

MS JUNIOR COLLEGE  
Hyderabad

GUESS PAPER - 2  
INTERMEDIATE 2<sup>nd</sup> YEAR  
MATHEMATICS- IIB

Time: 3hours

Max.Marks:75

- I. i) Very Short Answer Type Questions. (10 x 2 = 20)  
ii) Answer **ALL** questions.  
iii) Each question carries **TWO** marks.
1. Show that A (3, -1) lies on the circle  $x^2 + y^2 - 2x + 4y = 0$ . Also find the other end of the diameter through A.
  2. Find the value of k if the points (1, 3) and (2, k) are conjugate with respect to the circle  $x^2 + y^2 = 35$ .
  3. Find the equation of radical axis of the two circles  $2x^2 + 2y^2 + 3x + 6y - 5 = 0$ ,  $3x^2 + 3y^2 - 7x + 8y - 11 = 0$ .
  4. Find the equation of normal to the parabola  $y^2 = 6x$  at the positive end of the latusrectum.
  5. Find the product of lengths of the perpendiculars from any point on the hyperbola  $\frac{x^2}{16} - \frac{y^2}{9} = 1$  to its asymptotes.
  6. Evaluate  $\int \frac{1}{\cosh x + \sinh x} dx$ .
  7. Evaluate  $\int \frac{x^2}{\sqrt{1-x}} dx$ .
  8. Evaluate  $\int_0^{\pi/2} \sec^4 \theta d\theta$ .
  9. Find the area bounded between the curves  $y^2 - 1 = 2x$  and  $x = 0$ .
  10. Form the differential equation corresponding to the family of curves  $y = c(x - c)^2$ . where c is a parameter.
- II. i) Short Answer Type Questions. (5 x 4 = 20)  
ii) Answer any **FIVE** questions.  
iii) Each question carries **FOUR** marks.
11. Show that  $x + y + 1 = 0$  touches the circle  $x^2 + y^2 - 3x + 7y + 14 = 0$  and find its point of contact.
  12. Show that the circles  $x^2 + y^2 + 2ax + c = 0$  and  $x^2 + y^2 + 2by + c = 0$  touch each other if  $\frac{1}{a^2} + \frac{1}{b^2} = \frac{1}{c}$ .
  13. If P(x, y) is any point on the ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  with foci **S and S'** then prove that **SP + S'P** is a constant.
  14. Find the equations of the tangents to the ellipse  $2x^2 + y^2 = 8$  which are parallel to  $x - 2y - 4 = 0$ . and perpendicular to  $x + y + 2 = 0$ .
  15. Find the eccentricity, foci, equations of directrices, length of latus rectum of the hyperbola  $16y^2 - 9x^2 = 144$ .
  16. Find the area of the region enclosed between the curves  $y = 2 - x^2$ ,  $y = x^2$ .
  17. Solve:  $\frac{dy}{dx} = \frac{x(2 \log x + 1)}{\sin y + y \cos y}$ .

- III. i) Long Answer Type Questions. (5 x 7 = 35)  
ii) Answer any **FIVE** questions.  
iii) Each question carries **SEVEN** marks.

18. Find the equation of a circle which passes through the points (2, -3), (-4,5) and whose centre lies on  $4x + 3y + 1 = 0$ .

19. Prove that the combined equation of pair of tangents drawn from an external point  $P(x_1, y_1)$  to the circle  $S = 0$  is  $S_1^2 = SS_{11}$

20. Find the equation of the parabola whose focus is (-2, 3) and directrix is the line  $2x + 3y - 4 = 0$ . Also find the length of the latusrectum and the equation of the axis of the parabola.

21. Evaluate  $\int \sqrt{\frac{5-x}{x-2}}$ .

22. If  $I_n = \int \sec^n x \, dx$ , then prove that  $I_n = \frac{1}{n-1} \sec^{n-2} x \cdot \tan x + \frac{n-2}{n-1} I_{n-2}$ , and deduce value of  $\int \sec^5 x \, dx$ .

23. Show that  $\int_0^{\pi/2} \frac{x}{\sin x + \cos x} \, dx = \frac{\pi}{2\sqrt{2}} \log(\sqrt{2} + 1)$ .

24. Solve the differential equation  $\frac{dy}{dx}(x^2 y^3 + xy) = 1$ .

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