

SECTION "B" (Short Answer Question) Marks: 30

NOTE: Answer any SIX (06) questions from this section.

All questions carry equal marks.

2. If $A = \{1, 2, 3, 4, 5, 6\}$, $B = \{2, 4, 6, 8, 10\}$ and $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$ Prove that $(A \cap B)' \in A \cup B'$
3. Solve the equation by using componendo-dividendo theorem:

$$\frac{(x+3)^2 + (x-1)^2}{(x+3)^2 - (x-1)^2} = \frac{5}{4}$$

4. Find the remaining trigonometric function if $\sin \theta = \frac{\sqrt{3}}{2}$ and θ lies in second quadrant.
5. Find all the cube roots of -125

6. Resolve into partial fractions: $\frac{4x-3}{(x+1)^2}$

7. The following data show number of devices resulting in observation values in appropriate ranges. Find the Harmonic Mean (H.M.)

Class limit	10.5 - 10.9	11.0 - 11.4	11.5 - 11.9	12.0 - 12.4	12.5 - 12.9
Frequencies	2	7	10	12	8

8. Prove that $\sin^2 \theta = \frac{\tan^2 \theta}{1 + \tan^2 \theta}$
9. A straight line, drawn from the centre of a circle to bisect a chord (which is not a diameter) is perpendicular to the chord. Prove it
10. If two chords of a circle (or of congruent circles) are equal, then their corresponding arcs (minor, major, semi-circle) are congruent. Prove it.

11. Any two angles in the same segments of a circle are equal. Prove it
- OR

Find the mean deviation of the marks of students which are 4, 7, 12, 76, 48, 4, 51.

SECTION 'C; (Detailed - Answer Question) (30)

NOTE: Attempt any THREE (03) questions from this Section.

All questions carry equal marks.

12. Find the invers of the matrix

$$A = \begin{bmatrix} 2 & 1 & 1 \\ 3 & 2 & 1 \\ 2 & 1 & 2 \end{bmatrix} \text{ by adjoint method}$$

13. A line parallel to one side of a triangle and intersecting the other two sides, divides them proportionally. Prove it.
14. If a square of one side of triangle is equal to the sum of the squares of the other two sides, then the triangles a right angled triangle. Prove that.
15. Draw the circumcircle of ΔABC in which $m\overline{AB} = 5.5\text{cm}$, $m\overline{AC} = 6\text{cm}$ and $m\angle A = 60^\circ$ (Also write steps of construction)
16. If two circles touch externally, the distance between their centres is equal to the sum of their radii. Prove it.

OR

If a line is drawn perpendicular to a radial segment of a circle at its outer end point, it is tangent to the circle at that point. Prove it.