

Time: 3 Hours

293



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

Part - III

2221539

MATHEMATICS - PAPER - II (B)

(English Version)

Max. Marks: 75

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

## SECTION - A



10x2=20

- . .
  - (2) The large street and a second street and an artist street and an artist street and artists at the second street at the second
  - 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  $30^\circ$  then find its eccentricity of hyperbola.
  - **6.** Evaluate:  $\int \sec^2 x \csc^2 x \, dx$
  - 7. Evaluate :  $\int e^{\log \left( -\tan^2 x \right)} dx$ .
  - 8. Find the value of  $\frac{1}{2}\cos^7 x \sin^2 x dx$ .





- 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  $\left[\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^3\right]^{\frac{3}{2}} = 6y$ .

## SECTION - B

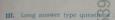
- II. Short answer type questions :

  - 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  $\frac{x^2}{2} + \frac{y^2}{\sqrt{2}} = 1(a > b)$  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.
- 16. Evaluate :  $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{\sqrt{\sin x}}{\sqrt{\sin x} + \sqrt{\cos x}} dx.$
- 17. Solve:  $\frac{dy}{dx} + \frac{3x^2}{1+x^3}y = \frac{1+x^2}{1+x^3}$ .



5x7=3

## SECTION - C



- (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  $n \ge 2$  and deduce  $\int \sin^4 x \, dx$ .

**22.** Evaluate : 
$$\int \frac{x+1}{x^2+3x+10} dx$$
.

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

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



