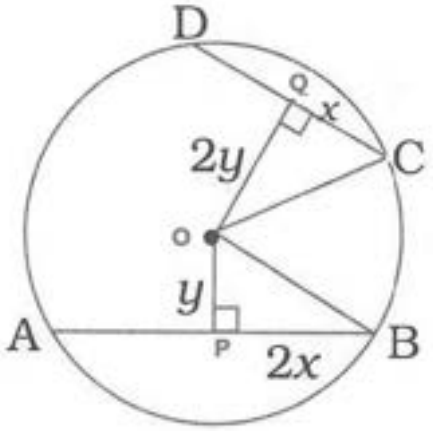
$$= 125000\left(1 + \frac{6}{100}\right)^3$$

$$= 125000 \times \frac{106}{100} \times \frac{106}{100} \times \frac{106}{100}$$

$$= \text{Rs.}148877$$

Compound interest = A – P = 148877 – 125000 = Rs. 23877

iii)



To prove: $r = \frac{\sqrt{5}}{2}CD$

Proof: Given $AB = 2CD$

Let $CD = 2x \Rightarrow AB = 4x$

Let $\overline{OP} \perp \overline{AB},\ P \in \overline{AB}$

$\therefore BP = \frac{1}{2}AB = \frac{1}{2}(4x) = 2x$

Let $\overline{OQ} \perp \overline{CD},\ Q \in \overline{CD}$

$\therefore CQ = \frac{1}{2}CD = \frac{1}{2}(2x) = x$

$\because OQ = 2OP$

Let OP=y $\therefore OQ = 2y$

In ΔOPB,

$m\angle P = 90$

$\therefore OB^2 = OP^2 + BP^2$

$\therefore r^2 = y^2 + (2x)^2$

$\therefore r^2 = y^2 + 4x^2 \quad ...(1)$

In ΔOQC, $m\angle Q = 90$

$\therefore OC^2 = OQ^2 + CQ^2$

$\therefore r^2 = (2y)^2 + x^2$

$\therefore r^2 = 4y^2 + x^2 \quad ...(2)$

From (1) and (2)

$y^2 + 4x^2 = 4y^2 + x^2$

$\therefore 4x^2 - x^2 = 4y^2 - y^2$

$\therefore 3x^2 = 3y^2$

$\therefore x^2 = y^2$

$\therefore x = y \quad [x, y > 0]$

Substituting $x = y$ in (1)

$r^2 = x^2 + 4x^2$

$\therefore r^2 = 5x^2$

$\therefore r = \sqrt{5}x$

$\therefore r = \frac{\sqrt{5}}{2} \times 2x$

$\therefore r = \frac{\sqrt{5}}{2} \times CD \qquad [\because CD = x]$

Solution 5

i) We have

$\left(x^2 + \frac{1}{25x^2}\right) = 9\frac{2}{5}$

$\Rightarrow \left(x^2 + \frac{1}{25x^2}\right) = \frac{47}{5}$

We know that $(x + y)^2 = x^2 + y^2 + 2xy$

$\because x^2 + \frac{1}{25x^2} = \frac{47}{5}$

$\left(x - \frac{1}{5x}\right)^2 = x^2 + \frac{1}{25x^2} - \frac{2}{5}$

$= \frac{47}{5} - \frac{2}{5} = \frac{45}{5} = 9$

$\Rightarrow \left(x - \frac{1}{5x}\right)^2 = 9$

Taking the square root on both sides, we get

$\left(x - \frac{1}{5x}\right) = \pm 3$

ii)

$$x^2 + \frac{1}{x^2} - 2 - 3x + \frac{3}{x} = \left(x^2 + \frac{1}{x^2} - 2\right) - 3\left(x - \frac{1}{x}\right)$$

$$= \left(x - \frac{1}{x}\right)^2 - 3\left(x - \frac{1}{x}\right)$$

$$= \left(x - \frac{1}{x}\right)\left(x - \frac{1}{x} - 3\right)$$

iii)

Mean = 45. 5 kg and the number of observations = 8

$$\text{We know that : Mean} = \frac{\text{sum of all the observations}}{\text{number of observations}}$$

$$\Rightarrow \text{sum of all the observations} = \text{Mean} \times \text{number of observations}$$

$$= 45.5 \times 8 = 364$$

Two more students having weights 41.7 kg and 53.3 kg join the group.

$\therefore$ Number of observations = 10 and sum of all the observations = 364 + 41.7 + 53.3 = 459

$$\Rightarrow \text{New mean weight} = \frac{459}{10} = 45.9$$

Therefore, the new mean weight is 45.9 kg.

Solution 6

i) Let the father's present age be x years and the son's present age be y years.

The father is 25 years older than his son.

$\Rightarrow x = y + 25$

$\Rightarrow x - y = 25$ ... (i)

After 5 years, his age will be twice that of his son.

$\Rightarrow x + 5 = 2(y + 5)$

$\Rightarrow x + 5 = 2y + 10$

$\Rightarrow x - 2y = 5$ ... (ii)

Subtracting equation (ii) from equation (i), we get

$y = 20$

Putting $y = 20$ in equation (i), we get

$x - 20 = 25$

$\Rightarrow x = 45$

Hence, the present ages of the father and the son are 45 years and 20 years, respectively.

ii)

$$\frac{5\times(25)^{n+1}-25\times5^{2n}}{5\times5^{(2n+3)}-(25)^{n+1}}$$

$$=\frac{5\times25^{n}\times25^{1}-5^{2}\times5^{2n}}{5\times5^{2n}\times5^{3}-25^{n}\times25^{1}}$$

$$=\frac{5\times5^{2n}\times5^{2}-5^{2}\times5^{2n}}{5\times5^{2n}\times5^{3}-5^{2n}\times5^{2}}$$

$$=\frac{5^{2n}5^{2}(5-1)}{5^{2n}5^{2}(5^{2}-1)}$$

$$=\frac{4}{24}$$

$$=\frac{1}{6}$$

iii)

The given frequency distribution table is as shown below:

Class interval	1–10	11–20	21–30	31– 40	41–50	51–60
Frequency	8	3	6	12	2	7

STEPS:

1. The given data is in the inclusive form (class intervals are discontinuous); convert it in the exclusive form (class intervals are continuous).

2. On making the classes exclusive (continuous), we get the actual class limits as (0.5–10.5), (10.5–20.5), (20.5–30.5), (30.5–40.5), (40.5–50.5) and (50.5–60.5).

3. Find the class mark (mid-value) of each of the given class intervals.

4. The class mark of a class interval = $\frac{\text{lower limit+ upper limit}}{2}$

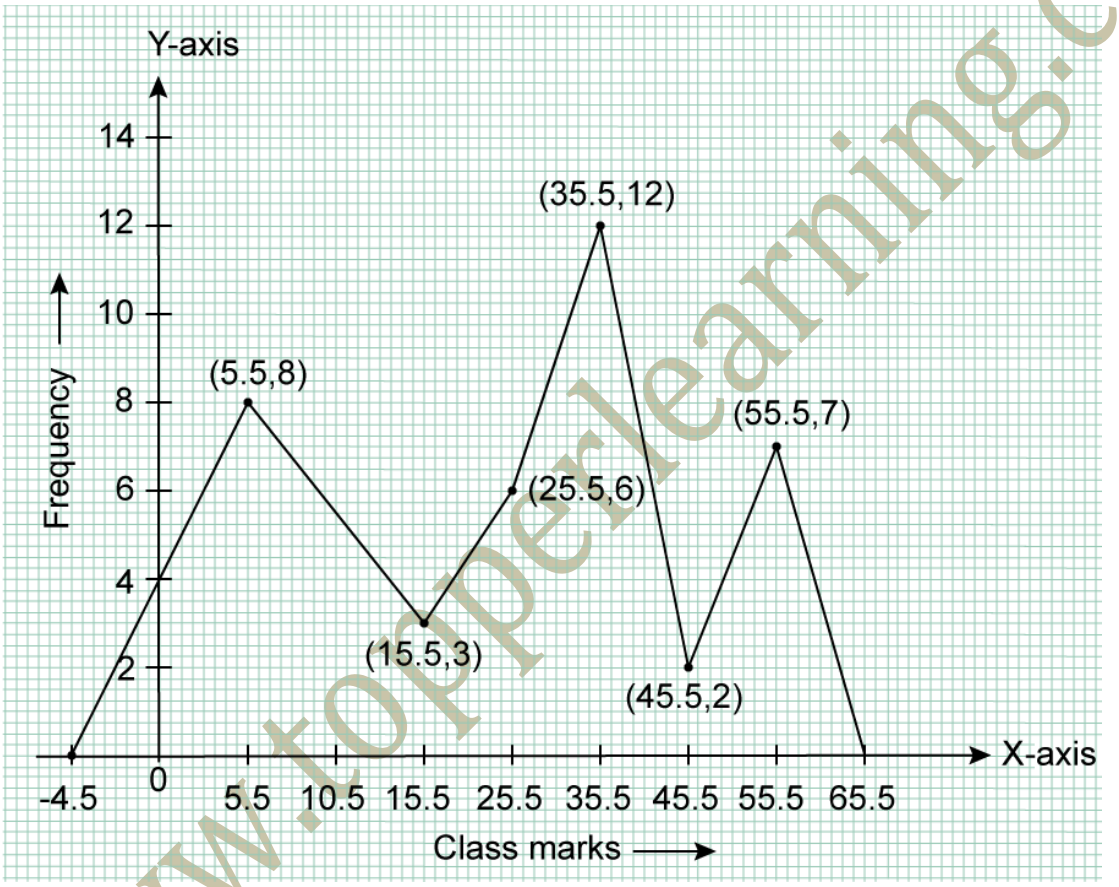
The frequency distribution table with class marks is given below:

Class Intervals	Class Marks	Frequency
(-9.5)–0.5	– 4.5	0
0.5–10.5	$\frac{0.5+10.5}{2}=\frac{11}{2}=5.5$	8
10.5–20.5	15.5	3
20.5–30. 5	25.5	6
30.5–40. 5	35.5	12
40.5–50.5	45.5	2
50.5–60.5	55.5	7
60.5–70.5	65.5	0

5. In the above table, we have taken imaginary class intervals (– 9.5)–0.5 at the beginning and
60.5–70.5 at the end, each with frequency zero.
4. On a graph paper, take class marks along the x-axis and the corresponding frequencies along the y-axis.
5. On this graph paper, plot the points (0,–4.5), (8, 5.5) … (55.5, 7) and (0, 65.5).
6. Draw line segments joining the consecutive points marked in step 5.

Note: Join the class mark of the class interval just before the first class and the class mark of the class interval just after the last class. This completes the required **frequency polygon**.

∴ The required frequency polygon will be



Solution 7

i)

Given

$\angle DCA = \angle ECB$

$\angle DBC = \angle EAC$

To prove: DC = EC

Proof: In ΔACE and ΔDCB we have;

AC = BC [Given]

$\angle EAC = \angle DBC$ [Given]

Also, $\angle DCA = \angle CDB + \angle DBA$

Because exterior $\angle DCA$ in ΔDCB is equal to sum of interior opposite angles.

Again in $\angle ACE$, we have

ext.$\angle BCE = \angle CAE + \angle AEC$

But, $\angle DCA = \angle BCE$ [Given]

$\Rightarrow$ $\angle CDB + \angle DBA = \angle CAE + \angle AEC$

$\Rightarrow$ $\angle CDB = \angle AEC$ .....[$\because \angle DBA = \angle CAE$ (given)]

Thus in ΔACE and ΔDCB,

AC = BC

$\angle EAC = \angle DBC$

and, $\angle CDB = \angle AEC$

$\therefore$ $\Delta ACE \cong \Delta DCB$ (By ASA)

So, DC =CE [C.P.C.T.]

ii)

AE = ½ AB $\because$ E is the mid-point of AB

DF = ½ DC $\because$ F is the mid-point of DC

$\Rightarrow$ AE = DF $\because$ AB = DC, opposite sides of $||^{gm}$

and AE || DF $\because$ AB || DC, opposite sides of $||^{gm}$

$\Rightarrow$ AEFD is a parallelogram $\because$ opposite sides AE and DF are parallel and equal

$\Rightarrow$ AD || EF || BC $\because$ opposite sides of parallelograms

Using the intercept theorem, transversal AB makes equal intercepts AE = BE on three parallel lines AD || EF || BC; hence, another transversal GH will also make equal intercepts on these parallel lines.

Hence, GP = PH.

iii)

In right-angled triangle ADB, by Pythagoras' theorem,

$AB^2 = AD^2 + BD^2 = 12^2 + 16^2 = 144 + 256 = 400\ cm^2$

$\Rightarrow AB = 20$ cm

$$\text{Now, Area of } \Delta ABD = \frac{1}{2} \times AD \times BD = \frac{1}{2} \times 12 \times 16 = 96\ cm^2$$

For ΔABC,

$$\text{Semi-perimeter (s)} = \frac{20+48+52}{2}$$

$$= \frac{120}{2} = 60\ cm$$

$$\therefore \text{ Area of } \Delta ABC = \sqrt{s(s-a)(s-b)(s-c)}$$

$$= \sqrt{60(60-20)(60-48)(60-52)}$$

$$= \sqrt{60 \times 40 \times 12 \times 8}$$

$$= \sqrt{12 \times 5 \times 8 \times 5 \times 12 \times 8}$$

$$= 12 \times 5 \times 8$$

$$= 480\ cm^2$$

Thus, the area of the shaded region = Area of ΔABC – Area of ΔABD

$= (480 - 96)\ cm^2$

$= 384\ cm^2$

Solution 8

i) The angles of a square are bisected by the diagonals.

