

Attempt all questions from Section 'A' and any four questions from Section 'B'.

All working, including rough work, must be clearly shown and must be done on the same sheet as the rest of the answer.

"Omission of essential working will result in loss of marks".

Mathematical tables are provided.

SECTION - A [40 MARKS]

Attempt all questions from this section

- Q.1. (a) Which term of the AP 5, 12, 19, 26, 33 will be 35 more than its 12th term? [3]

Using properties of proportion.

- (b) Solve $\frac{3x + \sqrt{9x^2 - 5}}{3x - \sqrt{9x^2 - 5}} = 5$ find x [4]

- (c) On a map drawn to a scale of 1:2,50,000 a triangular plot of land has the following measurement. AB = 3 cm, BC = 4 cm and $\angle ABC = 90^\circ$ [3]

Calculate

- (i) Actual lengths of AB and BC in Km
(ii) the area of the plot in sq.km

- Q.2. (a) prove the identity [3]

$$1 - \frac{\cos^2 A}{1 + \sin A} = \sin A$$

- (b) Using factor Theorem show that $(x + 4)$ is a factor of $2x^3 + x^2 - 12$.
Hence factorise the given expression completely. $2x^3 + 3x^2 + 3x - 12$ [4]

- (c) "JAB HARRY MET SEJAL" is a Hindi movie name; Find the probability that it is a Vowel & Consonant. [3]

Q.3. (a) The shadow of a tower, when angle of elevation of the sun is 45° , is found to be 10m longer than when it was 60° . Find the height of the tower. [3]

(b) In a class test, the marks obtained by 11 students are

15, 18, 13, 5, 11, 20, 3, 17, 8, 15, 6. Find. [4]

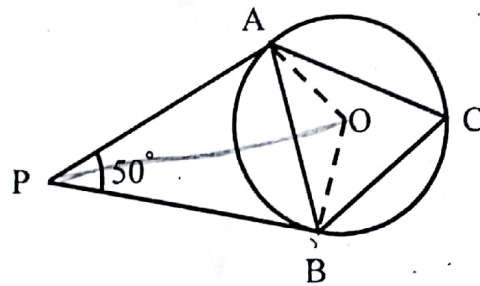
- (i) Median
- (ii) Lower Quartile
- (iii) Upper Quartile
- (iv) Inter Quartile range.

(c) If $A = \begin{bmatrix} 4 & -2 \\ 5 & 7 \end{bmatrix}$; $B = \begin{bmatrix} 3 & 5 \\ -4 & -2 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 3 \\ -2 & 4 \end{bmatrix}$

Find $A + B - C$

[3]

Q.4. (a) In the given figure PA & PB are two tangents to the circle with center O. [3]



If $\angle APB = 50^\circ$

Find (i) $\angle AOB$,

(ii) $\angle OAB$,

(iii) $\angle ACB = ?$

(b) A (0, 3), B (3, -2) and O (0, 0) are vertices of ABO. [4]

(i) Plot the triangle on a graph paper taking 2 cm = 1 unit on the both axes.

- (ii) Plot D, the reflection of B in the Y axis and write its co-ordinates.
- (iii) Give the geometric name of the figure ABOD.
- (c) The volume of a conical tent is 1232m^3 and the area of the base floor is 154 m^2 calculate:
- (i) radius of the floor
- (ii) height of the tent

[3]

SECTION- B [40 Marks]

Attempt any four questions from this section.

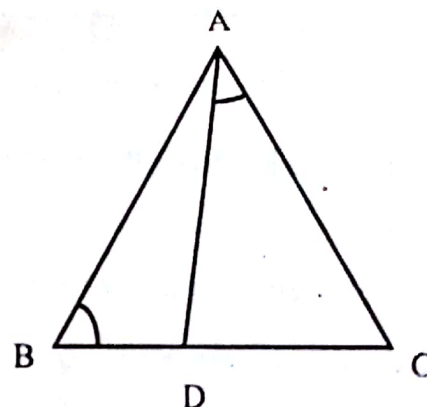
- Q.5. (a) The three vertices of a parallelogram ABCD, taken in order are A (2, -1), B (3, 4) and C (-2, 3), Find the Co-ordinates of the fourth vertex.

