MATHEMATICS-I(B)

Pre final Examination -2026

SET-A

Time:3Hours Max.Marks:75

SECTION-A 10×2=20

I.Very Short Answer Type Question:

(i) Answer **All** questions.

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

1 . Find equation of the line containing the points (2,-3) and (0,-3) .

2 . Find the ratio in which the straight line 2x+3y-20=0 divides the join of the points (2,3) and (2,10)

3 . Find the x , if the distance between (5,-1,7) and (x,5,1) is 9 .

4 . Write the equations of the plane 4x – 4y + 2z + 5 = 0 in the intercept form

5 . Compute $\lim_{x\to 2} \frac{x-2}{x^3-8}$

6 . Compute $\lim_{x\to 0} \frac{e^{7x}-1}{x}$.

7 . Find the derivative of $\sin^{-1}(3x - 4x^3)$

8 . Find the derivative of $\frac{1-cos(2x)}{1+cos(2x)}$

9 . Find dy and Δy of y = f(x) = $x^2 + x$ at x=10 when $\Delta x = 0.1$

10 .Find c , so that $f^1(c) = \frac{f(b)-f(a)}{b-a}$ in the following cases f(x) = e^x , a=0 ,b=1

SECTION-B 5×4=20

II.Short Answer Type Question:

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

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

11. A(5,3) and B(3,-2) are two fixed points . Find the equation of locus of P , so that the area of triangle PAB is 9.

12. When the axes are rotated through an angle α , find the transformed equation of Xcosα + ysinα = p .

13 . Prove that the points (1,11), (2,15) , (-3,-5) are collinear and find the eqation of the straight line containing them

14. Compute $\lim_{x\to 1} \frac{(2x-1)(\sqrt{x}-1)}{2x^2+x-3}$

15 . Find the derivative of tan2x from the first principle .

16 . show that at any point (x,y) on the curve y=$be^{\frac{x}{a}}$, the length of the sub tangent is constant and the length of the sub normal is $\frac{y^2}{a}$

17.The distance time formula for the motion of a particle along a straight line is s=$t^3 - 9t^2 + 24t - 18$ find when and where the velocity is zero

SECTION-C 5×7=35

III.Long Answer Type Question:

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

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

18 . If Q(h,k) is the foot of the perpendicular from P(x,y) on the straight line ax+by+c=0 then $(h-x_1):a =(k-y_1):b =-(ax_1+by_1+c):(a^2+b^2)$ and find the footof the perpendicular from (-1,3) on the straight line 5x-y-18=0

19. Show that the area of the triangle formed by the lines ax^2+2hxy+by^2=0 and line lx+my+n=0 is $\left|\frac{n^2\sqrt{h^2-ab}}{am^2-2hlm+bl^2}\right|$

20 . Find the condition for the chord lx+my=1 of the circle $x^2 + y^2 = a^2$ (whose centre is the origin) to subtend a right angle at the origin.

21 .Find the angle between two diagonals of a cube The vertices of a triangle are A(1,4,2) B(-2,1,2) C(2,3,-4) .Find $\angle A$, $\angle B$, $\angle C$

22. Find the derivatives of the function $sinx^x + x^{sinx}$

23. Find the angle between the curves $y^2 = 8x$, $4x^2 + y^2 = 32$

24 . A wire of length l is cut into two parts which are bent respectively in the form of a square and a circle . What are the lengths of the pieces of the wire respectively so that the sum of the areas is the least.