$\angle OCX = 45^\circ$ $\quad\quad \because \angle DCB = 90^\circ$ and CA bisects $\angle DCB$

Also,

$\angle COD + \angle COX = 180^\circ$ $\quad\quad \because$ Linear pair

$\therefore 105^\circ + \angle COX = 180^\circ$

$\therefore \angle COX = 75^\circ$

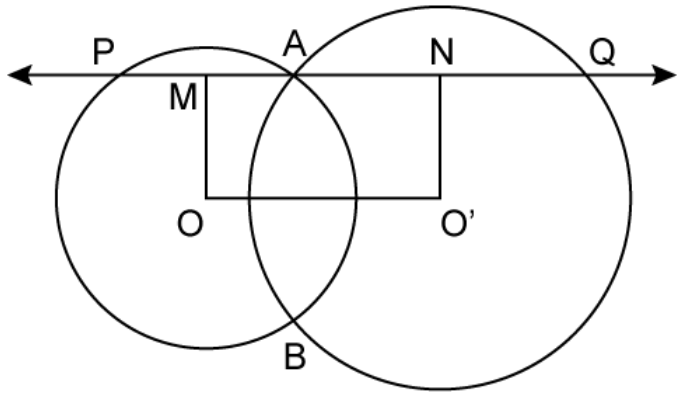
In ΔCOX

$\angle OCX + \angle COX + \angle OXC = 180^\circ$

$\therefore 45^\circ + 75^\circ + \angle OXC = 180^\circ$

$\therefore \angle OXC = 60^\circ$

ii)



Draw OM ⊥ PQ and O'N ⊥ PQ

⇒ OM ⊥ AP

⇒ AM = PM (perpendicular from the centre of a circle bisects the chord)

⇒ AP = 2AM ... (i)

And O'N ⊥ PQ

⇒ O'N ⊥ AQ

⇒ AN = QN (perpendicular from the centre of a circle bisects the chord)

⇒ AQ = 2AN ... (ii)

Now,

PQ = AP + AQ

⇒ PQ = 2AM + 2AN ... From (i) and (ii)

⇒ PQ = 2(AM + AN)

⇒ PQ = 2MN

⇒ PQ = 2OO' (since MNO'O is a rectangle)

iii)

Length of the bigger box = 25 cm

Breadth of the bigger box = 20 cm

Height of the bigger box = 5 cm

Total surface area of the bigger box = 2(lb + lh + bh)

= [2(25 × 20 + 25 × 5 + 20 × 5)] cm²

= [2(500 + 125 + 100)] cm² = 1450 cm²

Extra area required for overlapping $= \left(\frac{1450 \times 5}{100}\right) \text{cm}^2 = 72.5 \text{ cm}^2$

Considering all overlaps, the total surface area of 1 bigger box

= (1450 + 72.5) cm² =1522.5 cm²

Area of the cardboard sheet required for 250 such bigger boxes

= (1522.5 × 250) cm² = 380625 cm²

Total surface area of the smaller box = [2(15 × 12 + 15 × 5 + 12 × 5] cm²

= [2(180 + 75 + 60)] cm² = (2 × 315) cm² = 630 cm²

Extra area required for overlapping $= \left(\frac{630 \times 5}{100}\right) \text{cm}^2 = 31.5 \text{ cm}^2$

Considering all overlaps, the total surface area of 1 smaller box = (630 + 31.5) cm^2 = 661.5 cm^2

Area of the cardboard sheet required for 250 smaller boxes = (250 × 661.5) cm^2 = 165375 cm^2

Total cardboard sheet required = (380625 + 165375) cm^2 = 546000 cm^2

Cost of 1000 cm^2 cardboard sheet = Rs. 4

Cost of 546000 cm^2 cardboard sheet $= \text{Rs}\left(\frac{546000 \times 4}{1000}\right) = \text{Rs } 2184$

So, the cost of the cardboard sheet required for 250 boxes of each kind will be Rs. 2184.

Solution 9

i)

$$\frac{3\tan 25^\circ \tan 40^\circ \tan 50^\circ \tan 65^\circ - \frac{1}{2}\tan^2 60^\circ}{4\left(\cos^2 29^\circ + \cos^2 61^\circ\right)}$$

$$= \frac{3\tan 25^\circ \tan 40^\circ \tan\left(90^\circ - 40^\circ\right)\tan\left(90^\circ - 25^\circ\right) - \frac{1}{2} \times \left(\sqrt{3}\right)^2}{4\left[\cos^2 29^\circ + \cos^2\left(90^\circ - 29^\circ\right)\right]}$$

$$\left[\because \tan 60^\circ = \sqrt{3}\right]$$

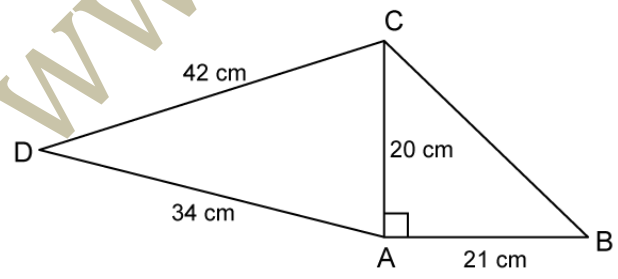
$$= \frac{3\tan 25^\circ \tan 40^\circ \cot 40^\circ \cot 25^\circ - \frac{3}{2}}{4\left(\cos^2 29^\circ + \sin^2 29^\circ\right)}$$

$$\left[\because \cos^2\theta + \sin^2\theta = 1\right]$$

$$= \frac{3 \times \tan 25^\circ \times \tan 40^\circ \times \frac{1}{\tan 40^\circ} \times \frac{1}{\tan 25^\circ} - \frac{3}{2}}{4 \times 1}$$

$$= \frac{3 - \frac{3}{2}}{4} = \frac{3}{2} \times \frac{1}{4} = \frac{3}{8}$$

ii)



In ΔBAC, by Pythagoras' theorem,

$BC^2 = AC^2 + AB^2 = 20^2 + 21^2 = 400 + 441 = 841\ cm^2$

$\Rightarrow BC = 29$ cm

∴ Perimeter of quadrilateral ABCD = AB + BC + CD + AD

$= 21 + 29 + 42 + 34$
$= 126$ cm

Now,

$$A(\Delta ABC) = \frac{1}{2} \times AB \times AC = \frac{1}{2} \times 21 \times 20 = 210 \text{ cm}^2$$

In ΔACD, AC = 20 cm, CD = 42 cm and AD = 34 cm

Let a = 20 cm, b = 42 cm and c = 34 cm

$$\text{Semi-perimeter, } s = \frac{a+b+c}{2} = \frac{20+42+34}{2}$$

$$= \frac{96}{2} = 48 \text{ cm}$$

$$\therefore \text{ Area of } \Delta ACD = \sqrt{s(s-a)(s-b)(s-c)}$$

$$= \sqrt{48(48-20)(48-42)(48-34)}$$

$$= \sqrt{48 \times 28 \times 6 \times 14}$$

$$= \sqrt{16 \times 3 \times 14 \times 2 \times 3 \times 2 \times 14}$$

$$= 4 \times 3 \times 14 \times 2$$

$$= 336 \text{ cm}^2$$

Thus, the area of quadrilateral ABCD

$= A(\Delta ABC) + A(\Delta ACD)$
$= (210 + 336)$ cm^2 $= 546$ cm^2

Solution 10

i)

Length of the plank = 5 m = 500 cm
Breadth of the plank = 25 cm
Height of the plank = 10 cm

$\therefore$ Volume of the plank $= l \times b \times h$
$= (500 \times 25 \times 10)$ cm^3

Now,

Length of the pit = 20 m = 2000 cm
Breadth of the pit = 6 m = 600 cm
Height of the pit = 80 cm

$\therefore$ Volume of one pit $= (2000 \times 600 \times 80)$ cm^3

$$\therefore \text{ Number of planks which can be stored} = \frac{\text{Volume of pit}}{\text{Volume of plank}}$$

$$= \frac{(2000 \times 600 \times 80)}{(500 \times 25 \times 10)} = 768$$

ii)
Let the required point on the y-axis be C(0, y).
It is given that C(0, y) is equidistant from A(–3, 2) and B(5, –2).
⇒ AC = CB
The distance between the given points $=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$$\Rightarrow \sqrt{(-3-0)^2+(2-y)^2}=\sqrt{(5-0)^2+(-2-y)^2}$$
$$\Rightarrow \sqrt{(-3)^2+(2-y)^2}=\sqrt{(5)^2+(-2-y)^2}$$

⇒ $9 + 4 - 4y + y^2 = 25 + 4 + 4y + y^2$
⇒ $13 - 4y + y^2 = 29 + 4y + y^2$
⇒ $-16 = 8y$
⇒ $y = -2$
∴ The required point on the y-axis = (0, –2).

iii)
A. $2x + 3y = 2$
$\Rightarrow x = \frac{2-3y}{2}$

When $y = 2 \Rightarrow x = \frac{2-3\times 2}{2}=\frac{2-6}{2}=\frac{-4}{2}=-2$

When $y = 0 \Rightarrow x = \frac{2-3\times(0)}{2}=\frac{2}{2}=1$

When $y = -2 \Rightarrow x = \frac{2-3\times(-2)}{2}=\frac{2+6}{2}=\frac{8}{2}=4$

x	–2	1	4
y	2	0	–2

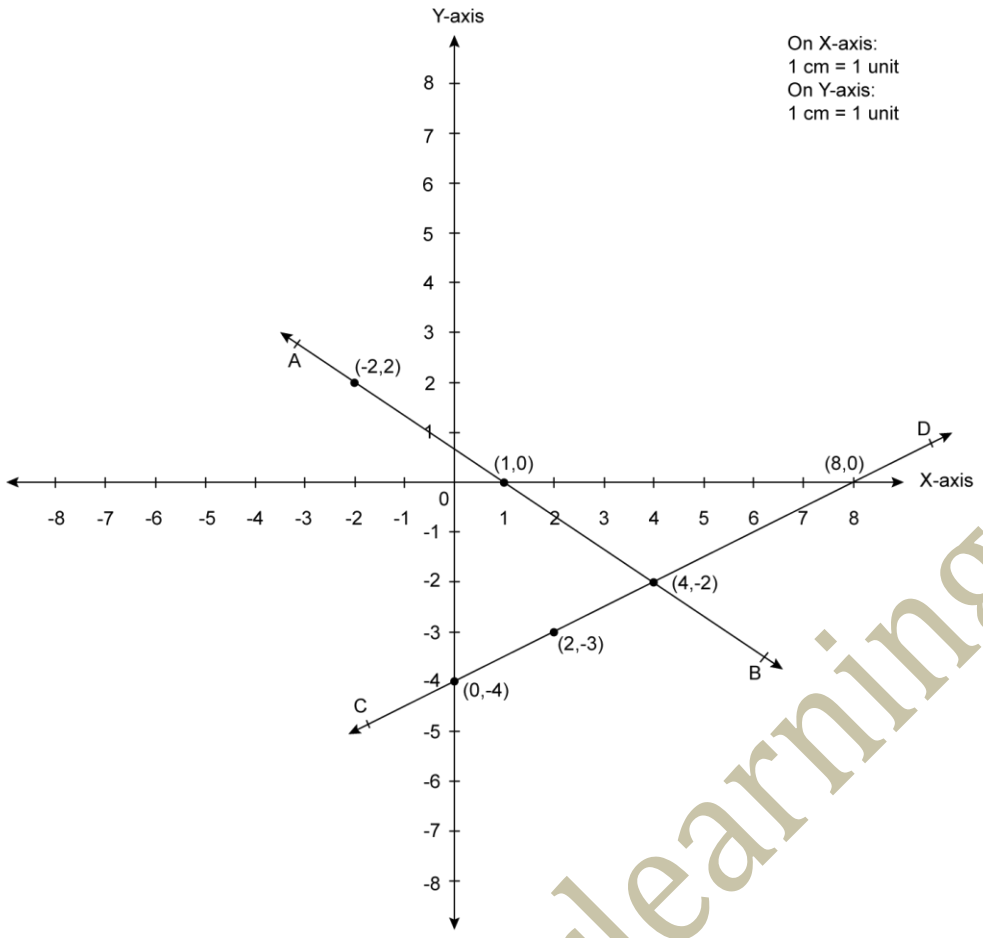
1. Plot the points (–2, 2), (1, 0), (4, –2) on the graph paper, taking 1 cm = 1 unit on both axes.

2. Draw a straight line AB passing through the points plotted.
B. $x - 2y = 8$
$\Rightarrow x = 8 + 2y$
When $y = -3 \Rightarrow x = 8 + 2(-3) = 8 - 6 = 2$
When $y = -4 \Rightarrow x = 8 + 2(-4) = 8 - 8 = 0$
When $y = 0 \Rightarrow x = 8 + 2(0) = 8$

x	2	0	8
y	–3	–4	0

1. Plot the points (2, –3), (0, –4), (8, 0) on the graph paper, taking 1 cm = 1 unit on both axes.

2. Draw a straight line CD passing through the points plotted.
From the graph, lines AB and CD intersect each other at point (4, -2).
⇒ The solution of the given simultaneous equations is (4, -2).



