Senior Inter Mathematics Model Paper- (IIB)

MATHEMATICS
Paper - II (B)

(English Version)

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

Section - A

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

1. Find circle concentric with
   $x^2 + y^2 – 6x – 4y – 12 = 0$ and passing through $(–2, 14)$

2. For circle $x^2 + y^2 – 10x – 10y + 25 = 0$ find polar equation drawn from $(1, –2)$

3. Find angle between circles
   $x^2 + y^2 – 12x – 6y + 41 = 0$,
   $x^2 + y^2 + 4x + 6y – 59 = 0$

4. Find the equation of axis and directrix of the parabola
   $y^2 + 6y – 2x + 5 = 0$

5. If the eccentricity of a hyperbola
   is $\frac{5}{4}$, then find the eccentricity of its conjugate hyperbola.

6. Evaluate $\int \frac{e^x(1=x)}{\cos^2(xe^x)} dx$

7. Find $\int \frac{1+\cos^2 x}{1-\cos 2x} dx$ {on $I \subset R \setminus n\pi : n \in Z$}

8. Find the value of $\int_{1}^{5} \frac{dx}{\sqrt{2x-1}}$

9. Find the value of
   $\int_{0}^{2\pi} \sin^2 x \cos^4 x \, dx$

10. For the differential equation
    $x^{\frac{1}{2}} \cdot \left(\frac{d^2 y}{dx^2}\right)^{\frac{1}{3}} + x\frac{dy}{dx} + y = 0$ Find order and degree.

Section-B

II. Short Answer Questions. Answer any *'Five'* Questions.

                                                      5×4=20M

11. Find the equation of the circle whose center lies on X-axis and passing through $(–2, 3)$, $(4, 5)$

12. Find the equation of the circle whose diameter is the common chord of the circles
    $S \equiv x^2 + y^2 + 2x + 3y + 1 = 0$ and
    $S' \equiv x^2 + y^2 + 4x + 3y + 2 = 0$

13. If the length of the latus rectum
    is equal $\frac{15}{2}$ and distance between foci is 2 then find equation of ellipse in the standard form.

14. Find the eccentricity and the length of the latus rectum of the
    $9x^2 + 16y^2 – 36x + 32y – 92 = 0$

15. Find the centre, eccentricity, foci, directrix and the length of the latus rectum of the hyperbola.
    $4x^2 – 9y^2 – 8x – 32 = 0$

16. $\int x \tan^{-1} x \, dx, x \in R$

17. Solve $\left(1+x^2\right)\frac{dy}{dx} + y = e^{\tan^{-1} x}$

Section-C

III. Long Answer Questions. Answer any *'Five'* Questions.

                                                      5×7=35M

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

19. Find direct common tangent equations for circles
    $x^2 + y^2 + 22x – 4y – 100 = 0$ and
    $x^2 + y^2 – 22x + 4y + 100 = 0$

20. Equation of a parabola in standard form.

21. Evaluate $\displaystyle\int \frac{1}{1 + \sin x + \cos x}\, dx$

22. Evaluate $\displaystyle\int \frac{2x + 5}{\sqrt{x^2 - 2x + 10}}\, dx$

23. Evaluate $\displaystyle\int_{0}^{\frac{\pi}{4}} \frac{\sin x + \cos x}{9 + 16\sin 2x}\, dx$

24. Solve $\sin^2 x.\dfrac{dy}{dx} + y = \cot x$