MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 55

Total Marks : 22

Max. Time : 23 min.

Topic : Circle

Type of Questions		M.M., Min.
Comprehension (no negative marking) Q.1 to Q.3	(3 marks, 3 min.)	[9, 9]
Single choice Objective (no negative marking) Q.4,5,6	(3 marks, 3 min.)	[9, 9]
Subjective Questions (no negative marking) Q.7	(4 marks, 5 min.)	[4, 5]

COMPREHENSION (For Q.No. 1 to 3)

Let (p, q) and (r, s) be any two points on the circle $x^2 + y^2 = 1$.

1. The value of $(3p - 4p^3)^2 + (3q - 4q^3)^2$ is equal to

(A) 0 (B) 1 (C) $\frac{1}{2}$ (D) $\frac{7}{2}$

2. The range of ps + qr is -

(A) [0, 1] (B) [–1, 0] (C) [–1, 1] (D) $[-\sqrt{2}, \sqrt{2}]$

3. If (p, q) is at a distance of θ from (1, 0) along circumfrence in anticlockwise direction and (r, s) is at a distance of 2θ from (p, q) along circumfrence in anticlockwise direction, then expression $sp^3 + rq^3$ is equal to

(A) $\frac{3}{4}\sin 4\theta$ (B) $\frac{3}{4}\sin 2\theta$ (C) $\sin 2\theta$ (D) $\sin 3\theta$

4. A circle S of radius 'a' is the director circle of another circle S_1. S_1 is the director circle of circle S_2 and so on. If the sum of the radii of all these circles is 2, then the value of 'a' is –

(A) $2 + \sqrt{2}$ (B) $2 - \frac{1}{\sqrt{2}}$ (C) $2 - \sqrt{2}$ (D) $2 + \frac{1}{\sqrt{2}}$

5. Centre of a circle of radius $4\sqrt{5}$ lies on the line y = x and satisfies the inequality 3x + 6y > 10. If the line x + 2y = 3 is a tangent to the circle, then the equation of the circle is

(A) $\left(x+\frac{23}{3}\right)^2 + \left(y+\frac{23}{3}\right)^2 = 80$ (B) $\left(x+\frac{17}{3}\right)^2 + \left(y+\frac{17}{3}\right)^2 = 80$

(C) $\left(x-\frac{17}{3}\right)^2 + \left(y-\frac{17}{3}\right)^2 = 80$ (D) $\left(x-\frac{23}{3}\right)^2 + \left(y-\frac{23}{3}\right)^2 = 80$

6. If two chords of the circle $x^2 + y^2 - ax - by = 0$, drawn from the point P(a, b) is divided by the x-axis in the ratio 2 : 1 in the direction from the point P to the other end of the chord, then

(A) $a^2 > 3b^2$ (B) $a^2 < 3b^2$ (C) $a^2 > 4b^2$ (D) $a^2 < 4b^2$

7. Find the equation of the circle having the lines $x^2 + 2xy + 3x + 6y = 0$ as its normals and having size just sufficient to contain the circle $x(x - 4) + y(y - 3) = 0$.

Answers Key

1. B

2. C

3. A

4. C

5. D

6. A

7. $x^2 + y^2 + 6x - 3y - 45 = 0$