ICSE

CLASS 9

PHYSICS

MOCK PAPER 1

SOLUTIONS

ICSE Board
Class 9 Physics
Mock Paper – 1

SECTION A

Answer 1

i) Correction answer – c) 10^7

Since the magnitude (3.84) is greater than 3.2. Therefore, order of magnitude will be $10^6 \times 10^1 = 10^7$.

ii) Correct answer -a) v-u= at

The first equation of motion v=u + at of v-u=at is the equation which relates velocity and time and hence is also known as velocity-time relation.

iii) Correct option – a) directly proportional to square of time

In case of accelerated motion along a straight line the distance traveled by the body is directly proportional to square of time.

iv) Correct option – d) zero

The body will weigh zero at the centre of the earth because the acceleration due to gravity 'g' is zero there.

v) Correct option – d) Barometric height changes with change in humidity in air

Barometric height changes with change in humidity in air.

vi) Correct option – a) Vertically upward

When a body is immersed in a liquid, the buoyant force balances the weight of the body due to which floats. This buoyant force acts in the upward direction due to which the object floats in the liquid.

vii) Correct option – d) Temperature: Microorganism

Temperature is an example of abiotic (non-living) component of an environment while microorganisms are treated as the biotic (living) component.

viii) Correct option – c) virtual and erect

Magnification produced by a concave mirror is positive when the image is virtual and erect.

ix) Correct option – c) halved

According to Ohm's law, I = V/R Therefore, if R becomes twice, I=V/2R = (½) I

x) Correct option – a) Resistance is doubled

Resistance gets added in series.

xi) Correct option – b) induced magnetism

The magnetism acquired by a magnetic material when it is kept near (or in contact with) a magnet called induced magnetism.

xii) Correct option – c) in north-south direction

When a magnet is placed with its axis in the magnetic meridian and with its north pole pointing towards geographic south, the positions of neutral points will be in north-south direction.

xiii) Correct option – d) 2

$$\text{R.D.} = \frac{W}{W - W'} = \frac{22}{11} = 2$$

xiv) Correct option – c) Women empowerment and family planning

Population growth can be controlled through Women empowerment and family planning.

xv) Correct option – a) Under no circumstances

The image formed by a convex mirror is always virtual and erect irrespective of the position of the object.

Answer 2

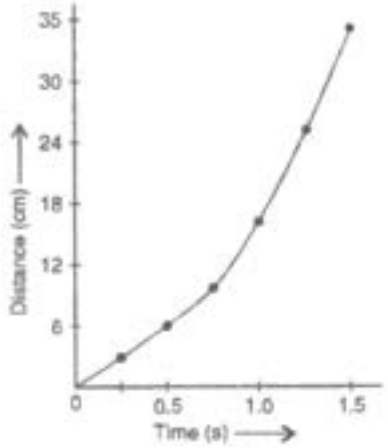
(i)

(a) One day = (24 x 60 x 60) s
= 86400 s = 8600000 ms = 8.64 x 10^7 ms

(b) Passengers' cabins in an aircraft are pressurized because as it suddenly gains height, pressure outside falls rapidly as compared to the pressure of dissolved oxygen in the blood. The difference in pressure may burst the fine capillaries within the nose causing it to bleed. This is why the passengers' cabins in an aeroplane are pressurized.

(c) A straight-line graph shows that the changes in the values of the quantities represented on both the axes are proportional to each other; e.g., in case of simple pendulum l vs T^2 is a straight-line graph which means that $l \propto T^2$ or l/T^2 is constant.

(ii)



(iii) $m = 10\,g = 0.01\,kg$

Weight, $W = mg = 0.01\,kg \times 9.8\,m/s^2$

$= 0.098\,N$ (in downward direction)

Reaction force, $R = 0.098\,N$ (in upward direction)

(iv) Fundamental units are independent units while derived units are obtained by the combination of fundamental units.

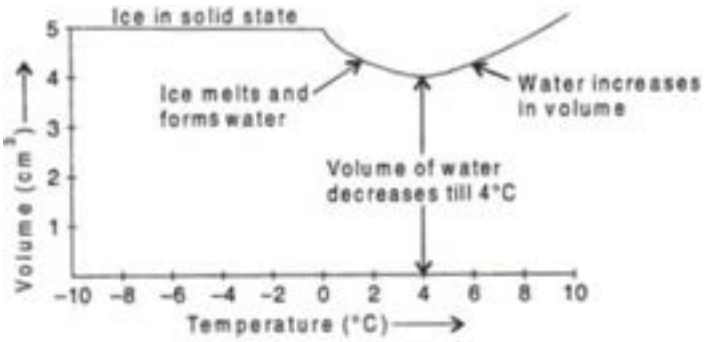
(v) An apple also attracts the earth with the same force that the earth exerts on the apple. However, due to the large mass of the earth, its acceleration is negligibly small. That is why, the movement of the earth towards the apple is not noticeable.

(vi) An empty truck will stop first. As both are moving with the same velocity, the momentum of the empty truck will be less. On applying brakes, the change in the momentum of the empty truck will be less.

(vii) Ice on the surface is a bad conductor of heat; so, it prevents the heat of water (under the layer of ice) from going out. Hence, it stops the freezing of water which is under the layer of ice.

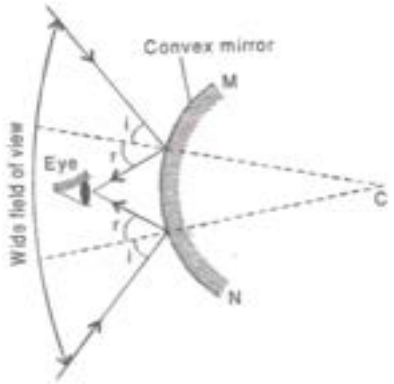
Answer 3

(i)



(ii) The system has to be cooled. As $\alpha_{brass} > \alpha_{steel}$, the brass disc contracts more than the hole in the steel plate and hence, gets loose.

(iii) Convex mirror forms the image of a wider region.



(iv) A plane mirror and a convex mirror can produce a real image if the object is virtual, i.e., the rays converging to a point behind a plane or convex mirror are reflected to a point in front of another mirror.

(v) No, the size of the mirror does not affect the nature of the image.

SECTION B

Answer 4

(i)

i. The least count of the screw gauge = $\frac{\text{Pitch}}{\text{Total number of divisions on circular scale}}$

$$= \frac{1\,\text{mm}}{50} = 0.02\,\text{mm} = 0.002\ \text{cm}$$

ii. Final reading of measurement = MSR + CSR = 17 mm + 40 × 0.02 mm

= 17 mm + 0.80 = 17.8 mm.

iii. Back-lash error is the error due to the wear and tear of the threads of the screw. Owing to which, on reversing the direction of rotation of the thimble, the tip of the screw does not move in the opposite direction immediately but remains stationary for a part of the rotation.

(ii)

i. It works on the principle of moments i.e., in equilibrium, the clockwise moment due to standard masses is equal to the anti-clockwise moment due to unknown mass.

ii. Physical balance (or beam balance) is used to measure the mass of a body by comparing it with a known standard mass.

iii. When the plumb line is set just above the pointer projection, the base board becomes horizontal.

iv. The role of base screws is to make the base board horizontal.

v. Two requirements for a good balance are:

1. Both arms must be of equal length.
2. Both pans must be of equal weight.

(iii)

i. Mass of hydrogen in the balloon = Volume × Density of H_2

$= 15\ m^3 \times 0.09\ kg/m^3 = 1.35\ kg$

ii. Mass of hydrogen and balloon = (1.35 + 7.15) kg

= 8.50 kg

iii. Mass of equipment, hydrogen and the balloon = (x + 8.5) k

iv. Volume of air displaced = 15 cm^3

∴ Mass of air displaced = Volume × Density of air displaced

$= 15\ m^3 \times 1.3\ kg/m^3 = 19.5\ kg$

v. Mass of equipment, hydrogen and balloon = Mass of air displaced

$x + 8.5 = 19.5$

$x = 19.5 - 8.5 = 11.0\ kg$

∴ Mass of equipment = 11.0 kg

Answer 5

(i) Given

$u = 5 \times 10^4\ m/s$

$a = 10^{15}\ m/s^2$

$v = 2u = 2 \times 5 \times 10^4\ m/s = 10^5\ m/s$

t =? s =?

Applying v = u + at

$$t = \frac{v - u}{a} = \frac{2u - u}{a} = \frac{u}{a} = \frac{5\times10^4\ m/s}{10^{15}\ m/s^2} = 5 \times 10^{-11} s$$

Applying $s = ut + \frac{1}{2}at^2$

$= (5 \times 10^4\ m/s) \times (5 \times 10^{-11}\ s) + ½ \times 10^{15}\ m/s^2 \times (5 \times 10^{-11}\ s)^2$

$= 25 \times 10^{-7}\ m + 12.5 \times 10^{-7}\ m$

$= 37.5 \times 10^{-7}\ m = 3.75 \times 10^{-6}\ m$

(ii)

i. Velocity provides the direction of motion of the body, e.g., during upward motion of a body, both the direction of motion and the velocity are in the upward direction but acceleration due to gravity is in the downward direction.

ii. Displacement of the body in 6 s = Sum of areas of portions 1, 2 and 3 of figure with proper signs.

$= 4 \times 2 - 2 \times 2 + 2 \times 2 = 8\ m$

Distance travelled by the body in 6 s = Sum of areas of portions 1, 2 and 3 of figure, ignoring signs.

$= 4 \times 2 + 2 \times 2 + 2 \times 2 = 16$ m

(iii)

i. Given, u = 98 m/s, a = g = -9.8 m/s^2,
v = 0, s = ?, t = ?
Applying $v^2 = u^2 + 2as$
$0 = (98 \text{ m/s})^2 + 2(-9.8 \text{ m/s}^2) \times s$
$s = \frac{98 \times 98}{2 \times 9.8} = 490$ m

ii. Applying V = u + at
$t = \frac{V - u}{a} = \frac{0 - 98}{-98} = 10$ s

Answer 6

(i)

i. Newton's third law of motion: To every action, there is always an equal and opposite reaction.
ii. Wall exerts a force of 20 N towards West.
iii.
   1. Force exerted by block on the thread will be 10 N in the downward direction.
   2. 10 N of force will be exerted by a thread on the block in the upward direction.

(ii) Disadvantages of construction of large dams for generating hydroelectric power:

i. uprooting people from their native place
ii. disruption of plant and animal life
iii. disruption of ecosystem.

(iii) A physical balance measures the mass of the body. When a physical balance is used, it measures the same mass at the pole and at the equator, because mass is a constant. Spring balance is used to measure the weight of the body. The weight of the body will be maximum at the pole because the value of acceleration due to gravity 'g' is maximum at the pole.

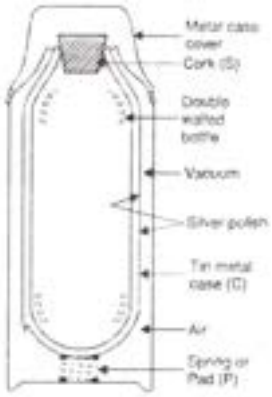
Answer 7

(i) The ozone layer serves as a protective shield of the troposphere and saves the earth's surface from most of the ultraviolet solar radiations by absorbing them. Due to ozone depletion, the increased ultraviolet solar radiations would raise the temperature of the earth which would cause global warming at the regional and global levels. Excess of incoming ultraviolet radiations will cause skin cancer and diseases of the eye.

(ii)

i. It is used for keeping the hot liquid hot and the cold liquid cold, for a sufficiently long time.

ii.



Thermos flask.

iii. The vacuum between the two walls checks the heat transfer by conduction.

iv. The outer shining surface of the inner wall prevents transfer of inner heat by radiation and the inner shining surface of outer wall reflects the heat received from the inside.

(iii) The wall of an ordinary glass test tube is thick. Due to bad conductivity of glass, its different layers expand differently on plunging into hot water. Fused silica has very low expansivity; hence, different layers of fused silica test tube do not expand/contract differently. Therefore, it can be safely plunged into water even when it is red hot.

Answer 8

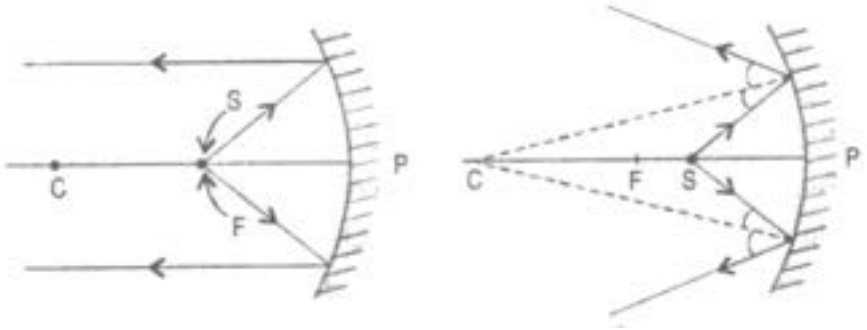
(i)

i. Candle flame, stars, red hot wire of heater, firefly.

ii. The room is illuminated due to diffused reflection.

iii. Black

(ii)



(iii) $\lambda_x = 25\,m, \quad V_x = 5\times10^3\ m/s$

$\lambda_y = 20\,m, \quad V_y = 4\times10^3\ m/s$

$\nu_x : \nu_y = ?$

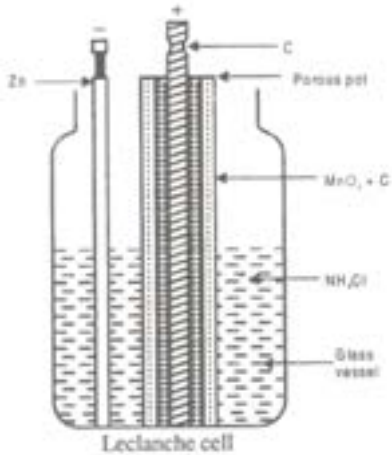
$$\frac{\nu_x}{\nu_y} = \frac{V_x\lambda_y}{V_y\lambda_x} = \frac{5\times10^3\times20}{4\times10^3\times25} = \frac{1}{1}$$

$\nu_x : \nu_y = 1$

Answer 9

(i) Conductor B will lose charge. The reason is that there is greater concentration of electrons (since B is negatively charged) at its pointed ends.

