

Solution

Section: A

1) Not defined

2)  $\alpha = 3$  &  $\beta = -5$

$$\begin{aligned} p(x) &= k(x^2 - (\alpha + \beta)x + \alpha\beta) \\ &= k(x^2 - (3 - 5)x + (3)(-5)) \\ &= k(x^2 + 2x - 15) \end{aligned} \quad , k = \text{const.}$$

3)  $p(x) = ax^2 + bx + c$ ,

If 1 is zero of  $p(x)$  then,

$$p(1) = 0$$

$$a + b + c = 0$$

$$\therefore a = -b - c \quad \text{--- (i)}$$

$$\rightarrow \frac{b+c}{a} = \frac{b+c}{-(b+c)} = -1.$$

$\therefore$  by (i)

4)  $\cos 81^\circ \dots \dots \cos 90^\circ \dots \dots \cos 100^\circ$

$$= \cos 81^\circ \dots \times 0 \times \dots \cos 100^\circ$$

$$= 0$$

$$\therefore \cos 90^\circ = 0$$

5)  $\sin A = \frac{1}{2} \Rightarrow \operatorname{cosec} A = 2$

$$\operatorname{cosec} A = \frac{1}{\sin A} \quad \operatorname{cosec}^2 A = 1 + \cot^2 A$$

$$\cot A = \sqrt{\operatorname{cosec}^2 A - 1}$$

$$= \sqrt{2^2 - 1}$$

$$\boxed{\cot A = \sqrt{3}}$$

6)  $\sec^2 26^\circ - \tan^2 (90^\circ - 64^\circ)$

$$= \sec^2 26^\circ - \tan^2 26^\circ$$

$$= 1$$

$$\therefore \sec^2 \theta = 1 + \tan^2 \theta$$



## Section: B

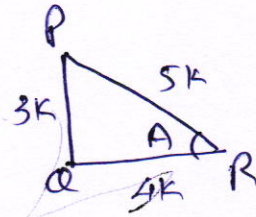
$$7) \sin A = 3/5$$

In  $\Delta PQR$ ,

$$PQ^2 + QR^2 = PR^2$$

$$\begin{aligned} \therefore QR^2 &= PR^2 - PQ^2 \\ &= 25k^2 - 9k^2 \\ &= 16k^2 \end{aligned}$$

$$\therefore QR = 4k$$



$$\therefore \cos A = 4/5$$

$$\tan A = 3/4$$

8) If,  $A, B, C$  are interior angles of  $\Delta ABC$ ,  
then  $A+B+C = 180^\circ$   
 $B+C = 180^\circ - A$  — ei)

$$\begin{aligned} \rightarrow \sin\left(\frac{B+C}{2}\right) &= \sin\left(\frac{180^\circ - A}{2}\right) \\ &= \sin\left(90^\circ - \frac{A}{2}\right) \\ &= \cos\left(\frac{A}{2}\right) \end{aligned}$$

$$\therefore \sin(90^\circ - \theta) = \cos \theta.$$

## Section: C

$$9) p(x) = x^2 - 2x - 8$$

$\rightarrow$  To find zeroes of  $p(x)$ :

$$x^2 - 2x - 8 = 0$$

$$x^2 + 2x - 4x - 8 = 0$$

$$x(x+2) - 4(x+2) = 0$$

$$(x+2)(x-4) = 0$$

$$\therefore x = -2 \quad \underline{\underline{\text{or}}} \quad x = +4$$

$$\rightarrow \alpha = -2, \quad \beta = 4$$

$$\alpha + \beta = -2 + 4 = 2 = -\frac{(-2)}{1} = -b/a$$

$$\alpha\beta = (-2)(4) = -8 = \frac{-8}{1} = c/a.$$