THE VILLAGE
INTERNATIONAL SCHOOL
"We Nurture Dreams"

GRADE: XII Date: 05/11/2024	MT 3 (2024-25) APPLIED MATHEMATICS	Marks: 20 Time: 1 hours

General Instructions:

Read the following instructions very carefully and strictly follow them:

(i) This Question paper contains 11 questions. All questions are compulsory.
(ii) This Question paper is divided into three Sections - A, B, and C
(iii) Use of calculators is not allowed.

Q.No	Questions	Mark
	SECTION A	
1	Find $\frac{dy}{dx}$, if $x^2 - y^2 - 5 = 0$ a) $\frac{x}{y}$ c) 2y b) 2x d) 0	**1**
2	Find $\frac{dy}{dx}x^2$ a) x c) 0 b) 2x d) 2	**1**
3	Find the second order derivative of $ax^3 + bx^2 + cx + d$ a) 3ax+2bx+c c) $3ax^2 + 2bx + c$ b) 6ax+2b d) 3a+b	**1**
4	Find the derivative of $x^2.e^x$ c) $x^2.e^x + e^x.2x$ c) $x.e^x + x^2.2x$ d) $x^2.xe^x + e^x.2x$ d) none of the above	**1**
5	A function is said to be strictly increasing on an open interval (a,b) if a) $x_1 < x_2 \Rightarrow f(x_1) > f(x_2)$ b) $x_1 < x_2 \Rightarrow f(x_1) < f(x_2)$ c) $x_1 < x_2 \Rightarrow f(x_1) \leq f(x_2)$ d) $x_1 < x_2 \Rightarrow f(x_1) \geq f(x_2)$	**1**

	SECTION B	
6	Find the interval in which the function is strictly increasing or decreasing $f(x) = 5 + 36x + 3x^2 - 2x^3$	**2**
7	Divide 30 into two parts such that their product is maximum	**2**
8	If the cost function is $C = 40 - 6x + x^2$, find the minimum value of cost C?	**2**
	SECTION C	
9	Find the local maximum and local minimum values, if any of the function $y = \frac{x^4}{x-1},\ x \neq 0$	**3**
10	The total revenue received from the sale of x units of a product is given by $R(x) = 200 + \frac{x^2}{5}$ Find i) The average revenue ii) The marginal revenue iii) The marginal revenue when x=25	**3**
11	**Case study** An architecture design an auditorium for a school for its cultural activities. The floor of the auditorium is rectangular in shape and has a fixed perimeter P.  Based on the above information solve the following questions:	

	i)	If x and y represents the length and breadth of the rectangular region, then relation between the variable is: a) $x + y = P$ b) $x^2 + y^2 = P^2$ c) $2(x + y) = P$ d) $x + 2y = P$	**1**
	ii)	The area A of the rectangular region, as a function of x, can be expressed as: a) $A = Px + \frac{x}{2}$ b) $A = \frac{Px+x^2}{2}$ c) $A = \frac{Px-2x^2}{2}$ d) $A = \frac{x^2}{2} + Px^2$	**1**
	iii)	School manager is interested in maximising the area of the floor A for this to be happen, the value of x should be: a) P b) $\frac{P}{2}$ c) $\frac{P}{3}$ d) $\frac{P}{4}$	**1**

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