293

II

Total No. of Questions : **24**
Total No. of Printed Pages : **3**

Regd. No.

Part - III

MATHEMATICS - PAPER - II (B)

(English Version)

Time : 3 Hours **Max. Marks : 75**

Note : *This question paper consists of three sections A, B and C.*

SECTION - A

I. Very short answer type questions : **10x2=20**

(i) Attempt *all* questions.

(ii) Each question carries *two marks.*

1. Find the equation of the circle whose end points of a diameter are (4, 2), (1, 5).

2. If the length of the tangent from (2, 5) to the circle $x^2+y^2-5x+4y+k=0$ is $\sqrt{37}$ then find k.

3. Find k if the pairs of circles $x^2+y^2+4x+8=0$, $x^2+y^2-16y+k=0$ are orthogonal.

4. Find the coordinates of the points on the parabola $y^2=8x$ whose focal distance is 10.

5. If the angle between the asymptotes is 30° then find its eccentricity of hyperbola.

6. Evaluate : $\int \sec^2 x \operatorname{cosec}^2 x \, dx$

7. Evaluate : $\int e^{\log(1+\tan^2 x)} dx$.

8. Find the value of $\int_0^{\frac{\pi}{2}} \cos^7 x \sin^2 x \, dx$.

9. Find the area of the region enclosed by the given curves $x=4-y^2$, $x=0$.

10. Find the order and degree of the differential equation $\left[\frac{d^2y}{dx^2}+\left(\frac{dy}{dx}\right)^3\right]^{\frac{6}{5}}=6y$.

SECTION - B

II. Short answer type questions : **5x4=20**

(i) Attempt *any five* questions.

(ii) Each question carries *four* marks.

11. Find the length of the chord intercepted by the circle $x^2+y^2-x+3y-22=0$ on the line $y=x-3$.

12. Show that the circles $x^2+y^2-8x-2y+8=0$ and $x^2+y^2-2x+6y+6=0$ touch each other and find the point of contact.

13. Find the equation of the tangent and normal to the ellipse $9x^2+16y^2=144$ at the end of the latus rectum in the first quadrant.

14. If P(x, y) is any point on the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1(a>b)$ whose foci are S and S′ then prove that SP+S′P is a constant.

15. Find the centre, foci, eccentricity, equation of the directrices, length of the latus rectum of the hyperbola.
$x^2-4y^2=4$.

16. Evaluate : $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{\sqrt{\sin x}}{\sqrt{\sin x}+\sqrt{\cos x}}\,dx$.

17. Solve : $\frac{dy}{dx}+\frac{3x^2}{1+x^3}y=\frac{1+x^2}{1+x^3}$.

SECTION - C

III. Long answer type questions : **5x7=35**

(i) Attempt *any five* questions.

(ii) Each question carries *seven marks.*

18. If (2, 0), (0, 1), (4, 5) and (0, c) are concyclic then find c.

19. Find the transverse common tangents of the circles $x^2+y^2-4x-10y+28=0$ and $x^2+y^2+4x-6y+4=0$.

20. Define parabola and obtain the standard form of the parabola $y^2=4ax$, (a > 0).

21. Obtain the reduction formula for $\int \sin^n x\, dx$ for an integer $n \geq 2$ and deduce $\int \sin^4 x\, dx$.

22. Evaluate : $\int \frac{x+1}{x^2+3x+12}\, dx$.

23. Evaluate : $\int_0^{\frac{\pi}{4}} \frac{\sin x+\cos x}{9+16\sin 2x}\, dx$.

24. Solve : $\left(1+e^{x/y}\right)dx + e^{x/y}\left(1-\frac{x}{y}\right)dy = 0$.

- o 0 o -

2158004

2158004

2158004