Joint Second Terminal Examination-2080

Class: - 10 **F.M: 100**

Subject: Optional mathematics **Time: 3hrs**

Group 'A' (5×(1+1)=10)

1 a. Define quadratic function.

b. What is the arithmetic mean between two number a and b?

2 a. Write the formula for the sum of first n natural number.

b. Write down $\lim_{x \to a-0} f(x)$ in sentences.

3 a. If matrix $A=\begin{pmatrix} a & b \\ c & d \end{pmatrix}$. What is the value of $|A|$? Write it.

b. Write the name of geometrical figure formed when a cone is cut by a plane that is parallel to the base or perpendicular to i axis?

4 a. Write the formula to find the angle between the pair of lines $ax^2+2hxy+by^2=0$.

b. Write the equation of circle touching Y-axis only.

5 a. What is the single transformation under $R_1.R_2$ if $R_1[(0,0), 81$ followed by $R_2[(0,0), 99°]$?

b. Write down the matrix associated with reflection in X-axis?

Group 'B' (13 × 2= 26)

6 a. If f(x)= 4x+2 and g(x)= 3x-4. Find fog(x).

b. If a polynomial $x^3-kx^2-13x+10$ is divided by (x+2) , the reminder is 4. Find the value of k.

7 a. If $A=\begin{bmatrix} 2 & 4 \\ -1 & 3 \end{bmatrix}$ and $B=\begin{bmatrix} -1 & 2 \\ 0 & 1 \end{bmatrix}$, find the determinant of AB

b. If $\begin{vmatrix} x & -4 \\ -3 & x \end{vmatrix}=\begin{vmatrix} 4 & 3x \\ 2 & 1 \end{vmatrix}$ Find x.

a. Find the value of k if $3x-4y+7=0$ and $kx-3y-5=0$ are perpendicular to each other.

b. Find the equation of the circle having centre at (5,4) and touches Y-axis.

c. Find the obtuse angle between a pair of straight line represented by an equation $3x^2-7xy+2y^2=0$.

9 a. If the Geometric mean of $\frac{1}{9}$ and x is 2. Find the value of x.

b. If the 5th term of an AP is 19 and the 8th term is 31. which term is 67?

10 a. The vertice of a ΔABC are A(1,3) B(2,2) and C(1,1). Find the image of ΔABC under a rotation through +90°. $(-y, x)$

b. If A'(1,4) and B'(3,8) are respective image of A(1,2) and B(3,4) after translation by 2×2 matrix $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$. Find 2×2 matrix.

11 a. If the quartile deviation of frequency distribution is 14 and the lower quartile is 35, find the third quartile.

b. In a continuous series $N=25$ $\sum fm=50$ and $\sum fm^2=130$ then find the standard deviation and its co-efficient

Group 'C' (11 × 4= 44)

12. If $f(x)= 3x-7$ and $g(x)=\frac{x+2}{5}$ and $g^{-1}f(x)= f(x)$. Find the value of

13. Solve: $x^3 - 4x^2 - 7x + 10 = 0$

14. Optimize: $P = 3x+2y$ under the following constraints $2x-y\leq 1$, $x+2y\leq 3$ and $x\geq 0$, $y\geq 0$.

15. If $f(x)=\frac{x^2-1}{x-1}$, then

i) Find the value of f(x) at x= 0.9 ,0.99,1.01, 1.001.

ii) Is function f(x) continuous at x=1? Give reason.

16. Solve by Matrix method: $\frac{2}{x}+\frac{3}{y}=1$, $\frac{6}{x}+\frac{4}{y}=\frac{7}{4}$

17. What is the single equation of the straight line through the origin and perpendicular to the lines represented by $x^2-5xy+4y^2=0$.

18. Find the equation of a circle whose centre is at the point of intersection of $2x+y=4$ and $2y-x=3$ and passing the point (4,6).

19. Find the 2×2 transformation matrix which transforms a unit square $\begin{pmatrix}0 & 1 & 1 & 0\\ 0 & 0 & 1 & 1\end{pmatrix}$ into parallelogram $\begin{pmatrix}0 & 3 & 5 & 2\\ 0 & 1 & 2 & 1\end{pmatrix}$

20. Find the inversion point of the point (4,5) of a circle whose center is (2,3) and radius is 4 units.

21. Calculate the mean deviation from median and its co-efficient.

CI	0-10	10-20	20-30	30-40	40-50
f	2	3	6	5	4

22. Find the standard deviation and Co-efficient of standard deviation of following data:

Marks obtained	0-10	10-20	20-30	30-40	40-50
No. of students	3	5	12	6	4

Group 'D' ($4 \times 5 = 20$)

23. If the function $f(x)=x^2-2x$, $g(x)=2x+3$ and $fog^{-1}(x)=3$. Find the value of X.

24. The sum of the first 20 terms of an A.P is 3050 and the sum of the first 40 terms is 4100. Find the first three terms of the A.P.

25. Find the equation of straight line with passes through (2,3) and are inclined at 45° to the straight line $2x+3y=2$.

26. The vertices of ΔABC are A(2,3) , B(1,1) , C(3,1). Find the co-ordinates of image of ΔABC under the rotation through +90 about origin, then enlarge the image so obtained by taking the scalar factor 2 and centre as origin and show all triangles in saine graph.