(ii)



Leclanche cell

It is not suitable for continuous use as MnO_2 being solid is a slow depolarizer. It does not oxidize hydrogen gas to water as fast as it is formed in the reaction. Therefore, if it is used for a long period, polarization starts after sometime due to deposition of excess of hydrogen on the anode which could not be converted into water. This is why, it is allowed to rest after using for some time so that MnO_2 oxidizes the excess hydrogen to water

(iii)

i. Like poles repel and unlike poles attract each other.
ii. The direction of the magnetic field at any point is the direction of force experienced by a north pole (hypothetical) placed at that point.
iii. The middle region of a bar magnet is **unmagnetized**.
iv. Iron, Steel, Nickel, Cobalt.

ICSE

CLASS 9

PHYSICS

MOCK PAPER 2

SOLUTIONS

ICSE Board
Class 9 Physics
Mock Paper – 2

SECTION A

Answer 1

(i) Correct option – d) The separation between two consecutive threads on its screw
The pitch is the separation between two consecutive threads of the screw and is equal to the linear distance moved by the screw along its axis in one complete rotation

(ii) Correct option – a) zero
When an object is dropped from some height its initial velocity is taken as zero

(iii) Correct option – a) uniform motion
If a body covers equal distance in equal interval of time, then its motion is called uniform motion

(iv) Correct option – c) external force
When the external force is zero a body continues to move with a uniform velocity.

(v) Correct option – c) Poles
Earth is not a perfect sphere its radius at the equator is greater than poles. Acceleration due to gravity is inversely proportional to the square of its radius. So, the acceleration due to gravity is greatest at poles Hence from relation W= mg it is clear that weight is highest at the poles.

(vi) Correct option – a) 51.19 kg
Mass = Volume x Density
= (4.5 x 3.5 x 2.5) x 1.3 =51.19 kg

(vii) Correct option c) - Very little usable energy is left after fourth step
Plants are able to trap only 1% of energy when sunlight falls on them. As the amount of usable energy is quite low and also 10% of it is available to pass on further (next trophic level)

(viii) Correct option -d) 0°
The angle of incidence is the angle between the incident ray and the normal. For light incident normal on the reflecting surface the angle of incidence is zero. According to the law of reflection, the angle of incidence is always equal to the angle of reflection. Thus, the angle of reflection is also zero.

(ix) Correct option – b) The maximum distance moved by the particles of a medium on either side of the mean position
The amplitude of a wave is the maximum distance moved by the particles of a medium on either side of the mean position. The loudness or softness of a sound is determined by its amplitude.

(x) Correct option – c) low, series
An ammeter is a low resistance device and it is always connected in series with the circuit.

(xi) Correct option – d) ebonite
Ebonite is the best insulator out of the above.

(xii) Correct option – d) It will rest in geographic north-south direction with north pole towards geographic north, making some angle with the horizontal
It will rest in geographic north-south direction with north pole towards the geographic north making same angle with the horizontal

(xiii) Correct option – a) (1) only
The magnetic field strength of a bar magnet is maximum at its poles.

(xiv) Correct option – c) is less than the density of water and greater than the density of oil
A substance floats in water because its density is less than the density of water. The substance sinks in coconut oil because its density is greater than the density of oil.

(xv) Correct option- a) -f/(u-f)
Magnification, m= - v/u
Mirror formula is 1/f =1/v + 1/u
or 1/v= 1/f - 1/u or
v = uf/ (u-f)
Therefore m = - v/u = - f/(u-f)

Answer 2

(i)

a) A magnet attracts iron nails.
b) Squeezing of a toothpaste tube.
c) Stretching of a spring.

(ii) 1 micro-century = 10^{-6} centuries

$= 10^{-6} \times 1000$ Y

$= 10^{-6} \times 365 \times 24 \times 60$ min

$= 52.6$ min

So, 1 micro-century = 52.6 min, which is nearly equal to the length of one lecture period (approximately 50 min)

(iii) On the surface of earth, when lemonade is sucked with a soda straw, the pressure falls within the straw and the outside atmospheric pressure forces the lemonade up the straw. However, on the surface of the moon, there is no atmospheric pressure and hence, lemonade cannot be sucked with a soda straw.

(iv) Graph is useful in physics for finding and confirming the relationship between different variables e.g., stretching of a piece of metal wire and the load applied to it.

(v) Total distance moved by the ball = Actual length of the path covered
= h +h = 2h.
Displacement of the ball = Shortest distance between its final and initial positions
= 0

(vi) The time period of a simple pendulum is
i. directly proportional to the square root of its length (l), i.e., $T \propto \sqrt{l}$.
ii. inversely proportional to the square root of acceleration due to gravity (g), i.e.
$T \propto \frac{1}{\sqrt{g}}$

(vii) Yes, it will be an accelerated motion because the particle's velocity is changing due to continuous change in the direction of motion.

Answer 3

(i) When water in pipes freezes at sub-zero temperatures, it expands due to anomalous expansion. In a dripping tap, the expanding water always finds space. Thus, water pipes do not burst.

(ii) The super-consumer of resources is man.

(iii) Both forces will be equal in magnitude but opposite in direction as gravitational force between two bodies is a mutual force.

(iv) No, the virtual image is formed due to reflected divergent rays which can be converged on a screen by a suitable convex lens. In the eye, its convex lens does this job. Hence, the virtual image formed by the mirror serves as a virtual object for the eye lens (convex) and thus, produces a real image on the retina. Hence, the statement is correct.

(v)
a) In a plane mirror, virtual image is of the same size as the object.
b) In a concave mirror, the virtual image is magnified.
c) In a convex mirror, the virtual image is always diminished in size.

SECTION B

Answer 4

(i) Ratchet is attached to the screw by a spring. Its function is to save the stud from the excess pressure exerted by the flat end of the screw when the flat end of the screw is brought in contact with the stud i.e. further rotation given to the ratchet does not press the flat end against the stud.

a) Pitch $= \frac{0.5\ \text{mm}}{1} = 0.5\ \text{mm} = 0.05\ \text{cm}$

b) Least count of the screw gauge $= \frac{0.05\,\text{cm}}{100} = 0.0005\ \text{cm}$

Diameter of the wire = 9 × 0.05 cm + 67 × 0.0005 cm
= (0.45 cm + 0.0335 cm)
= 0.4835 cm

c) Correct diameter = Observed diameter - correction
= 0.48535 cm – (7 × 0.0005 cm)
= 0.4835 cm – 0.0035 cm
= 0.4800 cm

(ii) When the girl sits on the swing, the centre of gravity of the swing is lowered i.e. the effective length of the swing increases and hence, the time period increases. As frequency of oscillation is inversely proportional to the time period, the frequency of oscillation decreases.

(iii) Volume of a body is the space occupied by it.
Given: r =14 m, m=500 kg, ρ =?

We know that, $\rho = \frac{\text{Mass (m)}}{\text{Volume (V)}} = \frac{500\ \text{kg}}{\frac{4}{3} \times \frac{22}{7} \times (1.4\text{m})^3} = \frac{500\,\text{kg}}{11.498\ \text{m}^3} = 43.48\ \text{kg/m}^3$

Answer 5

(i)

a) Acceleration of car A $= \frac{(35 - 0)\,\text{m/s}}{10\,\text{s}} = 3.5\,\text{m/s}^2$

b) Acceleration of car B between 2 s – 5 s $= \frac{(25 - 0)\,\text{m/s}}{3\,\text{s}} = 8.33\,\text{m/s}^2$

c) After 3 s velocity of both cars is 10 m/s and at 7s velocity of each car is 25 m/s.

d) Distance travelled by car A = Area of ΔOPQ

$= \frac{1}{2} \times \text{PQ} \times \text{OQ} = \frac{1}{2} \times 35\ \text{m/s} \times 10\ \text{s}$
$= 175\ \text{m}$

Distance travelled by car B = Area of trapezium RTLQ

$= \frac{1}{2} \times (8 + 5)\ \text{s} \times 25\ \text{m/s} = 162.5\ \text{m}$

Car A is ahead by 175 - 162.5 = 12.5 m

(ii) Let a body be moving with initial velocity 'u'. After time 't', its velocity becomes 'v' and during this journey, uniform acceleration is 'a.'

We know that, $a = \frac{v - u}{t}$

$v = u + at$

(iii)

a) Given : $u = 0, t = 4s, g = 9.8\ m/s^2$

$h = ut + ½\ gt^2$

$= 0 \times 4s + \frac{1}{2}(9.8\ m/s^2) \times (4s)^2 = 78.4\ m$

b) $v = u + gt$

$= 0 + (9.8\ m/s^2) \times 4\ s = 39.2\ m/s$

c) $u = 39.2\ m/s, v = 0, s = 0.8\ m$

$v^2 = u^2 + 2as$

$0 = (39.2)^2 + 2a \times 0.8$

$a = -\frac{39.2 \times 39.2}{1.6}\ m/s^2$

$a = -960.4\ m/s^2$

Answer 6

(i) When a ball is allowed to roll on the floor, it ultimately stops because of the frictional force exerted on it by the ground. Thus, the state of uniform motion of the ball changes due to external force (friction). On the Earth, every change in uniform motion of a body can be related with some external force acting on it. However, in free space, where no external force acts, state of motion described by the Newton's first law can be obtained and experienced.

(ii) Given $V_a = 330\ m/s$

$t = 3\ s$

Distance travelled by sound in air

$d_a = V_a \times t$

$= 330 \times 3 = 990\ m$

∴ Time taken by sound to travel 990 m in water

$= \frac{d_w}{V_w} = \frac{990\ m}{1650\ m/s} = 0.6\ s$

(iii) Coefficient of linear expansion of a material is defined as the fractional change in length per unit change in its temperature when a rod of that material is heated (or cooled).

Coefficient of linear expansions (α) =

$$\frac{\text{Change in length } (l_2 - l_1)}{\text{Original length } (l_1) \times \text{change in temperature } (t_2 - t_1)}$$

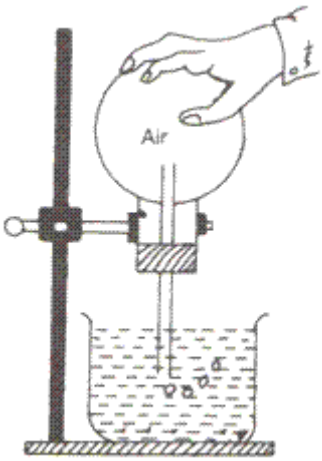
Its SI unit is K^{-1}.

Thermal expansion of a solid depends on the following factors:

i. Nature of the material.
ii. Initial dimension of the solid.
iii. Rise in temperature of the solid.

Answer 7

(i) Thermal expansion of gases:



Take a round bottom flask which is filled with air and closed with a one holed rubber cork. A narrow capillary tube is passed through the rubber stopper and the flask is supported on a tripod in an inverted position as shown in the figure; so that, the end of the capillary tube is under water. Now, heat the flask gently with a spirit lamp. You will observe bubbles coming out from the capillary tube. This shows that air has expanded on heating and it escapes from the flask. Like air, all other gases also behave in the same way.

(ii) Number of divisions between lower fixed point (ice point) and upper fixed point (steam point) on Celsius scale = 100

$\therefore \frac{8}{15}$ of Celsius scale $= \frac{8}{15} \times 100 = 53.33\,^{o}C$

$\therefore$ Temperature of Celsius scale $= (100 - 53.33)\,^{o}C = 46.67\,^{o}C$

Temperature on Fahrenheit scale $= \frac{9}{5} \times C + 32 = \frac{9}{5} \times 46.67 + 32$

$= 116.006\,^{o}F$; $116.01\,^{o}F$

(iii)

i. The infrared rays emitted from the sun have shorter wavelength than the infrared rays radiated from the earth.
ii. A degree on Celsius scale is 1/100th part of the interval between the ice point and the steam point. A degree on Fahrenheit scale is 1/180th part of the interval between the ice point and the steam point.

Answer 8

(i) Point object will be seen from different positions of the eye, but the image will be observed only when the reflected rays will enter into the eye. In position E_1 of the eye, both the object and the image will be seen while in position E_2 only the object will be seen.

(ii) Three applications of plane mirrors are:

i. Plane mirrors are used in many optical instruments.
ii. Plane mirrors are used in periscopes and kaleidoscopes.
iii. They are used in dressing rooms for viewing oneself.

(iii)

a) Differences between sound waves and light waves:

Sound Waves	Light Waves
1. These waves require material medium for their propagation.	1. These waves do not require material medium for their propagation.
2. These are caused due to the vibrations of the particles of the medium.	2. These are caused due to varying electric and magnetic fields.
3. These waves have low speeds which vary from medium to medium.	3. These waves have very high speed of 3×10^8 m/s.

b) Speed of sound in gases < Speed of sound in liquids < Speed of sound in solids.

Answer 9

(i) When a glass rod is rubbed with silk, the rod gets positively charged due to loss of electrons to the silk.

a) The leaves diverge as the positively charged glass rod is brought near the cap of a neutral electroscope. The leaves collapse as the rod is taken away.
The positively charged glass rod attracts the electrons of the leaves to the cap. Hence, due to deficit of electrons on the leaves, they get positively charged and diverge because of repulsion between like charges. When the rod is removed, the electrons redistribute themselves. The cap and the leaves become neutral again. Therefore, the leaves collapse.

b) On touching the cap with the finger momentarily, the leaves collapse and then diverge again as the rod is moved away. On touching the cap (with the rod kept near the cap), the free electrons at the cap cannot flow to earth as they are bound (by the force of attraction of the positive charge of the rod). But the deficit of electrons in the leaves of electroscope is compensated by the flow of electrons from the earth to the leaves. As the leave system becomes neutral, the leaves collapse. When the rod is removed, the free electrons at the cap spread throughout the cap, stem and leaves. Therefore, the leaves diverge due to the repulsion between the like charges on the leaves.

c) The leaves diverge when the cap is touched with the rod and it remains diverged on removal of the rod. When the positively charged rod is touched to the cap of the neutral electroscope, the sharing of positive charge takes place i.e., electrons from the leaves, stem and cap move to the rod. Hence, the electroscope gets positively charged. The leaves diverge due to repulsion between the like charges on the leaves. On removing the rod, the leaves remain diverged because the electroscope remains positively charged.

