

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

(i) A shopkeeper bought a washing machine for 20,000 from a dealer. He sold it to a consumer at a profit of 5000. If rate of GST is 28%, then the tax liability of the shopkeeper is:

- (a) 1400 (b) 700 (c) 650 (d) nil

(ii) The roots of $3x^2 - 5x + 1 = 0$ are

- (a) irrational (b) equal (c) imaginary (d) none of these

(iii) On dividing $x^3 - x^2 + x - 1$ by $(x - 1)$, the remainder is :

- (a) 1 (b) -1 (c) 0 (d) 4

(iv) A is a matrix of order 2×3 . The order of A' is:

- (a) 2×3 (b) 2×2 (c) 3×2 (d) 3×3

(v) If $x, 2x + p, 3x + 6$ are in AP, then the value of p is

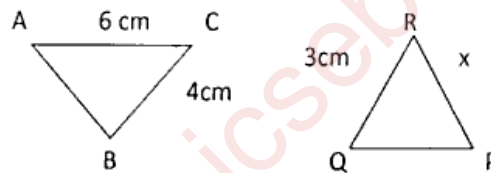
- (a) 2 (b) 3 (c) 5 (d) 7

(vi) If the image of the point P under reflection in the x-axis is $(-3, 4)$, then the coordinates of the point P are:

- (a) $(3, 4)$ (b) $(-3, -4)$ (c) $(3, 4)$ (d) $(-4, 3)$

(vii) In the figure, if $\triangle ABC \sim \triangle QPR$, then the value of x is

- (a) 2 cm
(b) 4 cm
(c) 3.5 cm
(d) 2.5 cm



(viii) A rectangular paper is folded into a cylinder. The length and breadth of the paper are L and B respectively. Which of the following represents its curved surface area?

- (a) $2\pi LB$ (b) LB (c) $\frac{L}{B}$ (d) πLB

(ix) If $2r - 1 \geq 9$, $x \leq 5$, then the greatest value of x is:

- (a) 3 (b) 2 (c) 4 (d) 5

(x) Which of the following cannot be the probability of an event?

- (a) $\frac{3}{4}$ (b) $\frac{3}{5}$ (c) 1.001 (d) 0.6

(xi) The value of $\begin{bmatrix} 2 & -1 \\ 0 & 5 \end{bmatrix} + \begin{bmatrix} 7 & 0 \\ -1 & 4 \end{bmatrix}$ is:

- (a) $\begin{bmatrix} 9 & -9 \\ -1 & 1 \end{bmatrix}$ (b) $\begin{bmatrix} -9 & -1 \\ -1 & 9 \end{bmatrix}$ (c) $\begin{bmatrix} 8 & 1 \\ 4 & -1 \end{bmatrix}$ (d) $\begin{bmatrix} 5 & 2 \\ 1 & -6 \end{bmatrix}$

(xii) If $P(-1, 1)$ is the mid-point of the line segment joining $A(-3, b)$ and $B(1, b + 4)$, then the value of b is:

- (a) 1 (b) -1 (c) 2 (d) 0

(xiii) ABCD is a cyclic quadrilateral such that AB is a diameter of the circle circumscribing it and $\angle ADC = 140^\circ$, then $\angle BAC$ is equal to:

- (a) 80° (b) 50° (c) 40° (d) 30°

(xiv) The n th term of an AP is $T_n = 4n - 1$. The common difference of the AP is:

- (a) 2 (b) 3 (c) -3 (d) 4

(xv) The relation between mean, median, and mode is:

- (a) $\text{Mean} - \text{Mode} = 3(\text{Mean} - \text{Median})$ (b) $3(\text{Mean} - \text{Mode}) = (\text{Mean} - \text{Median})$
(c) $\text{Mean} + \text{Mode} = 3(\text{Mean} - \text{Median})$ (d) $\text{Mean} - \text{Mode} = 3(\text{Mean} + \text{Median})$

Q 2

(i) Mr. Richard has a recurring deposit account in a bank for 3 years at 7.5% p.a. simple interest. If he gets 8325 as interest at the time of maturity, find :

- (a) The monthly deposit

(b) The maturity value.

(ii) If b is the mean proportion between a and c, show that: $a^4 + a^2 b^2 + b^4 = \frac{a^2}{b^4 + b^2 c^2 + c^4} = \frac{a^2}{c^2}$

iii) Prove that $\frac{\sin \theta - 2\sin^3 \theta}{2\cos^3 \theta - \cos \theta} = \tan \theta$

[4]

Q 3.

[5]

(i) The adjoining figure represents a solid consisting of a right circular cylinder with a hemisphere at one end and a cone at the other. Their common radius is 7 cm. The height of the cylinder and cone are each of 4 cm. Find the volume of the solid.

