Cat. No: Bass.1103.   Marks: 50.00

Title: Basic Mathematics (2+0)   Time: 2 hours

I. Fill up the blanks suitably   (10x1=10)

1. If $\begin{bmatrix} x & + & 1 \\ 3 & - & y \\ z & + & 2 \end{bmatrix} = \begin{bmatrix} 2 \\ 1 \\ 3 \end{bmatrix}$ then $\begin{bmatrix} x \\ y \\ z \end{bmatrix}$ is -------------

2. If the nth term of 3,10,17,......and 63,65,67,......are equal, then 'n' is -------------

3. $\begin{vmatrix} -4 & 8 & 5 \\ 2 & -4 & -3 \\ 7 & 5 & 9 \end{vmatrix}$ = -------------

4. The point on the curve $y=x^2-x+4$ at which the slope 3 is -------------

5. The function to be integrated under the sign of integration is called -------------

6. All the off diagonal elements of an identity matrix will be equal to zero (T/F).

7. The derivative of a constant function is a constant itself (T/F).

8. $Y(\frac{dy}{dx})^2 + 2x(\frac{dy}{dx}) - y = 0$ is a first order, second degree differential equation (T/F).

9. The third derivative of x^6 is -------------

10. $\underset{p \to 2}{Lt} \quad \frac{p^3-8}{p-2}$ = -------------

II. Write short notes/answers on any FIVE   (5x2=10)

1. Distinguish between increasing and decreasing function.

2. Find the area of the region bounded by the curve $y^2=2y-x$ and y axis.

3. Evaluate $\int_2^3 (x^2 + \frac{3}{\sqrt{x}} + \frac{4}{x^2} + 6)dx$

4. The sum of three integers in GP is 28 and their product is 512, find the numbers.

5. If $\begin{bmatrix} 5x & 4y-9 \\ x^2-2x & 0 \end{bmatrix} = \begin{bmatrix} x+4 & y^2-2y \\ -1 & 0 \end{bmatrix}$ find x and y.

6. Find the sum of all integers divisible by 7 and lying between 200 and 400.

7. If $y= x^2 sinx + 7x^2$, find $\frac{dy}{dx}$

III. Answer any FIVE questions   (5x4=20)

1. Find the sum of the following series

   a) 8, 4, 2, ...

   b) 2,4,8,16, ... up to 15 terms.

2. a) Find the AP, given that 3rd term is 26 and 7th term is 62

   b) How many terms of the AP 3, 9, 15 .... should be taken to get a sum of 363?

3. a) Find A and B if A-B = $\begin{bmatrix} 5 & 0 \\ 2 & 4 \end{bmatrix}$ and 2 A+B = $\begin{bmatrix} 4 & 3 \\ 1 & 2 \end{bmatrix}$

   b) Give examples of a scalar matrix, symmetric matrix, skew symmetric matrix, singular matrix.

4. State Binomial theorem for a positive integral exponent and its five properties.

5. Expand $\left(1 + \frac{2}{3x}\right)^6$ by using Binomial theorem.

6. Find the maximum and minimum values of $2 \sin x + \cos 2x$ when x varies from 0 to 2π

7. a) Explain angle of elevation and angel of depression.

   b) A tree broken over by the wind forms a right triangle with the ground. If the broken part makes an angle of 50° with the ground and if the top of the tree is now 20 ft. From its base, how tall was the tree?

IV. Write Essay on any ONE

(1x10=10)

1. Give a detailed comparison of Arithmetic progression, Geometric progression and Harmonic progression giving examples. Derive the formula to find out the nth term and sum to ' n' terms in each case. Find the sum of squares of first 'n' natural numbers.

2. Which are the different types of functions you have encountered? What do you mean by Limit of a function? Explain the Product rule and Quotient rule of differentiation.

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