VIBGYOR HIGH

Mock Test

Section A (Q 1 - Q 4) Section B (Q5-Q 11) Answer all questions from Section A. Answer any 4 from Section B

Question 1

a) Prove that: $\frac{cosA}{1-sinA} + \frac{sinA}{1-cosA} + 1 = \frac{sinAcosA}{(1-sinA)(1-cosA)}$ [3]

b) Solve and graph the solution on number line:
$-3 < -\frac{1}{2} - \frac{2x}{3} \leq \frac{5}{6}, x \in R.$ [3]

c) A shopkeeper buys a vacuum cleaner at a cost price of Rs. 7000. He marks a price of Rs. 10000 on it and allows a discount of 10% on the marked price. How much does a customer pay for the vacuum cleaner if GST is charged at 18%? Find the net tax paid by the shopkeeper if the sale is intra-state. [4]

Question 2

a) How many terms of the geometric series 1 + 4 + 16 + 64 + -------- will make the sum 5461 ? [3]

b) If $\begin{bmatrix} -2 & 0 \\ 4 & 5 \end{bmatrix} \begin{bmatrix} 0 & 4 \\ -3 & 2 \end{bmatrix} - 2M = \begin{bmatrix} 6 & -2 \\ 3 & 5 \end{bmatrix}$, find the matrix M. [3]

c) The equation of a line is 3x + 4y- 7 = 0. Find: [4]

(i) Slope of the line

(ii) Equation of a line perpendicular to the given line and passing through the intersection of the lines x – y + 2 = 0 and 3x + y -10 = 0

Question 3

a) A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears: [3]

(i) a two digit number

(ii) a perfect square number

(iii) a number divisible by 5

b) A solid is composed of a cylinder with hemispherical ends. If the whole length of solid is 105 cm and the diameter of the hemispherical ends is 36 cm, find the cost of polishing the surface of the solid at the rate of 21 paise per square cm. [3]

c) A two-digit number is such that the product of its digits is 14. When 45 are added to the number, then their digits are reversed. Find the number. [4]

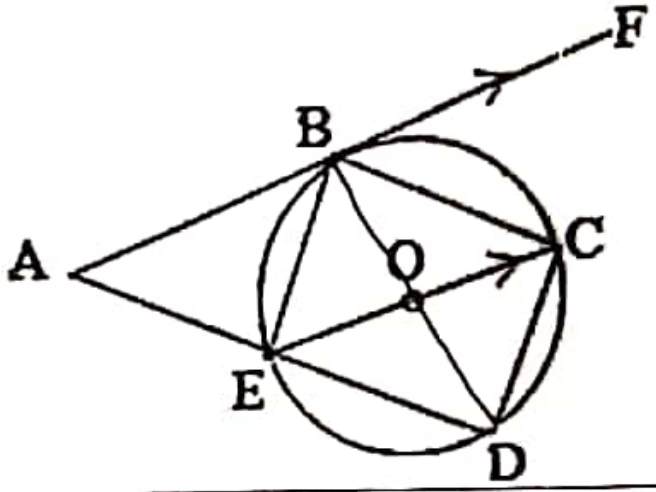
Question 4

a) If 10^{th} term of an AP is 52 and 17^{th} term is 20 more than the 13^{th} term, find A.P.

b) A circle with center O is shown below. A tangent AF is drawn touching the circle at B. The figure BCDE is a cyclic quadrilateral. Given, $\angle FBC = 55°$, $\angle BAE = 30^0$ and CE ∥ AF. Find:

(i) Value of $\angle BED$

(ii) Value of $\angle BCD$



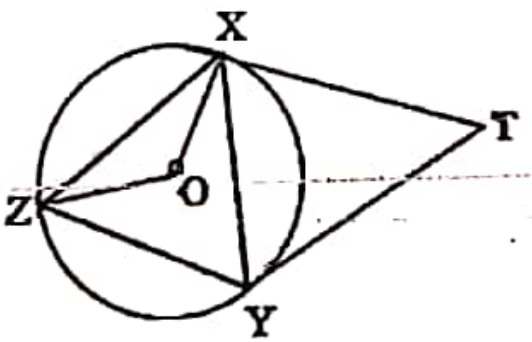
c) Using step deviation method, calculate the mean marks of the following distribution using step deviation method correct to one decimal place and also state the modal class. [4]

Class Interval	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90
Frequency	5	20	10	10	9	6	12	8

Question 5

a) Construct ΔABC, given, $\angle B = 45°$, BC = 5 cm and AC = 6cm. Find by construction, the locus of point X which is equidistant from AB and BC, and 4cm from the vertex C. [3]

b) In the figure, a circle is shown with center O. An inscribed ΔXYZ is drawn in this circle. Two radii OX and OZ are drawn. Two tangents TX and TY are also drawn. Given, $\angle XTY = 80°$, obtuse $\angle XOZ = 140°$. Calculate $\angle ZXY$. [3]



c) Draw a circle with radius 3cm. Mark a point P outside the circle at a distance of 5.3 cm from the center. Construct two tangents from P to the given circle. Measure and write [4