[3]

- (b) In $\triangle ABC$, $\angle ABC = \angle DAC$
 $AB = 8\text{cm}$, $AC = 4\text{cm}$, $AD = 5\text{cm}$

[4]

- (i) Prove that $\triangle ACD \sim \triangle BCA$
- (ii) Find BC & CD
- (iii) Find area ($\triangle ACD$) : area ($\triangle ABC$)



- (c) The 2nd and 5th terms of a G. P are $-\frac{1}{2}$ and $\frac{1}{16}$ respectively. Find the sum of first 8th term of the G.P.

[3]

- Q.6. [a] Find the positive value of K for which the equation

$$x^2 + kx + 64 = 0 \text{ and } x^2 - 8x + k = 0 \text{ will have real root.}$$

[3]

- [b] Two solid spheres of radii 2cm and 4cm are melted and recast into a cone of height 8cm, Find the radius of the cone so formed.

[3]

- [c] Construct a ΔABC in which $BC = 6.5\text{cm}$, $\angle ABC = 60^\circ$ and $AB = 5\text{cm}$ [4]
- Construct the locus of a points at a distance of 3.5cm from A.
 - Construct the locus of points equi-distant from AC and BC.
 - Mark two points X & Y which are at a distance of 3.5cm from A and also equidistant from AC and BC. Measure XY.

Q.7. [a] Let M be a Matrix such that [3]

$$M \times \begin{bmatrix} 2 & 1 \\ 0 & 3 \end{bmatrix} = \begin{bmatrix} 4 & -7 \end{bmatrix}$$

- State the order of M
 - Find M
- [b] A can do a piece of work in x days and B can do it in $(x+16)$ days. If both working together can do it in 15 days, calculate x . [4]
- [c] A man invests a sum of money in ₹100 shares, paying 15% dividend and quoted at 20% premium, It has annual dividend 540, calculate. [3]
- his total investment
 - the rate of return on his investment

Q.8. [a] The given table shows the number of casualties due to accidents at different age groups in a city. [6]

Age	5-15	15-25	25-35	35-45	45-55	55-65	65-75
Not of Casualties	6	10	16	15	24	8	7

Construct the 'less than frequency curve for the data. Use 1cm= 10 years on x-axis 1cm =10 causalities on Y axis, use graph paper for the same, from your graph determine

- (i) the lower quartile
- (ii) the upper quartile
- (iii) the median

- [b] Katrina has a cumulative time deposit account of ₹ 340 per month at 6% p.a. If she gets ₹ 7157 at the time of maturity, find the total time for which the account was held

[4]

Q.9. [a] Find the value of 'k' if $(x-2)$ is a factor of

$$x^3 + 2x^2 - kx + 10.$$

Hence determine whether $(x+5)$ is also factor.

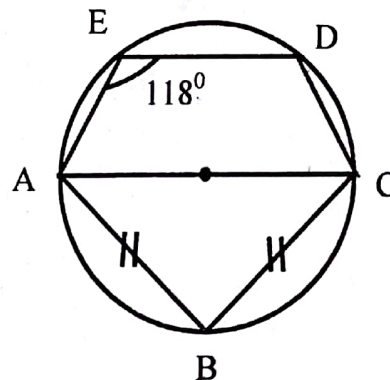
[3]

- [b] A(7, -1), B(4, 1) and C (-3, 4) are the vertices of a triangle ABC. Find the equation of a line through the vertex B and the point P in AC, such that $AP:CP = 2:3$.

[4]

- [c] AC is a diameter of the circle, $AB=BC$ and $\angle AED = 118^\circ$. Calculate

- (i) $\angle DEC$ (ii) $\angle DAB$



[3]

- Q.10. [a] How many term of the AP. $20 + 19\frac{1}{3} + 18\frac{2}{3} + \dots$ must be taken so that their sum is 300?

[3]

- [b] Without solving the following quadratic equation, find the value of 'M' for which the given equation has real & equal roots.

$$x^2 + \underbrace{2(m-1)}_b x + \underbrace{(m+5)}_c = 0.$$

[4]

- [c] Three circles touch each other externally. A triangle is formed when the centers of these circles are joined together. Find the radii of the circles.

If the sides of the triangle formed are 6cm, 8cm, and 9cm.

[3]

- Q.11. [a] Find the G.P whose 5th term is 48 and 8th terms is 384

[3]

- [b] Draw a circle of radius 3cm. Mark a point P at a distance of 5 cm, from the center of the circle drawn, Draw two tangents PA & PB to the given circle and measure the length of each tangent.

[4]

- [c] $\sqrt{\sec^2 A + \operatorname{cosec}^2 A} = \tan A + \cot A$ (Prove it)

[3]
