

Reg. No.....

**FIFTH SEMESTER B.Sc. DEGREE (U.G.—CCSS) EXAMINATION
NOVEMBER 2014**

(SDE)

Core Course—Mathematics

MM 5D 03—MATHEMATICS FOR SOCIAL SCIENCES

Time : Two Hours and Forty-five Minutes

Maximum : 27 Weightage

Part B

PART I

Answer all the nine questions.

1. Write the equation of the line passing through (1, -1) and having slope ⁻¹
2. Solve by factorising $x^2 + 12x + 35 = 0$ •
3. Evaluate $\lim_{x \rightarrow -4} \left(\frac{4+x}{16-x} \right)^2$
4. If $u = t^{\frac{1}{2}} + 3t + 1$ find $\frac{dy}{dt}$
5. If the cost function is $C = x^2 + 10x + 48$, find the marginal cost at $n = 6$.
6. Show that $y = (4x - 5)^2$ is increasing at $x = 3$.
7. Find $\log_2 \left(\frac{1}{32} \right)$
8. Find the derivative of $y =$
9. Evaluate $\int (x^2 - 3x + 1) dx$

(9 x 1 = 9 weightage)

Turn over

PART II

Answer any five questions.

10. Solve $-5x + y = -8$ $6x - y = 11$.
11. Given $f(x) = x^3$; $g(x) = x^2 - 2x + 5$, $h(x) = x - 4$. Find $g(f(x))$ and $f(h(x))$
12. Given the average cost function $A = 2Q^2 - 5Q + 7 + \frac{200}{Q}$. Find the marginal cost function.
13. Find the relative maximum and minimum of $f(x) = -5x^3 + 22.5x^2 + 420x + 85$.
14. Use logarithmic differentiation to find the derivative of

$$y = (x^4 + 7)(x^5 + 6)(x^2 + 2).$$

15. Evaluate $\int_4^{36} \frac{1}{x} dx$.

16. Find the cross partial derivatives of:

$$f(x, y) = 5x^3y^2 - 10x^2y^4.$$

(5 x 2 = 10 weightage)

PART III

Answer any two questions.

17. (a) Find the slope, x-intercept and y-intercept of $3x + y = 7$.
 (b) Find the equation of a line passing through $(-2, 5)$ and perpendicular to the line $4x - y + 3 = 0$.
18. (a) Find $\frac{dy}{dx}$ if $y = \frac{7x^3}{4x+9}$
 (b) Given the cost function $C = 8Q + 4\sqrt{Q} + 95$ and the production schedule is $Q = 150t + 2700$.
 Find the rate of change of cost w.r.t. time at $t = 6$.
19. (a) Given $y = (x^3 - 2)(x^2 - 3)(8x - 5)$. Apply logarithmic differentiation, to find $\frac{dy}{dx}$
 (b) Evaluate $\int_0^5 3x^2 - 7 dx$.

(2 x 4 = 8 weightage)

8. The value of $\int x^{-2} dx$ is _____.

(A) $\frac{x}{2} + c$.

(B) $2x + c$.

(C) $\frac{x^2}{3} + c$.

(D) $\frac{1}{2} + c$.

9. At $x = 2$ the function $f(x) = 10$ is _____

(A) Increasing.

(B) Decreasing.

(C) Inflection.

(D) Slope = 0.

10. The limit of $(1 + \frac{1}{n})^n$ as $n \rightarrow \infty$ is _____

(A) 0.

(B)

(C) e .

(D) 1.

11. The value of $\log_9 27$ is equivalent to

(A) $\frac{2}{3}$.

(B) 3.

(C) 81.

(D) $\frac{3}{2}$.

12. $\frac{1}{2} \ln 49$ is equivalent to _____

(A) $\ln 22$.

(B) $\ln 7$.

(C) $\ln 47$.

(D) $\ln 22.5$.

13. The vertex of the parabola $y = (x + 2)^2 + 9$ is _____

(A) (-2, 3).

(B) (-2, 9).

(C) (2, 9).

(D) (2, 3).

14. The axis of the parabola $y = x^2 - 8x + 16$ is _____

(A) $x = 4$.

(B) $x = -4$.

(C) $x = 8$.

(D) $y = 4$.

15. The limit of $1 - (x)^2 + x(x - 3)$ as $x \rightarrow 3$ is _____

(A) 3.

(B) 9.

(C) 0.

(D) -3.

16. The limit of $f(x) = \frac{x^2 - x - 20}{x^2 - 25}$ as $x \rightarrow 5$ is _____

(A) 0.

(B)

(C) $\frac{9}{10}$.

(D) Limit does not exist.

17. The function $f(x) = \frac{x-5}{x^2-25}$ is discontinuous at _____

(A) 5.

(B) -5.

(C) 25.

(D) 5 and -5.

18. The slope of $f(x) = 3x^2 - 5x$ at $(2, 5)$ is _____

(A) 7.

(B) 6.

(C) 0.

(D) 12.

19. If $f(x) = (2x + 5)^5$ then $f'(x)$ is _____

(A) $\frac{5}{(2x+5)^5}$

(B) $5(2x+5)^4$.

(C) $\frac{(2x+5)^6}{12}$

(D) $10(2x+5)^4$.

20. If $f(x) = 6x^3$ then $f'(x)$ is _____

(A) $\frac{5}{4x}$.

(B) $18x^2$.

(C) $36x$.

(D) 36.

is said,
roups ch
is like Irf
told TH
ion did n
promot
s the co
ere co
"We
e