

Section-B

Short Answer

Note: Answer any SIX of the following questions.

Q.2 If  $U = \{x / x \in \mathbb{Z}, -1 \leq x \leq 5\}$ ,  $A = \{y / y \in \mathbb{W}, 1 \leq y < 4\}$ ,  $B = \{z / z \in \mathbb{N}, 2 < z \leq 5\}$ .  
Then verify that  $B - A = B \cap A'$ .

Q.3 Find the multiplicative inverse of  $\frac{1}{2} + \frac{1}{2}i$ .

Q.4 If the sum of 8 terms of an arithmetic's sequence is 64 and that of 19 terms is 361. Find the sum of 29 terms.

Q.5 Prove the proposition  $1 + 5 + 9 + \dots + (4n - 3) = n(2n - 1)$  by using Mathematical induction.

Q.6 Find the equation whose roots are reciprocal the roots of  $x^2 - 6x + 8 = 0$ .

Q.7 If  $\cos \alpha = \frac{1}{2}$ ,  $\cos \beta = \frac{3}{2}$  and  $\alpha, \beta$  are in first quadrant then find  $\cos(\alpha - \beta)$ .

Q.8 Find the value of "n" when  ${}^{2n+1}P_{n-1} : {}^{2n-1}P_n = 3:5$ .

Q.9 Write in simplified form, the term independent of x in  $(x - \frac{1}{2})^n$ .

Q.10 Show that the roots of the following equation is rational.

$$(a - b)x^2 + (b + c - a)x - c = 0, a, b, c \in \mathbb{Q}, a \neq b.$$

Section-C

(Descriptive Answer)

Note: Answer any TWO of the following questions.

Q.11 (a) Show that:  $\frac{\sin 2\theta}{1 - \cos 2\theta} = \cot \theta$

(b) Solve:  $2 \sin x \cos x - \sin x = 0$

Q.12 (a) Solve the equation:

$$2\left(y + \frac{1}{y}\right) - 6\left(y + \frac{1}{y}\right) = 4$$

(b) Find the smallest angle in triangle ABC with  $a = 4\text{cm}$ ,  $b = 2\text{cm}$ ,  $c = 2.5\text{cm}$

Q.13 (a) Find the sum of 20 terms of an AP whose 4<sup>th</sup> term is 8 and 7<sup>th</sup> term is 13.

(b) Prove that :

$$\frac{1 - \cos \theta}{\sin \theta} = \frac{\sin \theta}{1 - \cos \theta}$$

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