MIDTERM EXAMINATION Spring 2009

MTH101- Calculus And Analytical Geometry (Session - 6)

Time: 60 min Marks: 40

Calculus & Analytical Geometry-I

Question No: 1	(Marks: 1) - Please choose or	ne
		The
set {,-4,-3,-2,-1,	0,1,2,3,4,} is know as set of	

- ► Natural numbers
- ▶ Integers
- ► Whole numbers
- ► None of these

Question No: 2 (Marks: 1) - Please choose one

The

$$h(x) = \frac{1}{(x-2)(x-4)}$$

domain of the function

i

- \blacktriangleright $(-\infty, 2) \cup (2, 4) \cup (4, +\infty)$
- ► $(-\infty, 2\} \cup \{2, 4\} \cup \{4, \infty)$
- ► $(-\infty, 2.5) \cup (2.5, 4.5) \cup (4.5, \infty)$
- ► All of these are incorrect

Question No: 3 (Marks: 1) - Please choose one

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Tf

the then the inequality $(L - \epsilon) < f(x) < L + \epsilon$ holds in any subset of the interval

$$(a-\delta,a)\cup(a,a+\delta)$$

$$(a-1,a)\cup(a,a+1)$$

$$(a - \mathbf{\epsilon}, a) \cup (a, a + \mathbf{\epsilon})$$

None of these

Question No: 4 (Marks: 1) - Please choose one

$$L - \epsilon < f(x) < L + \epsilon$$
 Can be written as

$f(x) - L < \epsilon$

$$f(x) - L > \epsilon$$

$$f(x) - L < \varepsilon + 1$$

▶ None of these

Question No: 5 (Marks: 1) - Please choose one

Tf

a function satisfies the conditions

f(c) is defined

$$\lim f(x)$$

→c+

Exists

$$\lim_{x \to c^+} f(x) = f(c)$$

Then the function is said to be

- Continuous at c
- ► Continuous from left at c

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► Continuous from right at c

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► None of these

Question No: 6 (Marks: 1) - Please choose one

$$d [sex] = - - - - - dx$$

$$\sin x$$

$$1-\sin^2 x$$

$$-\sin x$$

$$1-\sin^2 x$$

1

$$1-\sin^2 x$$

► None of these

Question No: 7 (Marks: 1) - Please choose one

$$\log_b ac = -----$$

$$\log_{a+c} b$$

► None of these

Question No: 8 (Marks: 1) - Please choose one

$$\log g^r = -----$$

$$a \log_b r$$

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$b\log_a r$	•
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▶ None of these

Question No: 9 (Marks: 1) - Please choose one

If

f "(x) < 0 on an open interval (a,b) then f is ----- on (a,b)

- ▶ None of these
- ▶ Concave up
- Concave down
- ➤ Closed

Question No: 10 (Marks: 1) - Please choose one

f is a twice differentiable function at a stationary point $\int_0^{x_0} dx \, dx \, dx = 0$ then f

has relative At $^{\chi_{_{0}}}$

- Minima
- Maxima
- ► None of these

Question No: 11 (Marks: 1) - Please choose one

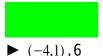
line is called a tangent line to the circle if it meets the circle at precisely

- One point
- ► Two points
- ► Infinite points
- ► None of these

Question No: 12 (Marks: 1) - Please choose one

The equation $(x+4)^2 + (y-1)^2 = 6$ represents a circle having center at and

radius



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$$(-4, -1)$$
, 6

► None of these

Question No: 13 (Marks: 1) - Please choose one

The

$$\lim_{x \to a} f(x) \text{ where } f(x) = k$$

(k is a constant) is equal to

- ▶ k+2
- ▶ k+1
- ► <mark>k</mark>
- ▶ kf

Question No: 14 (Marks: 1) - Please choose one

 $P(x) = c + c + \dots + c + x^n$

For

and any real number a

$$\lim_{x \to a} P(x) = c + c + c + c + c + c + a^n = 0$$

P(a)

P(a + 1)

ightharpoonup P(a-1)

1 *P*(*a*)

Question No: 15 (Marks: 1) - Please choose one

Polynomials are always Function

- ► Continuous
- **▶** Discontinuous

Question No: 16 (Marks: 1) - Please choose one

$$D [dh(x)] = - - - -$$

$$Dx$$

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where d is a constant

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dh(x)

dh'(x)

- ▶ None of these

Question No: 17 (Marks: 1) - Please choose one

The

graph $x = y^2$ is symmetric about

- X-axis
- ➤ Y-axis
- ► Origin
- ► None of these

Question No: 18 (Marks: 1) - Please choose one

Consider two function f(x) = 3 xandg(x) = x what is true about these functions

$$f(x).g(x) = 3x$$

$$f(x)$$

$$g(x) = 3x$$

$$f(g(x)) = 3x$$

▶ None of these

Question No: 19 (Marks: 1) - Please choose one

The

$$\lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

formula

is called with respect to x of the function f

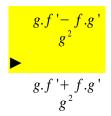
- Derivative
- ➤ Slope
- ► Tangent
- ► None of these

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Question No: 20 (Marks: 1) - Please choose one

$$\frac{d}{dx} (f)$$

Suppose that $\int and g$ are differentiable function of x then



$$g.f'-f.g$$

▶ None of these

Question No: 21 (Marks: 2)

If

$$\frac{dy}{dx} = -\frac{3yx^2 + 1}{28y^3 + x^3}$$

then find the slope of the tangent line at the point (2, 0).

Question No: 22 (Marks: 3)

Let
$$f(x) = \begin{cases} x^2 - x - 2 \\ x + 1 \end{cases}$$
 if $x \neq -1$
 $\begin{vmatrix} -3 \end{vmatrix}$ if $x = -1$

At what points the function f is continuous and discontinuous? At point of discontinuity if any explain why it is discontinuous?

Question No: 23 (Marks: 5)

Differentiate w.r.t. x by chain rule $y = x^2 + 1$

Question No: 24 (Marks: 10)

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Evaluate the following limit.

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lim
$$g(y)$$
 where, $g(y) = \begin{cases} y^2 + 5 & \text{if } y < -2 \\ 3 - 3y & \text{if } y \ge -2 \end{cases}$

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