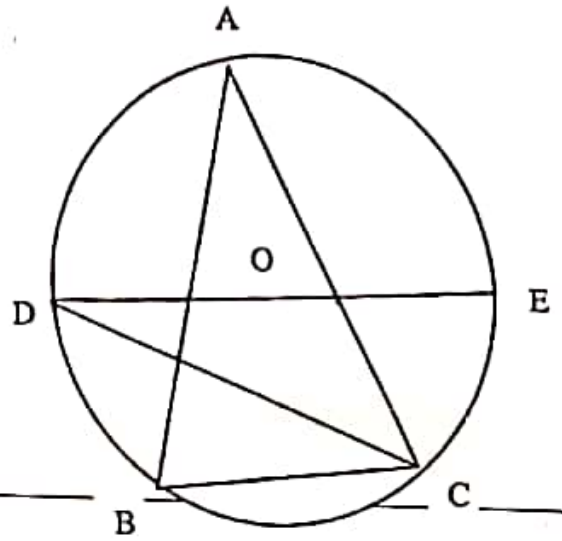
down the length of tangents.

Question 6

a) If a man repays a loan of Rs. 3,250 by paying Rs. 20 in the first installment and then increases the payment by Rs. 15 every month, how long will it take him to clear the loan? [3]

b) Solve the following quadratic equation for x and give your answer correct to three significant figures: $2x^2 - 4x - 3 = 0$ [3]

c) In the given figure, BC ∥ DE and O is the center of the circle and DE is the diameter. If ∠CDE = x°, find in terms of x°, the value of ∠BAC. [4]



Question 7

a) Find the GP for which the sum of the first two term is -4 and the fifth term is 4 times the third term. [3]

b) A rectangular tank has length 4m, width 3m and a capacity of $30m^3$. A small model of the tank is made with capacity $240cm^3$. Find: [3]
   (i) The dimensions of the model.
   (ii) The ratio between the total surface area of the tank and its model.

c) 6 is the mean proportion between two numbers x and y and 48 is the third proportion to x and y. Find the numbers. [4]

Question 8

a) If $\frac{a^3+3ab^2}{3a^2b+b^3} = \frac{x^3+3xy^2}{3x^2y+y^3}$; show that $\frac{x}{a} = \frac{y}{b}$ [3]

b) Given $\begin{bmatrix} 8 & -2 \\ 1 & 4 \end{bmatrix} \times M = \begin{bmatrix} 12 \\ 10 \end{bmatrix}$; find: [3]
   (i) Order of the matrix M
   (ii) The matrix M

c) From a solid cylinder of height 36cm and radius 14cm, a conical cavity of radius 7cm and height 24cm is drilled out. Find the volume and total surface area of the remaining solid. [4]

Question 9

a) Find the value of 'a' when $ax^3 + 3x^2 + 5x - 2$ and $x^3 + 2x^2 + ax - 12$ are divided by $(x + 2)$, leave the same remainder. [3]

b) Kishore opened a Recurring Deposit Account in a bank and deposited Rs.800 per month for 1 year and 6 months. If he received Rs.15084 as maturity value, find the rate of interest. [3]

c) (i) Plot P (3, 2), Q (5, 4). Obtain P' and Q' as images when reflected in the x-axis. Write down the coordinates of P' and Q'. [4]

(ii) Reflect the points P and P' in the line QQ' to obtain images R and R'. Write down the coordinates of R and R'.

(iii) Write down the name of the figure PQRR'Q'P'.

Question 10

a) The income of parents of 100 students is shown. The income of all the parents is less than Rs. 40,000 per annum. [6]

Income in Rs. 1000	0 – 8	8 – 16	16 – 24	24 - 32	32 – 40
No. of families	8	35	35	14	8

(i) Draw cumulative frequency curve, and estimate the median income and inter quartile range of this distribution.

(ii) If 15% students are given free ship on the basis of their parent's income, find the annual income of parents below which free ship will be awarded

b) A 1.4m tall boy spots a balloon moving with the wind in a horizontal line at height of 91.4m from the ground. The angle of elevation of the balloon from the eye of the boy is 60°. After some time, the angle of elevation reduces to 30°. Find the distance travelled by the balloon during that interval. Leave your answer nearest to meter. [4]

Question 11

a) $(\cos\theta - \operatorname{cosec}\theta)^2 + (\sin\theta - \sec\theta)^2 = (1 - \sec\theta \operatorname{cosec}\theta)^2$ [3]

b) Find the ratio in which the point P(4, b) divides the line AB formed by joining A(6, –2) and B(– 3, 16). Find the value of b. [3]

c) A man invests Rs. 4,500 in 8%, Rs.10 shares at Rs. 15. He sells the shares when the price rose to Rs. 30, and invests the sale proceeds in 12% Rs. 100 shares at Rs. 125. Calculate: [4]

(i) Sale proceeds

(ii) Number of Rs. 125 shares

(iii) Change in income.