(ii)

a) The potential difference between points A and B is 1.5 V as the voltage in parallel combination of the cells remains the same.
b) In series combination, e.m.f. of cells is added i.e., 3 V which is twice the effective voltage in parallel arrangement of two cells.
c) The cells in a conventional flash light are connected in series.

(iii) Suspend each of the three bars separately by means of a thread. We will observe that one bar sets itself in a particular direction even after being disturbed and the other two can stay in any direction. The one having a fixed direction will be a permanent magnet. Remove this bar and bring it near the other bars. One of them will be attracted by the magnet bar at both the ends. This is the soft iron bar. The third bar will be of a non-magnetic substance.

ICSE

CLASS 9

CHEMISTRY

MOCK PAPER 1

SOLUTIONS

ICSE Board
Class 9 Chemistry
Mock Paper – 1

SECTION A

Solution 1

(i) (d)
(ii) (b)
(iii) (a)
(iv) (c)
(v) (d)
(vi) (c)
(vii) (a)
(viii) (a)
(ix) (c)
(x) (d)
(xi) (d)
(xii) (b)
(xiii) (d)
(xiv) (c)
(xv) (b)

Solution 2

(i)

(a)

Element	Mass No.	Atomic No.	p	n	e
A	1	1	1	**0**	**1**
B	14	**7**	7	**7**	7
C	**24**	12	12	12	**12**
D	35	**17**	17	**18**	17

(b) Electronic configuration of A = 1
Electronic configuration of B = 2, 5
Electronic configuration of C = 2, 8, 2
Electronic configuration of D = 2, 8, 7

(c) A = Hydrogen, B = Nitrogen, C = Magnesium, D = Chlorine

(d) A = 1, B = 5, C = 2, D = 7

(e) A = 1, B = 3, C =2, D = 1

(ii)

Column I	Column II
1. Torr	(c) Pressure
2. Kelvin	(d) Temperature
3. cm^3	(e) Volume
4. Boyle's law	(b) $P_1V_1 = P_2V_2$
5. Charle's law	(a) $V_1/T_1 = V_2/T_2$

(iii)

(a) Dalton used the symbol for oxygen and the symbol for hydrogen.
(b) Symbol represents gram atom(s) of an element.
(c) Symbolic expression for a molecule is called molecular formula.
(d) Sodium chloride has two radicals. Sodium is a basic radical, while chloride is an acid radical.
(e) Valency of carbon in CH_4 is 4, in C_2H_6 is 4, in C_2H_4 is 4 and in C_2H_2 is 4.

(iv)

(a) $3Mg + N_2 \rightarrow Mg_3N_2$
(b) $Mg_3N_2 + 6H_2O \rightarrow 3Mg(OH)_2 + 2NH_3$
(c) $Cu(OH)_2 \xrightarrow{\Delta} CuO + H_2O$
(d) $2KClO_3 \xrightarrow{\Delta} 2KCl + 3O_2$
(e) $2ZnS + 3O_2 \rightarrow 2ZnO + 2SO_2$

(v)

(a) Double decomposition (Neutralisation)
(b) Double displacement (Precipitation)
(c) Synthesis
(d) Thermal decomposition
(e) Synthesis

SECTION-B

(Attempt any four questions)

Solution 3

(i)

Acidic radical	Basic radical
SO_4^{2-}	Fe^{2+}
NO_2^-	Ni^{2+}

(ii) Characteristics of a chemical reaction:

(a) When hydrochloric acid is added to silver nitrate, a white precipitate of silver chloride is formed.

(b) When calcium carbonate is heated it decomposes to give calcium oxide and carbon dioxide gas is evolved.

(iii)

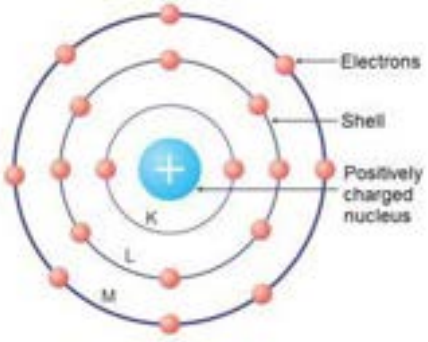
(a) Effervescent: Washing soda, Glauber's salt
(b) Deliquescence: $FeCl_2$, $MgCl_2$
(c) Hygroscopic: CuO, $CuSO_4$

(iv)

Pollutants	Origin	Harmful effect
Carbon monoxide (CO)	It is produced by incomplete combustion of fuels such as petrol, diesel and wood and also cigarettes.	It reduces oxygen carrying capacity of blood which causes retardation and dizziness.
Carbon dioxide (CO_2)	It is produced by burning of coal, oil and natural gases.	It reduces oxygen levels.
Chlorofluorocarbons (CFC)	It is released by refrigerators and air conditioning systems.	It causes reduction in the ozone layer that protects us from harmful ultraviolet rays of the Sun.

Solution 4

(i) Closed physical contact (mixing): A chemical reaction occurs when two substances are mixed in the solid state. Example: Iodine and sulphur react explosively when brought into close contact. When sodium metal comes in contact with cold water, it reacts violently and an explosion reaction occurs.



Niels Bohr's Atomic Model

(ii) Bohr's model of atom:

(iii) Causes of Water Pollution:

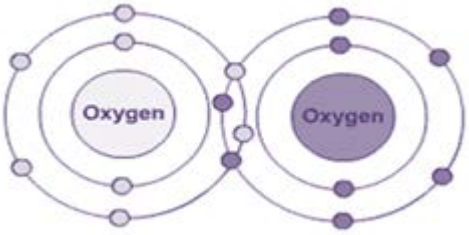
1. Household detergents – Chemical cleaning organic substances.
2. Industrial waste – Waste from industrial sources which contain harmful toxic chemicals.
3. Domestic sewage – Waste water from household activities which contain both organic and inorganic materials.
4. Offshore oil drilling – Exploring of oil and gas below the ocean floors releases drilling fluids and causes oil spills which result in the pollution of marine water.
5. Agricultural wastes – Residues of agricultural work such as pesticides, fertilisers etc. pollute water.
6. Thermal pollution – Elevated water temperatures decrease oxygen levels, kill marine organisms and affect ecosystem composition.

(iv)

(a) The clement B would have lower metallic character than A.
(b) The element A would probably have higher electron affinity than B.
(c) The element A would have smaller atomic size than B.

Solution 5

(i) Bonding between two oxygen atoms: A double covalent bond is formed by sharing two pairs of electrons between two oxygen atoms, each contributing two electrons.



(ii)

(a) Thermal decomposition: A decomposition reaction brought about by heat.

$$2KClO_3 \xrightarrow{\text{Heat}} 2KCl + 3O_2 \uparrow$$

(b) Electrical decomposition: On passing electric current through acidulated water, water produces two volumes of hydrogen gas and one volume of oxygen gas.

$$2H_2O_{(l)} \xrightarrow{\text{Electric Current}} 2H_{2(g)} + O_{2(g)}$$

(iii)

(a) Zinc is the most preferred metal in the laboratory preparation of hydrogen.
(b) Dilute sulphuric acid.

Conc. nitric acid, even in its dilute form, is not used in the preparation of hydrogen from metals because it is a powerful oxidising agent. Oxygen formed due to its decomposition oxidises hydrogen to give water, thus defeating the purpose of the reaction.

Conc. Sulphuric acid is not used in the preparation of hydrogen as it will produce sulphur dioxide.

(c) The gas is collected by the downward displacement of water.
Common drying agents such as fused calcium chloride, caustic potash stick and phosphorous pentoxide remove water vapour.

(iv)

(a) $NaOH(aq) + HCl(aq) \rightarrow NaCl(aq) + H_2O(l)$

(b) $Na_2SO_4(aq) + BaCl_2 \rightarrow BaSO_4(s) + 2NaCl(aq)$

Similarity: A reaction in which ions of the reactants exchange places to form two new compounds, hence both the reactions are double displacement reactions.

Difference: The reaction (a) is just double displacement where there is no precipitation. While reaction (b) is a type of double decomposition or precipitation where an insoluble solid ($BaSO_4$) formed.

Solution 6

(i)

	Valency	Formula
(a) Ammonium ion	+1	NH_4^+
(b) Cupric ion	+2	Cu^{2+}

(ii) Impacts of acid rain:

(a) Changes the acidity of soil

The acids present in acid rain such as nitric acid, nitrous acid, sulphuric acid and sulphurous acid increase the acidity of soil. It removes calcium and potassium minerals, i.e. the basic ingredients from the soil lose their fertility.

The hydrogen ions H^+ which are added to the soil when acid rain falls to the Earth interact chemically with existing soil minerals.

$$H_2SO_4 + H^+ \rightleftharpoons 2\,H^+ + SO_4^{2-}$$

(b) Affects water bodies and marine organisms

The water of lakes and rivers becomes acidic and may no longer support aquatic life.

(iii)

	Points	Similarity of hydrogen with alkali metals [Group 1 (IA)]	Similarity of hydrogen with halogens [Group 17 (VIIA)]
(a)	**Electronic configuration**	Electronic configuration = 1. Thus, 1electron in the outermost valence shell. Example: H = **1**; Li = 2, **1**; Na = 2, 8, **1**; K = 2, 8, 8, **1**	One electron less than the nearest noble gas. Example: H = 1 (He = 2) F = 2, 7 (Ne = 2, 8) Cl = 2, 8, 7 (Ar = 2, 8, 8)
(b)	**Ion formation**	Electropositive character exhibited. $H - 1e^- \rightarrow H^{1+}$ $Li - 1e^- \rightarrow Li^{1+}$ $Na - 1e^- \rightarrow Na^{1+}$	Electronegative character exhibited. $H + 1e^- \rightarrow H^{1-}$ $F + 1e^- \rightarrow F^{1-}$ $Cl + 1e^- \rightarrow Cl^{1-}$
(c)	**Valency**	Electrovalency of one exhibited. H^{1+}, Li^{1+}, Na^{1+}	Electrovalency and covalency exhibited. Hydrogen forms NaH (electrovalent) CH_4 (covalent) Chlorine forms NaCl (electrovalent) CCl_4 (covalent)

(iv)

Let the initial volume of gas (V_1) = x

Initial temperature of gas (T_1) = 0°C

..... = 0 + 273 K = 273K

Final volume (V_2) = $\frac{x}{6}$

Final temperature $(T)_2$ = ?

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

$$\frac{x}{T_1} = \frac{x}{6 \times T_2}$$

$$T_2 = \frac{273x}{6 \times x} = 45.5 \text{ K}$$

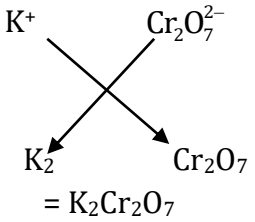
$$= 45.5 - 273$$

$$= -227.5°C$$

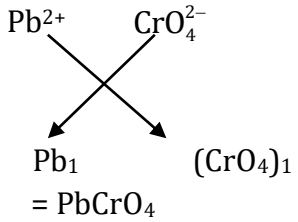
Solution 7

(i)

(a)



(b)



(ii) Certain chemical reactions are characterized by typical changes which are quiet easily observed. One of the characteristics is 'change of state'. In some reactions, a change of a state is observed. The reaction starts with solid or liquid reactants and end up with gaseous products and vice versa. Example: Ammonia gas reacts with hydrogen chloride gas to form ammonium chloride which is in the solid state.

$$NH_3(g) + HCl \rightleftharpoons NH_4Cl$$

(iii)

(a) Rubidium
(b) Copper
(c) Oxygen

(iv) Solubility of a solute in a particular solvent at a particular temperature is the maximum amount of a solute in gram that can be dissolved in 100 gram of a solvent at that temperature.

Factors Affecting Solubility:

1. Size of solute particles: Smaller the size of solute particles, greater will be the solubility of that solute.
2. Stirring: It brings more of the solvent in contact with the solute, thus, increasing the rate of the formation of the solution.
3. Temperature: Solubility of a solid solute increases with increase in temperature.
   i. Solubility of a gas solute decreases with increase in temperature.
   ii. Solubility of a gas solute increases with increase in pressure.

Solution 8

(i)

(a) The physical and the chemical properties of the elements are the periodic functions of their atomic numbers.

(b) Group 17

(ii)

(a) 1 atmosphere = 76 cm. Hg =760 mm Hg

(b) A decrease in the pressure at a constant temperature increases the volume of a gas.

(iii) General methods of preparation of hydrogen by the reaction of metals with cold water form metal hydroxide and liberate hydrogen gas.

	Metal	**Reaction**	**Reason why method is not preferred**
(a)	Potassium	$2K + 2H_2O \rightarrow 2KOH + H_2\uparrow$	The reaction is violent and exothermic. The heat liberated during the reaction ignites hydrogen.
(b)	Sodium	$2Na + 2H_2O \rightarrow 2NaOH + H_2\uparrow$	The reaction is violent but comparatively less violent than potassium. Sodium melts into a silvery globule and darts about the water.
(c)	Calcium	$Ca + 2H_2O \rightarrow Ca(OH)_2 + H_2\uparrow$	The reaction is slightly vigorous, but calcium is quite expensive. Hence, it is economically not viable.