(ii) A(2, 5), B(-1, 2) and C(5, 8) are the vertices of a triangle ABC, 'M' is a point on AB such that AM : MB = 1 : 2. Find the co-ordinates of 'M'. Hence find the equation of the line passing through the points C and M

(iii) Use a graph paper for this question (Take 2 cm = 1 unit on both X and y axis)

(a) Plot the following points : A(0, 4), B(2, 3), C(1, 1) and D(2, 0)

(b) Reflect points B, C, D on the y-axis and write down their coordinates. Name the images as B', C', D respectively.

(c) Join the points A, B, C, D, D', C', B' and A in order, so as to form a closed figure. Write down the equation of the line of symmetry of the figure formed.

Q 4.

(i) Mr. Roy went to a departmental store and bought the following items. The GST rates and the quantity of each item and market price of each are given below : [3]

S No.	Items	Price per item in	Quantity	GST rate	Amount
1	Walnut	650	1	5%	
2	Potato Chips	50	2	0%	
3	Coffee	80	3	18%	

Find the :

(a) The total amount of SGST paid.

(b) The total amount of the bill

(ii) Solve $x^2 + 7x = 7$ and give your answer correct to two decimal places. [3]

(iii) Draw a histogram for the given data, using a graph paper: [4]

Class -interval	Frequency
0-10	14
10-20	22
20-30	27
30-40	22
40-50	23
50-60	20
60-70	15

Estimate the mode from the graph.

Q 5.

(i) Find the values of x and y if $\begin{bmatrix} 1 & 2 \\ 3 & 3 \end{bmatrix} \begin{bmatrix} x & 0 \\ 0 & y \end{bmatrix} = \begin{bmatrix} x & 0 \\ 9 & 0 \end{bmatrix}$ [3]

(ii) In the given figure, AC is a tangent to the circle with centre O. If $\angle ADB = 55^\circ$, find x and y. Give reasons for your answers. [3]

(ii) Using the Remainder Theorem, find the remainders obtained when $x^3 + (kx + 8)x + k$ is divided by $x + 1$ and $x - 2$. Hence find k if the sum of the two remainders is 1. [4]

Q 6.

(i) A (-1, 3), B(4, 2) and C(3, -2) are the vertices of a triangle. [3]

(a) Find the coordinates of the centroid of the triangle.

(b) Find the equation of the line through G and parallel to AC. $\cot A = 1/2$ sec AA $\cot A$

(ii) Prove that : $\cot a - 1 : \cot A$

$$\frac{\cot a - 1}{2 - \sec^2 A} = \frac{\cot A}{1 + \tan A}$$

[3]

ii) The 4th term of an A.P. is 22 and 15th term is 66. Find the first term and the common difference. Hence find the sum of the series to 8 terms. [4]

Question 7 :

(i) If one card is drawn at random from a pack of 52 playing cards, what is the probability that it is: [3]

(a) a king? (b) the ace of clubs? (c) a heart?

(ii) The sum of the radius of the base and the height of a solid cylinder is 37 cm. If the total surface area of the cylinder is 1628 m, find its volume. [3]

(iii) In the given figure, TP and TQ are two tangents to the circle with centre O, touching at A and C respectively. If $\angle BCQ = 55^\circ$ and $\angle BAP = 60^\circ$, find: [3]

(a) $\angle OBA$ and $\angle OBC$ (b) $\angle AOC$ (c) $\angle ATC$

Question 8 :

(i) Solve the following in equation and represent the solution set on a number line. [3]

$$\frac{1}{2} < -\frac{1}{2} - 4 < 7\frac{1}{2}, x \in I$$

(ii) Find the mean of the following data: [3]

Class -interval	0 -10	10 -20	20 -30	30 -40	40 -50
Frequency	12	16	6	7	9

(iii) In ΔABC , AD is the bisector of $\angle A$. If $BC = 10$ cm, $BD = 6$ cm and $AC = 6$ cm, find AB [4]

Question 9 :

(i) The duration of telephone calls in a week at a school were recorded as below: [6]

Time in seconds	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. Of calls	5	14	19	27	43	29	16	12	5

Draw an ogive and locate the median and quartiles.

(ii) 7500 were divided equally among a certain number of children. Had there been 20 less children, each would have received Rs. 100 more. Find the original number of children. [4]

Question 10 :

(i) Using properties of proportion solve for x, given [3]

$$\frac{5x + 2x - 6}{5x - 2x - 6} = 4$$

(ii) Using ruler and compass only, construct a ΔABC such that $BC = 5$ cm and $AB = 6.5$ cm and $\angle ABC = 120^\circ$. [3]

Construct a circum-circle of ΔABC .

(iii) The angle of elevation from a point P of the top of a tower QR, 50 m high is 60° and that of the tower PT from the point Q is 30° . Find the height of the tower PT. Correct to the nearest metre. [4]