

FYUG PROGRAMME EXAMINATION, NOVEMBER 2024

(2024 Admission Regular)

SEMESTER I – MINOR B COURSE (MATHEMATICS)

MT1DSCB01B24 – GROUND ROOTS OF MATHEMATICS

Time: 1.5 Hours

Maximum Mark: 50

PART A

I. Answer all questions (MCQ). Each question carries 1 mark

Q.No:	QUESTIONS	CO	LEVEL
1.	The y intercept of the line $y = 3x + 4$ is a) 3 b) 4 c) 0 d) 12.	1	U
2.	If $A = \{a, b, c\}$ and $B = \{b, c\}$, then $A \cup B = \dots\dots\dots$ a) $\{a\}$ b) $\{a, b, c\}$ c) $\{b, c\}$ d) $\{c\}$.	1	U
3.	The derivative of a constant is a) 0 b) 4 c) 3 d) 2	3	U
4.	The function $y = x - 2 $ attains a relative minimum at $x_0 = \dots\dots\dots$ a) 0 b) 2 c) -2 d) 1	4,5	Ap
5.	$y = x^3$ has an inflection point at $x_0 = \dots\dots\dots$ a) 0 b) 1 c) 2 d) 3	4,5	Ap

(5x1=5)

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

Q.No:	QUESTIONS	CO	LEVEL
6.	Identify whether $f(x) = x$ is even or odd function?	1	U
7.	$y = \tan x$. Determine $\frac{dy}{dx}$	3	Ap
8.	$y = x^2 - 1$. Determine $\frac{dy}{dx}$ at $x = 1$.	3	Ap
9.	$y = \cos^2 x$, Determine $\frac{dy}{dx}$.	3	Ap
10.	Identify the critical points of $y = 3x^2 - 6x + 1$.	3	Ap

(5x1=5)

PART B

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

Q.No:	QUESTIONS	CO	LEVEL
11.	If $f(x) = x + 1$ and $g(x) = 3x$. Determine a) $(f \circ g)(x)$ b) $(f \circ f)(x)$ c) $(g \circ f)(x)$.	1	Ap
12.	If $f(x) = x^2$. Determine the inverse $f^{-1}(x)$.	2	Ap
13.	If $f(x) = (3x^2 + 6)(2x - 1)$. Determine the derivative of f , $f'(x)$.	3	Ap
14.	If $y = 2\sin^2 x$. Determine $\frac{dy}{dx}$	3	Ap
15.	If $y = \cos(2x^2 + 3x + 2)$, determine $\frac{dy}{dx}$.	3	Ap
16.	$x^3 + y^3 = 3xy$. Determine $\frac{dy}{dx}$ by implicit differentiation.	3	Ap
17.	Determine the intervals where f is increasing or decreasing. $y = x^2 - 2x + 1$.	4,5	Ap
18.	Determine the critical points of $f(x) = 3x^2 - 6x + 1$.	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 after shifting a) $y = \frac{1}{x}$ upwards 1 unit and 1 unit to the right. b) $y = x $ downwards 3 units and 2 units to the left. c) $y = \sin x$ stretch 2 units vertically.	1	U
20.	Determine $f'(x)$, where $f(x)$ is a) $\frac{2x+1}{x^2+2}$ b) $\frac{3x}{(x+1)}$ c) $\cos(x^2+2x)$ d) $\sqrt{x^2+2x+1}$	3	Ap

(1x10=10)

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