(iv) Excessive use of chlorofluorocarbon is one of the reason for ozone layer depletion. It is released by refrigerators and air conditioning systems.

It causes reduction in ozone layer that protects us from harmful ultraviolet rays (UV radiations) of the Sun.

The chlorofluorocarbons are decomposed by the ultraviolet rays to highly reactive chlorine which is produced in the atomic form.

$$CF_2Cl_2 \xrightarrow{\text{Ultraviolet rays}} CF_2Cl + Cl$$

(Free radical)

The free radical [Cl] reacts with ozone to form chlorine monoxide.

$$Cl + O_3 \rightarrow ClO + O_2$$

(Chlorine monoxide)

This causes depletion of the ozone layer. Chlorine monoxide then reacts with atomic oxygen to produce more chlorine free radicals.

$$ClO + O \rightarrow Cl + O_2$$

(Free radical)

This free radical destroys ozone, and the process continues depleting the ozone layer.

ICSE

CLASS 9

CHEMISTRY

MOCK PAPER 2

SOLUTIONS

ICSE Board
Class 9 Chemistry
Mock Paper – 2

SECTION A

Solution 1

(i) (a)
(ii) (b)
(iii) (a)
(iv) (b)
(v) (d)
(vi) (b)
(vii) (a)
(viii) (b)
(ix) (a)
(x) (d)
(xi) (d)
(xii) (a)
(xiii) (b)
(xiv) (a)
(xv) (b)

Solution 2

(i)

(a)

Element	Group	Period	Element Configuration		
			K	L	M
A	17	3	2	8	7

(b)

Metal	Non-metal	Inert gas
B	A	E
	B	
	C	

(c)

Element	Element Configuration		
	K	L	M
A	2	8	7
B	2	8	1
C	2	4	_
D	2	6	_
E	2	8	8

(ii)

Column I	Column II
1. Aluminate	(e) AlO_2^{-2}
2. Chromate	(c) CrO_4^{-2}
3. Caustic Potash	(a) KOH
4. Lime stone	(b) $CaCO_3$
5. Silica	(d) SiO_2

(iii)

(a) acid rain
(b) greenhouse
(c) ultraviolet
(d) ozone
(e) chlorine

(iv)

(a) Element A
Atomic number = 7 = Number of electrons = 2, 5
Valency of A = 8 – 5 = 3
(b) Element B
Electronic configuration 2, 8, 8
Valency of B = Zero
(c) Element C has 13 electrons
Electronic configuration = 2, 8, 3
Valency of C = 3
(d) Element D
Protons = 18 = Electrons = 2, 8, 8
Valency of D = Zero
(e) Element E
Electronic configuration = 2, 8, 8, 1

(v)

(a)

1. K = °C + __273__

2. 1 dm3 = __1000__ cm3

3. 1 torr = __760__ mm of Hg

(b)

1. Boyle's law: At constant temperature, the volume of a given mass of a dry gas is inversely proportional to its pressure.
   $V \propto 1/P$(At constant temperature)

2. Charles' law: At constant pressure, the volume of a given mass of a dry gas increases or decreases by 1/273 of its original volume at 0°C for each degree centigrade rise or fall in temperature.
   $V \propto T$ (At constant pressure)

SECTION-B

(Attempt any four questions)

Solution 3

(i) Greenhouse effect is the process of heating up of the Earth's atmosphere due to trapping of the Sun's infrared radiations reflected from the Earth's surface by gases like carbon dioxide, water vapour, nitrous oxide, ozone, methane which are called greenhouse gases.
These gases act as a thermal blanket and do not allow the heat energy to escape, thus causing the heating up of the atmosphere. It is due to the greenhouse effect of gases like carbon dioxide that the planet earth is ideally warm for the survival of life on it. However, excess accumulation of greenhouse gases is causing further warming of the earth. This is called global warming which could be hazardous.

(ii) Displacement reactions are those reactions in which one element takes the place of another element in a compound. The more reactive element displaces the less reactive element from its compound.
$AB + C \rightarrow AC + B$
Example:
$Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$
Here, zinc displaces copper from copper sulphate solution to form zinc sulphate and copper.

(iii)

(a) Solution: A homogeneous mixture of two or more substances which are chemically non-reacting, whose composition can be varied within certain limits is called a solution.

(b) <u>Crystallisation:</u> It is the process by which crystals of a substance separate out on cooling its hot saturated solution

(c) Hard water: Water is said to be hard when it does not readily form lather with soap.

(iv) Valency of metal M is +2.

(a) Hydroxide: $M(OH)_2$

(b) Nitrate: $M(NO_3)_2$

(c) Oxide: MO

Solution 4

(i) Characteristics of chemical reaction:

(a) Formation of precipitate: Some chemical reactions are characterised by the formation of a precipitate. The precipitate is an insoluble solid substance.

(b) Change of state: In some reactions, a change of a state is observed. The reaction starts with solid or liquid reactants and ends up with gaseous products and *vice versa*.

$NH_3(g) + HCl(g) \rightleftharpoons NH_4Cl(s)$

(ii) Nature of bond in XY_2 is an ionic bond.

(iii)

(a) Water is an excellent liquid to use in cooling systems because of its ability to absorb large quantities of heat as a cooling agent.

(b) A water-soluble solid disappears in a solution where the solvent is water, and water has the property of being clear and transparent. So, the solution is also always clear and transparent.

(c) Lakes and rivers do not freeze suddenly in winters because of the high specific latent heat of solidification, i.e. the amount of heat released when 1 g of water solidifies to form 1 g of ice at 0°C. It is about 336 J/g or 80 cal/g.

(iv)

(a) Cl

Metals have low ionisation energy and non-metals have high ionisation energy. Also, across the period, ionization energy tends to increase. The elements P, Na and Cl belong to the third period. Na - Group 1, P - Group 15 and Cl - Group 17.

(b) Ne

Inert gases have zero electron affinity because of their stable electronic configuration.

(c) He

Ionisation energy decreases with an increase in the atomic size, i.e. it decreases as one moves down a group. Ne, He and Ar are inert gases. He - Period 1, Ne - Period 2 and Ar - Period 3.

Solution 5

(i)

(a) Calcium nitrate

Symbol Ca NO_3

Valency: Ca^{2+} NO_3^{1-}

1- 2+

Formula: **$Ca(NO_3)_2$**

(b) Sodium chloride

Symbol Na Cl

Valency: Na^{2+} Cl^{2-}

2- 2+

Formula: Na_2Cl_2 = **NaCl**

(ii) Substances which influence the rate of a chemical reaction by improving the efficiency of the catalyst are called promoters. In the manufacture of ammonia, iron acts as a catalyst. Molybdenum is added and functions as a promoter by improving the efficiency of iron.

$$N_2 + 3H_2 \underset{\text{molybdenum}}{\overset{\text{Iron+}}{\rightleftharpoons}} 2NH_3$$

(iii) General methods of preparation of hydrogen from the reaction of metals with acids:

- Hydrogen is displaced from acids when the latter react with some metals (more reactive than hydrogen). The extent to which this reaction occurs for a given metal also gives the activity series of metals.
- The metals placed near the top of the series are the most reactive, while those placed near the bottom are the least reactive.
- When dilute hydrochloric acid or dilute sulphuric acid react with the metals above hydrogen in the activity series, they produce hydrogen. However, the

metals below hydrogen in the activity series do not.

(a)	Magnesium	$Mg + 2HCl \rightarrow MgCl_2 + H_2\uparrow$
(b)	Aluminium	$2Al + 3H_2SO_4 \rightarrow Al_2(SO_4)_3 + 3H_2\uparrow$
(c)	Zinc	$Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2\uparrow$

(iv)

(a) $CuCO_3 \xrightarrow{\Delta} CuO + CO_2\uparrow$ (Thermal decomposition of metal carbonates)

(b) $2Zn(NO_3)_2 \xrightarrow{\Delta} 2ZnO + 4NO_2 + O_2\uparrow$ (Thermal decomposition of metal nitrates)

(c) $4AgOH \xrightarrow{\Delta} 4Ag + 2H_2O + O_2\uparrow$ (Thermal decomposition of metal hydroxides)

Solution 6

(i) Isobars are atoms of different elements with the same mass number but different atomic numbers. For example, two elements calcium $^{40}_{20}Ca$ and argon $^{40}_{18}Ar$. The number of electrons in these atoms is different, but the mass number of both these elements is 40. That is, the total number of nucleons is the same in the atoms of this pair of elements.

(ii)

$2Ag_2O(s) \xrightarrow{heat} 4Ag + O_2\uparrow$

$2Pb_3O_4 \xrightarrow{heat} 6PbO + O_2\uparrow$

(iii) Initial volume of gas $V_1 = 5.6\ dm^3$

Initial pressure of gas $P_1 = 2$ atm

The 20% of initial pressure $= 2 \times \frac{20}{100} = \frac{4}{10} = 0.4$

Final pressure $P_2 = 0.4 + 2 = 2.4$ atm

Final volume $V_2 = ?$

$P_1V_1 = P_2V_2$

$2 \times 5.6 = 2.4 \times V_2$

$V_2 = \frac{5.6 \times 2}{2.4} = 4.67\ dm^3$

(iv) Hydrogen is the first element in the periodic table. Its atomic number is 1.

- It is has only one electron in its outermost (valence) shell. Hence, it belongs to the first group and the first period of the periodic table. Though the properties of hydrogen should be similar to those of the other members of the 1st group, but this is not the case.
- This is because some of the properties of hydrogen resemble the properties of group IA elements (Alkali metals) and some of it resembles the properties of Halogens (VIIA), so hydrogen was put at the top of the periodic table so that the symmetry of the modern periodic table is not disturbed,

Solution 7

(i)

	Radicals	Formula	Valency
(a)	Nitride	N^{3-}	−3
(b)	Bicarbonate	HCO^{3-}	−1

(ii) Reactions which occur by the action of light are called photochemical reactions or photolysis. Molecules of the reactants absorb light energy, get activated and then react rapidly.

Photosynthesis:

$$6CO_2 + 6H_2O \xrightarrow{\text{Sunlight}} \underset{\text{(Glucose)}}{C_6H_{12}O_6} + 6O_2 \uparrow$$

(iii)

(a) Atomic number
(b) Periods
(c) Alkali

(iv)

(a) Washing soda is an efflorescent salt. When it is exposed to the atmosphere, it loses its water of crystallistion and crumbles to form a powder. Thus, it loses its weight when exposed to the atmosphere.

(b) Substances which are insoluble in water actually dissolve in traces. So, when water is stored in a sealed glass bottle, a small amount of glass dissolves in water and leaves an etching on the surface of glass.

(c) Sodium chloride salt contains impurities like magnesium chloride and calcium chloride which are deliquescent substances. So, these impurities absorb moisture from the atmosphere. Due to this, sodium chloride becomes wet.

Solution 8

(i)

(a) Seventh period is an incomplete period.
(b) At the end of 2nd and 3rd period, there is a presence of an inert gas having eight electrons in the valence shell having stable electronic configuration following octet rule.

(ii) Initial volume of gas (V_1) = 100 cm^3
Initial temperature (T_1) = 27 + 273 = 300 K
Final volume (V_2) = ?
Final temperature (T_2) = 20 + 273 = 293 K

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

$$\frac{100}{300} = \frac{V_2}{293}$$

$$V_2 = \frac{100 \times 293}{300}$$

$$= 97.66 \text{ cm}^3$$

(iii)

(d) Hydrogen and chlorine (in their equal volumes) react slowly in diffused sunlight but reacts explosively in direct sunlight. A spontaneous reaction takes place with the release of a large amount of energy.

$H_2 + Cl_2 \xrightarrow{\text{Sunlight}} 2HCl$

(e) Dry hydrogen when passed over heated metals, such as Na, K and Ca, reacts to give their corresponding hydrides. The hydride formed further reacts with water to form hydrogen gas.

$2K + H_2 \rightarrow 2KH$

(f) Hydrogen reduces metal oxides to give metals; i.e. hydrogen is a reducing agent. Thus, metal is liberated from metal oxide when hydrogen gas is passed over strongly heated metal oxide. Colour changes from brown to grey as metal oxide changes to metal.

$Fe_2O_3 + 3H_2 \rightarrow 2Fe + 3H_2O$

(iv) Effects of Global Warming

1. Due to global warming, the ice at the poles of the Earth starts melting. This could cause a rise in the sea level which could further result in flooding of coastal areas.

   Even a 0.5 m to 1.5 m rise in the sea level can cause flooding of coastal cities.
2. It is alarming and we need to take essential measures to control the rise in the proportion of carbon dioxide and other greenhouse gases.
3. Global warming can lead to change in rain pattern as well as shift in crop zones. For example, wheat producing zones will shift from Russia and Canada to less fertile polar regions.

