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TH241125MINB

Reg. No.....

Name.....

FYUG PROGRAMME EXAMINATION, NOVEMBER 2024**(2024 Admission Regular)****SEMESTER I – MINOR B COURSE (MATHEMATICS)****MT1DSCB101B24 – GROUND ROOTS OF MATHEMATICS****Time: 1.5 Hours****Maximum Marks: 50****PART A****I. Answer all questions (MCQ). Each question carries 1 mark**

Q.No:	QUESTIONS	CO	LEVEL
1.	$ A = 2, B = 4$, then $ A \times B =$ _____. a) 2^4 b) 8 c) 6 d) 4^2	1	U
2.	If $y = x^2 + 3$, then $\frac{dy}{dx} =$ _____. a) $2x$ b) $2x^{\frac{1}{2}}$ c) $2x + 3$ d) x^3	3	Ap
3.	$f(x) = \cos x$. Then the derivative of f, $f'(x) =$ _____. a) $-\sin x$ b) $\sin x$ c) $-\cos^2 x$ d) $-\cos x$	3	Ap
4.	$y = x $, attains a minimum at $x =$ _____. a) 2 b) -1 c) 0 d) 4	4	U
5.	$y = f(cx)$, _____ the graph of $y = f(x)$ horizontally by a factor of c units. ($c \neq -1$) a) stretches b) compresses c) rotates d) reflects	1	U

(5x1=5)

II. Answer all questions in one word. Each question carries 1 mark

Q.No:	QUESTIONS	CO	LEVEL
6.	$y = f(-x)$ reflects the graph of $y = f(x)$ about theaxis.	1	U
7.	Identify whether $f(x) = x^2 + 2x + 1$ is an even or odd function.	1	U
8.	$y = (x^2 - 1)^2$. Determine $\frac{dy}{dx}$ at $x = 1$.	3	Ap
9.	If $y = \sin x$. Determine $\frac{d^2y}{dx^2}$.	3	Ap

10.	Determine whether the following statement is True or False. The function $f(x) = x^2$ has no critical points.	4	Ap
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(5x1=5)

PART B

III. Answer any six questions in one paragraph. Each question carries 5 marks.

Q.No:	QUESTIONS	CO	LEVEL
11.	Let $f(x) = \sqrt{x+1}$, $g(x) = 2x$. Identify $(f \circ g)(x)$ and $(g \circ f)(x)$.	1	U
12.	If $y = f(x) = 3x + 2$, Determine the inverse $f^{-1}(x)$.	2	Ap
13.	If $f(x) = (x^2 - 1)(x-1)$, determine $\frac{df}{dx}$.	3	Ap
14.	If $f(x) = 2 \sin x + 3 \cos x$, determine $f'(x)$.	3	Ap
15.	If $y = \sqrt{x+3}$, determine $\frac{dy}{dx}$.	3	Ap
16.	If $xy = 1$. Determine $\frac{dy}{dx}$.	3	Ap
17.	Identify the intervals where the function $f(x) = x^2 + 2x + 1$ is increasing and decreasing.	4	U
18.	Determine the critical points of $y = \sin x$. Determine the points of relative maximum or minimum in $[0, \pi]$.	4,5	Ap

(6x5=30)

PART C

IV. Answer any one question. The question carries 10 marks.

Q.No:	QUESTIONS	CO	LEVEL
19.	Identify the equation of the graph obtained by shifting the graph of a) $y = (x+2)^2$, 2 units downwards and 2 units right. b) $y = x $, 2 units upwards and 1 unit right. c) $y = \cos x$, stretch vertically by a factor of 3.	1	U
20.	Determine $f'(x)$ for $f(x) = \frac{3x+4}{x}$ b) $f(x) = \frac{x-2}{x+1}$ c) $f(x) = \frac{x^2}{x+4}$.	3	Ap

(1x10=10)

CO : Course Outcomes Level : R – Remember, U – Understand, Ap- Apply, An- Analyze, E- Evaluate, C- Create