D 11167 (Pages : 2) Name.....

Reg. No.....

FIFTH SEMESTER B.A./B.Sc./B.Com./B.B.A. DEGREE EXAMINATION NOVEMBER 2016

(CUCBCSS—UG)

Open Course

MAT 5D 19—MATHEMATICS FOR SOCIAL SCIENCES

Time : Two Hours Maximum : 40 Marks

Section A

Answer **all** *the six questions.*
Each question carries 1 *mark .*

1. Find the slope of the equation $24x + 6y = 30$.

2. Evaluate $\lim_{x \to 5} \frac{7x^2 - 9x}{x + 8}$.

3. Define an inflection point.

4. Find the partial derivative $\frac{\partial z}{\partial x}$ if $z = 8x^2 + 14xy + 5y^2$.

5. Find the marginal cost function if the average cost function $AC = 1.5Q + 4 + \frac{46}{Q}$.

6. Convert the natural logarithm In 13 = 2.56495 into equivalent natural exponential form.

($6 \times 1 = 6$ marks)

Section B

Answer any **five** *out of seven questions.*
Each question carries 2 *marks.*

7. A company has a fixed cost of Rs. 8,250 and a marginal cost of Rs. 450 for each item produced. Express the cost C as a function of the number x of items produced and evaluate the function at $x = 20$ and $x = 50$.

8. Find the equation of the straight line with slope 7 and y intercept (0,16).

9. Find the derivative of $y = \frac{6x^3}{2x + 5}, \left(x \neq -\frac{5}{2}\right)$.

Turn over

10. Test whether the function $f(x) = 5x^2 - 12x + 8$ is increasing at $x = 3$.

11. Integrate $(3x^2 - 4)^3 (6x)$ with respect to x.

12. Evaluate $\int_2^3 \left(1 - \frac{1}{2}x\right) dx$.

13. If the marginal revenue is given by $MR = 27 - 12x + x^2$, find the total revenue function.

(5 × 2 = 10 marks)

Section C

Answer any **three** *out of five questions.*
Each question carries 4 *marks.*

14. Differentiate the function $y = 10^x + 10e^x$.

15. Evaluate $\lim_{x \to 0} \frac{1 - \sqrt{1 - x^2}}{x^2}$.

16. Find the second order partial derivatives z_{xx} and z_{yy} for the Cobb-Douglas function $z = x^{0.1} y^{0.9}$.

17. Find the relative extrema for the function $f(x) = -9x^2 + 126x - 45$.

18. Solve $5^x + 5^{2-x} = 26$.

(3 × 4 = 12 marks)

Section D

Answer any **two** *out of three questions.*
Each question carries 6 *marks.*

19. Use integration by parts to find the indefinite integral $\int 24x^2 e^{6x} dx$.

20. A company has a demand curve given by the function $2Q + 3P = 160$. The average cost curve of the firm is given by the relation $AC = 3Q^2 - 18Q + 63 + \frac{5}{Q}$. Find the level of output which maximize total revenue.

21. (a) Evaluate $\int \log x dx$.

(b) Find the equation of the line passing through the point (1, 1) and parallel to the line $4x + 4y + 7 = 0$.

(2 × 6 = 12 marks)