ICSE

CLASS 9

BIOLOGY

MOCK PAPER 1

SOLUTIONS

ICSE Board
Class 9 Biology
Mock Paper – 1

SECTION A

Answer 1

(i) Epiglottis
(ii) Cell membrane
(iii) Fibrous connective tissue
(iv) Stigma and anthers mature at the same time
(v) Baker's yeast
(vi) Bacillus
(vii) Alveoli
(viii) The skin will turn dry and rough
(ix) Cervical- 7
(x) Stomach into intestine
(xi) Proteins
(xii) It has all the four whorls
(xiii) Maize grain- coleoptile
(xiv) Absence of centrosome
(xv) Stomata and lenticels

Answer 2

(i)
(a) Cell
(b) Human Immunodeficiency Virus (HIV)
(c) Diastema
(d) Serum
(e) Prophylaxis

(ii)
(a) False. (Coconut is not a dry fruit.)
(b) False. (Insects have three pairs of legs.)
(c) True
(d) False. (Intercostal muscles help in external respiration or breathing.)
(e) True

(iii)

Column I	Column II
(a) Ribosomes	2. Protein synthesis
(b) Vacuoles	4. Store excess water
(c) Cell membrane	5. Entry and exit of substances in and out of the cell
(d) Centriole	1. Cell division
(e) Nucleus	3. Regulates growth of the cell

(iv)

(a) Frog. It is an amphibian, while lizard, snake, tortoise are reptiles.
(b) Centrosome. It is not present in a plant cell, while chloroplast, mitochondria and cell wall are present in a plant cell.
(c) Cartilage. It is an animal tissue, while collenchyma, sclerenchyma, parenchyma are plant tissues.
(d) Formalin. It is an example of a disinfectant while lysol, carbolic acid and benzoic acid are examples of antiseptics.
(e) Pine. It belongs to Kingdom Plantae while *Chlamydomonas*, *Amoeba*, *Paramoecium* belong to Kingdom Protista.

(v)

(a)

Prokaryotic cell	Eukaryotic cell
1. Prokaryotic cells do not have a well-defined nucleus.	1. Eukaryotic cells have a well-defined nucleus.
2. Presence of one chromosome is observed in these cells.	2. Presence of more than one chromosome is observed in these cells.

(b)

Respiration	Breathing
1. Respiration involves oxidation of glucose.	1. Breathing involves taking in of O_2 and giving out CO_2.
2. Respiration liberates energy.	2. Breathing does not liberate energy.

(c)

Parenchyma	Sclerenchyma
1. The cells are oval or spherical.	1. The cells are angular.
2. Nucleus is present in these cells.	2. Nucleus is absent in these cells.

(d)

Striated muscles	Unstriated muscles
1. Myofibrils with alternate light and dark bands.	1. Myofibrils without alternate light and dark bands.
2. Striated muscles are involved in voluntary actions.	2. Unstriated muscles are involved in involuntary actions.

(e)

Active Immunity	Passive Immunity
1. Produced by one's own body.	1. Received from an outside source.
2.Provides effective and long-lasting protection	2. Protection is less effective and does not ensure protection against subsequent infections.

SECTION B

Answer 3

(i) The energy liberated in respiration is stored in the form of ATP inside the cells. Some part of it is lost as heat to the surroundings.

(ii) Protoplasm is the cell's life matter. Because protoplasm's chemical composition is so complicated, it cannot be chemically analysed. It varies slightly from cell to cell, however the common components involved in protoplasm composition, such as carbon, hydrogen, oxygen, nitrogen, sulphur, iron, and phosphorus, are the same in all cells.

(iii) A tissue is a group of similar cells from the same origin that work together to perform a specific function. An egg is a zygote or a cell, however a cluster of eggs cannot be considered as a tissue because it does not form an organ like a tissue. Instead, when fertilised, it produces a new individual organism.

(iv) Advantages of-

a) Long and feathery stigma - allows catching of dispersed pollen grains in the wind and increases the adhesiveness of the attachment.

b) Smooth and light pollen - easily carried by wind and are characteristic of wind-pollinated plants.

(v)

a) Because the cotyledon of the seed absorbs food from the endosperm, germinated grams are considered very nutritious. It is high in carbohydrates and protein in its outermost layer.

b) Yes, we call it germination because all of the changes that lead to the creation of a seedling are referred to as germination. The epicotyl or hypocotyl elongates during germination.

Answer 4

(i) Phylum, Class, Order, Family, Genus, Species

(ii) Spore formation is not considered as a type of reproduction in bacteria because bacteria reproduce solely asexually through fission or cell division. Spore development is simply a means of evading adverse environments.

(iii) A balanced diet is one that includes all of the major food ingredients in adequate amounts.

A balanced diet is one that gets at least 50% of its energy from carbs, 35% from fat, and 15% from protein. The specific recommended amounts of each nutrient will vary

depending on age, gender, and activity level.

(iv) It is critical to thoroughly chew our meals since chewing aids in the breakdown of complex food ingredients into simpler molecules. Chewing stimulates the salivary glands to produce saliva. The saliva moistens the meal and forms a bolus that is readily swallowed. Saliva also contains enzymes that aid in the breakdown of carbohydrates.

(v) A structure that has been moved by a muscle cannot be returned to its original place until another muscle acts on it. Antagonistic muscles are those that create opposing movements.

When you flex your arm above the elbow, the muscle above the upper arm, known as the biceps, can be seen and felt bulging. As a result of contraction, this muscle shrinks in length, stiffens, and thickens. Biceps contraction pulls the forearm towards the upper arm. However, biceps relaxation cannot return the forearm to its former posture. When the arm is stretched or straightened, the triceps muscle, located near the back of the upper arm, contracts. To bend or flex and straighten the arm at the elbow, the two muscles operate antagonistically or in opposed ways.

Answer 5

(i) Modified sweat gland is mammary gland and modified sebaceous gland is Meibomian gland.

(ii) The air released after breathing is always warmer or at body temperature. It can be sensed by exhaling air on our own hand. The warmth of the air released during breathing can be felt.

(iii) An elephant's cells would be of the same size as a rat's cells. The size of cells within organisms does not vary; nevertheless, the number of cells varies from one creature to the next. A larger animal, such as an elephant, will have more cells than a smaller species, such as a rat. However, the cell size will remain constant.

(iv) Ciliated columnar epithelium is found in the tracheal lining. The free ends of this epithelium have thread-like extensions called cilia. The cilia are constantly lashing out and moving the materials that enter this organ.

(v)

a) Figure A represents stamen.
b) Contents in the pollen sacs in B are male gametes.
c) The contents in the pollen sacs would come out through agents like air, wind, insects leading to pollination in flowers.

Answer 6

(i) Because expiration is caused by reverse motions of the ribs and diaphragm, gaseous exchange occurs in the lungs even during expiration. The thoracic cavity is reduced and the lungs are squeezed as a result of rib and diaphragm motions, forcing air out into the atmosphere.

(ii) Skin limits energy loss from the body. It conserves body heat in cold weather and promotes heat loss in hot weather.

(iii) Muscles pull the structures together. A muscle has two ends: a fixed end that originates the muscle and a moveable end that pulls on another section. The movable end is

drawn out to produce a robust structure linked to the bone known as a tendon. When a nerve stimulates a muscle, it contracts and gets shorter and thicker, pulling the bone at its movable end. Muscles can only contract and relax; they do not have the ability to lengthen.

(iv) Roughage is a type of dietary fibre that is mostly made up of cellulose. It cannot be digested by our bodies because they lack cellulose-digesting enzymes. Example- Fruits and green leafy vegetables contain roughage.

(v) Role of microorganisms in industrial production:

a) Bacteria are utilised in the creation of vinegar as well as the processing of coffee, tobacco, and other products.
b) Certain microorganisms produce different flavours of tea, coffee, and other beverages.
c) Bacteria are utilised to produce antibiotics, enzymes, hormones, serum, vaccines, and toxoids on a massive scale.

Answer 7

(i) Because the nose includes hair and mucous that trap dust and microorganisms, breathing through the nose rather than the mouth ensures that the inhaled air is pure and the respiratory passage is free of dust and microorganisms.

(ii) It is critical to understand how germs leave a patient's body because various diseases and infections spread through air, water, or direct touch. To take precautions and prevent people from subsequent illnesses, it is necessary to understand how germs exit the body of an infected individual.

(iii) TAB vaccine for typhoid, BCG vaccine for measles and DTP vaccine for diphtheria, tetanus and pertussis (whooping cough)

(iv) Functions of World Health Organisation:

a) To promote and support disease research programmes.
b) To gather and disseminate information about the presence of epidemic diseases such as cholera, plague, and yellow fever.

(v) Usefulness of waste incineration:

a) It minimises the waste's weight.
b) It decreases the amount of garbage.
c) It converts harmful waste into less toxic or non-toxic waste.

Incineration safety precautions:

a) It should be done at extremely high temperatures.
b) It should be outfitted with pollution-control equipment.
c) It should be placed in an area away from residential zones.

Answer 8

(i) Organs of an organism are body parts that have a specific shape and structure and perform specified duties. Cell organelles are also cell components that have a distinct shape and structure and conduct unique functions. Organelles have the same status in a cell as organs do in an animal's or plant's entire body, performing specific duties.

(ii) Photosynthesis and respiration occur in green plants during the day. CO_2 evolution is used to show respiration in living organisms. CO_2 created during plant respiration is consumed during photosynthesis, hence there is no CO_2 evolution. As a result, demonstrating respiration in green plants is challenging because there is no CO_2 evolution throughout the day.

(iii) Goose flesh is a distinctive roughness of the skin caused by cold or fear, in which the hair follicles rise erect and form bumps on the skin.

Goose flesh develops when the erectors or arrector muscles at the base of the hair contract. The erector muscles are positioned obliquely between the hair follicle and the dermal layer. They are smooth muscles that are required for hair movement. The erector muscle contracts, pulling the hair vertical and depressing the skin, resulting in goose flesh.

(iv) <u>Adaptations in ileum for the absorption of digested food:</u>

a) Long in order to give additional surface area for absorption.
b) The presence of a significant number of villi increases the surface area even further.

(v) <u>Advantages of cross-pollination:</u>

a) The offspring are healthier.
b) The seeds that are generated are abundant and fertile.
c) Cross-pollinating two different kinds of the same species might result in the production of new variations.

<u>Disadvantages of cross-pollination:</u>

a) Pollination is not always guaranteed.
b) Pollen must be produced in big quantities.
c) The procedure is uneconomical for the plant because the flowers must be huge, colourful, fragrant, and generate nectar to attract pollinators.

ICSE

CLASS 9

BIOLOGY

MOCK PAPER 2

SOLUTIONS

ICSE Board
Class 9 Biology
Mock Paper – 2

SECTION A

Answer 1

(i) they have no chlorophyll
(ii) Mitochondria
(iii) Rings of vascular bundles in a monocot stem
(iv) Ovule
(v) Pollen grain
(vi) Vertebrates and invertebrates
(vii) A, D and E
(viii) HCl and Pepsin
(ix) Cartilage
(x) Albinism, Leucoderma
(xi) loss in dry weight
(xii) Cholera
(xiii) April 7
(xiv) Geneva
(xv) Plastics

Answer 2

(i)
(a) Complete flower
(b) Monoecious plant
(c) AIDS
(d) Gamosepalous
(e) Ribosomes

(ii)
(a) Cervical, Thoracic, Lumbar, Sacrum, Coccyx
(b) Nostrils, Pharynx, Larynx, Bronchioles, Alveoli
(c) Pollen grains, Stigma, Pollen tube, Ovary, Embryo sac
(d) Pharynx, Oesophagus, Stomach, Duodenum, Rectum
(e) Cell wall, Cell membrane, Cytoplasm, Nuclear membrane, Nucleolus

(iii)

Column I	Column II
(a) Penicillin	3. Antibiotic
(b) Cell wall	4. Plant cells
(c) Plants without roots, stem and leaves	5. Thallophyta
(d) Centrosome	1. Animal cells
(e) Moss	2. Bryophyta

(iv)

(a) Spirogyra (Algae), rest are fungi
(b) Crab (Class Crustacea), rest are Class Insecta
(c) Nymph (immature form of insect), rest are stages of life history of insects
(d) Mumps (infectious disease), rest are non-infectious diseases
(e) Liver (associated with digestive system), rest are structures of alimentary canal

(v)

(a)

Cold-blooded animals	Warm-blooded animals
The body temperature of cold blooded animals changes according to the surrounding temperature.	The body temperature of warm blooded animals remains constant irrespective of the surrounding temperature.

(b)

Self-pollination	Cross-pollination
Self-pollination is a type of pollination within a single flower or between two flowers of the same plant.	Cross-pollination is a type of pollination between two flowers of two different plants.

(c)

Snake	Earthworm
The body of a snake is covered by white scaly exoskeleton.	The body of an earthworm is soft and made up of segments.

(d)

Infectious diseases	Non-infectious diseases
Infectious diseases can be transmitted from one person to another.	Non infectious diseases cannot be transmitted from one person to another.

(e)

Inspired air	Expired air
Inspired air contains more O_2.	Expired air contains more CO_2.

SECTION B

Answer 3

(i) Calcium and phosphorus.

(ii) Ciliated epithelium is found in the lining of the trachea. Ciliated epithelium is a thin tissue that has hair-like structures on it. These hairs called cilia move back and forth to help move particles out of our body.

(iii) The two contrivances which favour cross-pollination are unisexuality and self-sterility.

(iv)

Embryo	Seed
• It remains within the seed in inactive or dormant state.	• It is a mature ovule after fertilisation.
• When embryo is exposed to favourable conditions, it germinates.	• It contains a tiny living plant called the embryo.

(v)

(a) Tapeworm

(b) It is a parasite.

(c) Suckers help the animals fix themselves to the gut wall of their hosts.

Answer 4

(i) Man - *Homo sapiens*
Domestic cat - *Felis domesticus*
Peepal tree - *Ficus religiosa*

(ii) The myofibril consists of two proteins called actin and myosin. In response to a nerve impulse, the actin filament slides over the myosin filament. This decreases the length of the sarcomere, which causes the muscle to contract.

(iii) Direct sunlight contains UV radiations from the Sun, which aid in the death of mould spores in the air. As a result, it is recommended that every living space in the house receive direct sunlight for at least a brief period of time.

(iv) Incisors are used for biting and cutting. Canines are used for holding and tearing food.

(v) The end products are
Starch - Maltose
Proteins - Small peptides and amino acids
Fats - Glycerol and fatty acids

Answer 5

(i) Two parts of our body where the supporting skeleton is made of cartilage instead of bone are external ear and tip of the nose.

