

(Group - I)

(Session 2017-2019 to 2019-2021)

PART - I

2. Write short answers to any SIX (6) questions: (12)

- i Define reciprocal equation.
- ii Solve by factorization: $x^2 - 11x = 152$
- iii Solve: $x^2 + 2x - 2 = 0$
- iv Evaluate $(1 - 3\omega - 3\omega^2)^5$
- v Find the product of complex cube roots of unity.
- vi If the ratios $3x + 1 : 6 + 4x$ and $2 : 5$ are equal, find the value of x .
- vii If $y \propto \frac{1}{x}$ and $y = 4$, when $x = 3$, find x when $y = 24$.

viii Find ω^2 , if $\omega = \frac{-1 + \sqrt{-3}}{2}$

ix Find a third proportional to: $(x - y)^2, x^2 - y^2$

3. Write short answers to any SIX (6) questions: (12)

- i Resolve into partial fractions: $\frac{x - 11}{(x - 4)(x + 3)}$
- ii What are partial fractions?
- iii If $X = \{1, 4, 7, 9\}$ and $Y = \{2, 4, 5, 9\}$, then find $Y \cap X$
- iv Define an Onto function.
- v If $A = N$ and $B = W$ then find the value of $B - A$.
- vi If $L = \{a, b, c\}$, $M = \{d, e, f, g\}$, then find two binary relation in $L \times M$.
- vii Find the arithmetic mean by direct method for the set of data: 200, 225, 350, 375, 270, 320, 290
- viii Define class mark.
- ix Name two measures of central tendency.

4. Write short answers to any SIX (6) questions: (12)

- i Find 'r', when $l = 56$ cm and $\theta = 45^\circ$
- ii Define radian measure of an angle.
- iii Express the angle 315° into radian.
- iv State theorem of componendo and dividendo.
- v Find the fourth proportional to 8, 7, 6.
- vi In a $\triangle ABC$, $a = 17$ cm, $b = 15$ cm and $c = 8$ cm, find $m \angle B$.
- vii Divide an arc of any length into four equal parts.
- viii Write the closes quadrantal angles between which the angle $-3\pi/4$ lies.
- ix Verify:

$$(1 - \sin\theta)(1 + \sin\theta) = \cos^2\theta$$

PART - II

Note : Attempt THREE questions in all. But question No.9 is Compulsory.

5.a Solve by factorization:

$$\frac{x + 1}{x} + \frac{x}{x + 1} = \frac{25}{12}$$

b. Find m, if the roots of the equation $x^2 + 7x + 3m - 5 = 0$ satisfy the relation $3\alpha - 2\beta = 4$

6.a If $a : b = c : d$ ($a, b, c, d \neq 0$), then show that

$$\frac{a}{b} = \sqrt{\frac{a^2 + c^2}{b^2 + d^2}}$$

b. Resolve into partial fractions:

$$\frac{3x - 11}{(x + 3)(x^2 + 1)}$$

7.a If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$, $A = \{1, 3, 5, 7, 9\}$ and $B = \{2, 3, 5, 7\}$ then verify $(A \cup B)' = A' \cap B'$

b. Find the standard deviation "S" =:

9, 3, 8, 8, 9, 8, 9, 18

8.a Verify the identity: $\frac{1 + \sin\theta}{1 - \sin\theta} - \frac{1 - \sin\theta}{1 + \sin\theta} = 4 \tan\theta \sec\theta$

b. Draw circle which touches both the arms of angle : 45°

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.

OR

If the angles subtended by two chords of a circle (or congruent circles) at the centre (corresponding centres) are equal, the chords are equal.