A.P. Intermediate Board Mathematics IIB Model Paper

(Extracted from https://bieap.apcfss.in)

Mathematics Paper - II(B)

Time : 3 Hours *Max. Marks : 75*

SECTION - A

I. Very Short Answer Type Questions : **10 × 2 = 20**

(i) Attempt **ALL** questions.

(ii) Each question carries **TWO** marks.

1. Find the value of `a' if $2x^2 + ay^2 - 3x + 2y - 1 = 0$ represents a circle. Also find radius of circle.

2. Find the power of point P (5, –6) with respect to the circle $S = x^2 + y^2 + 8x + 12y + 15 = 0$.

3. Find k, if the circles $x^2 + y^2 - 6x - 8y + 12 = 0$, $x^2 + y^2 - 4x + 6y + k = 0$ are orthogonal.

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

5. Define Rectangular hyperbola and find its eccentricity.

6. Evaluate: $\int \frac{1}{\cosh x + \sinh x}\, dx$ on $x \in R$

7. Evaluate : $\int x \log dx$ on $(0, \infty)$

8. Evaluate : $\int_1^5 \frac{dx}{\sqrt{2x-1}}$

9. Find $\int_0^{\pi/2} \sin^4 x \cos^5 x\, dx$

10. Find the general solution of $\frac{dy}{dx} = \frac{2y}{x}$

SECTION - B

II. Short Answer Type Questions : **5 × 4 = 20**

*(i) Answer **ANY FIVE** questions.*

*(ii) Each question carries **FOUR** marks.*

11. *Find the length of the chord intercepted by the circle $x^2 + y^2 - 8x - 2y - 8 = 0$ on the line $y = x + y + 1 = 0$.*

12. *Find the radical centre of the circles $x^2 + y^2 + 4x - 7 = 0$, $2x^2 + 2y^2 + 3x + 5y - 9 = 0$, $x^2 + y^2 + y = 0$.*

13. *Find, eccentricity, coordinates of foci, length of latus rectum and equations of directrices for the ellipse $9x^2 + 16y^2 = 144$.*

14. *A man running on a race course notices that sum of distances of two flag posts from him is always 10 m. and distance between flag posts is 8 m. Find the equation of race course traced by the man.*

15. *Find the equations of tangents to the hyperbola : $x^2 - 4y^2 = 4$ which are (i) parallel to (ii) perpendicular to the line $x + 2y = 0$.*

16. *Evaluate :* $\int_0^{\pi/2} \frac{a \sin x + b \cos x}{\sin x + \cos x}\, dx$.

17. *Solve :* $\frac{dy}{dx} = \frac{(x+y)^2}{2x^2}$.

SECTION - C

III. Long Answer Type Questions : **5 × 7 = 35**

*(i) Attempt **ANY FIVE** questions.*

*(ii) Each question carries **SEVEN** marks.*

18. *Show that the four points (1, 1), (–6, 0), (–2, 2),(–2, –8) are concyclic and find the equation of the circle on which they lie.*

19. *(a) Find pole of $3x + 4y - 45 = 0$ with respect to $x^2 + y^2 - 6x - 8y + 5 = 0$*

(b) Find the locus of P, if the tangents drawn from P to $x^2 + y^2 = a^2$ *are perpendicular to each other.*

20. *Prove that the area of the triangle inscribed in the parabola* $y^2 = 4ax$ *is* $\frac{1}{8a}\,|(y_1 - y_2)(y_2 - y_3)(y_3 - y_1)|$ *sq.units where* y_1, y_2, y_3 *are ordinates of its vertices.*

21. *Evaluate :* $\int \frac{9\cos x - \sin x}{4\sin x + 5\cos x}\,dx.$

22. *Obtain the reduction formula for In =* $\int \cot^n x\,dx$*, n being a positive integer,* $n \geq 2$ *and deduce the value of* $\int \cot^4 x\,dx.$

23. *Evaluate :* $\int_0^1 \frac{\log(1+x)}{1+x^2}\,dx.$

24. *Solve the differential equation :*

$\cos x \cdot \frac{dy}{dx} + y \sin x = sec^2 x.$