(ii) Perspiration can be caused even when it is intensely cold outside when the temperature of the body rises due to strenuous physical activity, fever and sickness (Hypertension, High blood pressure).

(iii) We inhale air that is high in oxygen and low in carbon dioxide, and we exhale air that is low in oxygen and high in carbon dioxide. As a result, the statement "We breathe in oxygen and expel carbon dioxide" is incorrect.

(iv) The two methods of controlling flies are

- Elimination of breeding places of flies.
- Spraying houses and breeding places of flies with DDT and other insecticides.

(v) Diphtheria is a dangerous bacterial infection. It causes cold, cough, and sneeze, and if left untreated, it can lead to paralysis or heart failure.

Medication and supportive care are used in the treatment. The most crucial procedure is to provide diphtheria toxoid intravenously as soon as possible. Once administered to a patient, the toxoid causes the body to produce antibodies against the bacteria that cause diphtheria.

Answer 6

(i) The causative of AIDS is HIV (Human Immunodeficiency Virus).

Transmission of AIDS is through sexual intercourse, contaminated blood transfusions, mother to child transmission and injection needles.

(ii) The main functions of the Red Cross are-

- To extend relief and help the victims of any calamity — fire, flood, famine, earthquakes etc.
- To procure and supply blood for the victims of war and other calamities.

(iii) Broken glass utensils cannot be degraded by microorganisms. Hence, they are classified as non-biodegradable waste. To avoid danger, these should be disposed of in deep trenches. One of the applications of broken glass is that they can be utilised in the glass industry after melting.

(iv)

Organ	Organelle
• Visible to naked eyes and larger in size	• Microscopic
• They are present throughout the body	• Found within the cell

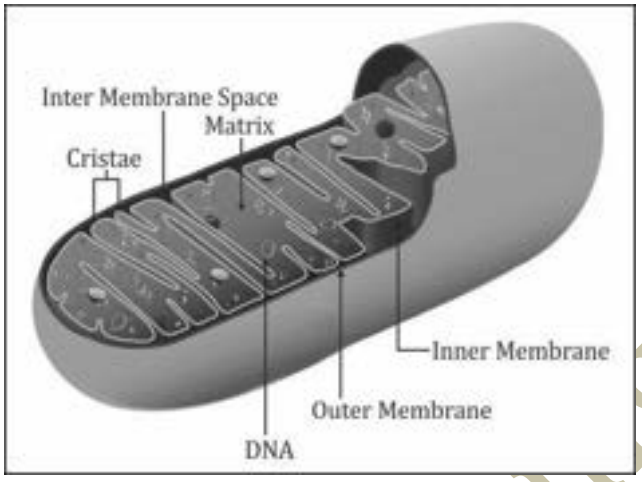
(v) The three kinds of muscles found in the human body are –

- Skeletal muscle – Biceps.
- Smooth muscle – Intestines and stomach.
- Cardiac muscle – Heart.

Answer 7

(i) The androecium of pea flower is diadelphous because the filaments of anthers are united in two bundles. Nine out of ten filament in a pea plant form a staminal tube. The tenth filament is free.

(ii) Structure of a mitochondrion:



(iii) Endospermic (albuminous) seeds — Castor, Maize, Poppy.
Non-endospermic (exalbuminous) seeds — Bean, Gram, Pea.

(iv) Respiration is considered to be the reverse of photosynthesis because:

- During respiration, organic food is broken down into its inorganic components, notably carbon dioxide and water. Organic food is created through photosynthesis from its inorganic components, which are carbon dioxide and water.
- Carbon dioxide is released during respiration, but carbon dioxide is consumed during photosynthesis.

(v) People from different countries and languages must read about each other's research in science. As a result, it was vital to minimise any potential confusion caused by local names. Certain universal laws govern the creation of scientific names. They are distinct and can be used to identify organisms all around the planet. As a result, scientific names for living things are preferred over colloquial names.

Answer 8

(i) Bacteria are unicellular organisms that lack membrane bound cell organelles like chloroplast, mitochondria, etc. and even a well-defined nucleus is absent which states that they have a simpler cellular organization.

(ii) *Rhizopus* is the common bread mold. It grows not only on bread but also on a variety of other organic matter such as cloth, wood, paper, leather goods, animal dung and even in food materials such as pickles, bread, fruit, chapatti etc. They specifically occur in humid and warm climatic conditions.

(iii) Whole grain *atta*, fruits and green leafy vegetables are the chief sources of roughage. The benefits of roughage are:

- It enables undigested food to move easily through the intestines.
- It stimulates secretion from the digestive tract.

(iv) Vitamins are small enough that they do not require enzyme digestion in order to be absorbed into the bloodstream. They are taken immediately from the digestive system and delivered by the blood to the cells, where they are absorbed and used as needed.

(v) Some joints, such as the shoulder and knee, must be held firmly in place in order to be properly lubricated. Such joints contain synovial fluid, a lubricating (loosening) fluid that acts as a cushion between the bones, reducing friction during movement. As we age, the movement of our joints becomes stiffer and less flexible as the synovial fluids decrease and the cartilage thins. Furthermore, when ligaments shorten and lose flexibility, joints become stiffer.

ICSE

CLASS 9

ENGLISH LITERATURE

MOCK PAPER 1

SOLUTIONS

ICSE Board
Class 9 English Literature
Mock Paper – 1

SECTION A

Ans 1.

i. (a)
ii. (b)
iii. (d)
iv. (d)
v. (a)
vi. (a)
vii. (b)
viii. (a)
ix. (b)
x. (d)
xi. (a)
xii. (b)
xiii. (c)
xiv. (a)
xv. (a)
xvi. (b)

Section B

Ans 2.

i. This scene takes place in Venice. The speaker of the above lines is Shylock. He says these words to Antonio.
ii. Shylock is referring to the insults hurled at him by Antonio such as speaking abusively of him and his money-lending, spitting on his long Jewish robe, kicking him, calling him a dog, and ridiculing the Jews in general.
iii. The "present wants" refer to the immediate need of Antonio for three thousand ducats to provide for Bassanio's trip to Belmont to woo Portia. The speaker is ready to supply the wants provided Antonio signs a bond, according to which, if Antonio is unable to pay him the money on the specified date, the penalty to be paid will be an exact pound of flesh from any part of Antonio's body.
iv. "This is kind I offer you" means, 'this is the kindness that I offer you'. This refers to Shylock lending money to Antonio without charging any interest on it. The speaker i.e., Shylock asks Antonio and Bassanio to accompany him to the notary and sign a bond in a merry sport.

v. Shylock insists on a pound of Antonio's flesh to take revenge on him and to put him completely at his mercy. Shylock's hatred for Antonio and Christians is shown in his absurd demand. Taking advantage of the situation, he wants to take revenge on Antonio and all Christians, who persecuted him and his race. He comes across as cunning, cautious, and crafty. Antonio is confident that there is no danger in signing the bond because, he is confident that one month before the date of payment, his ships will have brought nine times the amount they are borrowing and they will not have to pay the penalty. This incident shows Antonio's overconfidence and generosity towards Bassanio. Thus, Antonio comes across as easy-going, trust-worthy, slightly melancholic, romantic and naïve in this scene.

Ans 3.

i. Shylock is talking about his servant Launcelot. Launcelot is a Christian. Shylock, a Jew, considers Christians to be descended from Hagar, a slave woman mentioned in the Old Testament. So, he calls Launcelot "Hagar's offspring."
ii. Jessica lied to her father. Launcelot actually told her to look out of the window to catch a glimpse of her lover, Lorenzo. Since Jessica did not want her father to know about Lorenzo, she lies and tells her father that Launcelot was just saying goodbye.
iii. Shylock says that Launcelot is a voracious eater. He works as slow as a snail. He also sleeps more than a wild cat during the day. Shylock does not want such an idle person living with him. So, he parts with Launcelot.
iv. Shylock knows that Launcelot is leaving him to serve Bassanio. Bassanio has got a loan from Shylock for which Antonio has stood surety. So, Shylock says that he is glad Launcelot is going to Bassanio to help him waste the borrowed money.
v. Shylock asks his daughter to shut the door after he leaves. He quotes a proverb, "Fast bind, fast find," which means that locking something up is the best way to keep it safe. He says, "this is a good proverb that a smart person should always keep in mind." Jessica bids her father goodbye. She says that if everything goes according to plan, she would lose a father and her father would lose a daughter. She refers to her plan to elope with Lorenzo, a match that her father would never approve of.

SECTION C

Ans 4.

i. Mr. Oliver was an Anglo-Indian teacher in a public school at Simla. Mr. Oliver often strolled into the town in the evening. He returned after dark and usually took a shortcut through the pine- forest.
ii. The school at which Mr. Oliver worked was one of the best public schools in India. It was often referred to as the "Eton of the East". Most of the students came from wealthy Indian families. They dressed themselves up in the smart school uniform which included blazers, caps, and ties. The school was situated about three miles

away from the Simla Bazaar which was known for its cinemas and restaurants. Mr. Oliver had been teaching in this school for several years. Mr. Oliver encountered the boy sitting on a rock, all alone in the forest.

iii. Mr. Oliver sensed that something was wrong. He found the boy crying and shaking convulsively. When he questioned the boy about his problem, the boy did not look up and kept on sobbing as before. Mr. Oliver felt uneasy as the boy was sitting all alone in the dark forest.

iv. As Mr. Oliver flashed the torch on his face, he was horrified to see that the face had no eyes, ears, nose, or mouth. It was just a round smooth head with a school cap on. Immediately, the torch fell from Mr. Oliver's hand and he ran towards the school calling for help.

v. Mr. Oliver stumbled up to the watchman for help. The watchman asked Mr. Oliver about the cause of his terror. The latter told him that he had seen a boy without a face. Hearing this, the watchman lifted the lantern he carried to his own face and enquired if the face of the boy was as featureless as the watchman had. Then Mr. Oliver noticed that the face of the watchman also resembled that of the boy - no eyes, no ears, no features - not even an eyebrow! Ruskin Bond employs words and phrases like 'sad', 'eerie sounds', 'racked with silent sobbing', 'shook convulsively', etc., to create an atmosphere abounding in supernatural and fearful connotations. The story is opened with normal routine occurrences and then gradually built towards an atmosphere of strangeness and supernatural events through the use of imagery and language. The title itself suggests that something is not right and is eerie.

Ans 5.

i. The old man sitting beside the road was in a weary condition as he had already walked twelve kilometers and was too tired to move further. Moreover, his clothes were dusty and his face had turned grey. He was wearing steel-rimmed spectacles.

ii. At the beginning of the story, the author described the Pontoon Bridge as over the river. The carts, trucks, men, women, and children were crossing it. There was an old man sitting beside the road on the bridge who wore steel-rimmed spectacles and very dusky clothes and was too tired to walk further.

iii. The narrator's duty was to cross the bridge, explore the bridgehead beyond and find out how far the enemy had advanced.

iv. The old man had to leave his home in San Carlos because there was heavy firing from the enemy force which made him do so. The old man was the last to leave because he was taking care of his pet animals.

v. The Spanish Civil War forms the background of the story and Hemingway depicts how, in times of war, man acts inhumanly to his own race. War causes death and destruction, and this is highlighted through the condition of the old man who can be seen as the symbol of civilian victims of war. The old man gave meaning to his life by taking care of his animals, but the war took away everything from him. He sat alone by the side of the road; he felt as helpless as his goats; he could not escape and was too old and tired to save himself.

Section D

Ans 6.

i. The man is quite poor. He wears tattered clothing. In his view, the rich men were lazy and he saw them with hatred. He shook his coat to make himself comfortable but it was not adequate enough to keep him warm.
ii. The poor man is prejudiced against the rich one He is envious of the rich man and does not want to do anything that would benefit someone better off than he is. He calls him 'idle rich'.
iii. The poor are resentful towards the rich. They envy their wealth and luxury. They consider them to have got their wealth through unfair means and label them with words like 'idle without knowing anything about them. It is an economic prejudice.
iv. The rich man wanted to protect the wealth that he had stored from the poor. The poor man wanted to keep his log from benefitting the rich. Though they are financially at opposite ends, they have the same attitude-both are prejudiced and allow their prejudices to blind them. Both of them judge and label each other unfairly. It is interesting to note that both the rich and the poor man call the other one 'idle/lazy'.
v. The poor man withheld his log because he did not want it to benefit the rich man. He might have satisfied his prejudiced mind, but he did not achieve anything of value. All he succeeded in doing was making sure they both ended up dead. The outcome was not favourable because the man was driven by his hatred and did not think of his fatal end at all. He was willing to suffer the cold so long as the rich man suffered too.

Ans 7.

i. The poet promises that within a week or two of getting rid of their television sets, parents would be able to see changes in their children. The kids will search for something to read, which will give them a lot of joy.
ii. Children would begin to look for something to read. Once they start, they would become more joyful, interested, and intelligent. They would wonder why they used to watch TV and they would love their parents more.
iii. The children would become so immersed in the joy of reading that they would wonder why they ever found television interesting. He implies that books are very stimulating whereas the television set is not.
iv. Children would realize that their parents did a great thing by getting rid of the television set and introducing them to books instead. They would be so happy and get entertained by books, that they would realize the value of reading. Their gratitude would make them love their parents even more.
v. The poet advises parents to throw away their television sets and replace them with bookshelves filled with books. He says that children would not like it at all initially. They would be so angry and resentful that they would protest by giving them dirty looks and screaming at them. They might even bite, kick or hit their parents with sticks. The poet says that eventually, everything will get better. The children would

fall in love with books and reading. They would become so interested in the fascinating worlds within books that they would wonder why they ever watched television. They would be thankful to their parents and love them even more. Everyone would be happy with the change.