D 50728 (Pages : 3) Name.....

Reg. No.....

FIFTH SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2013

(UG-CCSS)

Mathematics (Open Course)

MM5 D03—MATHEMATICS FOR SOCIAL SCIENCES

Time : Three Hours Maximum : 30 Weightage

Unit I

Answer all **twelve** *questions.*

1. Equation of the X-axis is ————.
2. y-interrupt of the line $3x + y = 11$ is ————.
3. If $f(x) = 3x + 2$ and $g(x) = x - 1$ then $f - g(x)$ is ————.
4. One solution of $x^2 - 5x = 0$ is ————.
5. $f(x) = 2x^3 - 4x^2 + 7x - 10$ then $f(1)$ is ————.
6. $\lim_{x \to \infty} \frac{2x^2 - 3x}{5x^2 - 12}$ is ————.
7. Domain of the function $f(x) = \frac{2}{x-1}$.
8. $y = x^2 + n + 1$ the $\frac{dy}{dx}$ at $x = 1$ is ————.
9. Value of $\ln e^{\sqrt{x}}$ is ————.
10. If $y = 6x^2$; then $\frac{\partial^2 y}{\partial x^2}$ is ————.
11. If $z = x^2 y + xy^2$ then $\frac{\partial z}{\partial x}$ is ————.
12. Value of $\int 4\, dx$ is ————.

(12 × ¼ = 3 weightage)

Turn over

Unit II

Answer all **nine** *questions.*

13. Solve algebraically $6x + 2y = 16$
$-4x + y = -6$.

14. An author receives a fee of Rs. 75,000 plus Rs. 15 for every book sold. Express his revenues R as a function of the number of books x sold.

15. Evaluate $\underset{x \to 3}{\text{Lt}} \dfrac{\sqrt{x} - \sqrt{3}}{x - 3}$.

16. Find $\dfrac{dy}{dx}$ if $y = \left(2x^3 + 7x\right)^5$.

17. Determine whether $y = \left(2x^3 + 7\right)^5$ is increasing or decreasing at $x = -1$.

18. Simplify $y = \dfrac{1}{2}\log_2(64)$.

19. Find the slope of the tangent to the curve $y = x^2 + 10x + 25$ at (–3, 4).

20. Evaluate $\int_2^4 3x^2\,dx$.

21. Find the marginal revenue given the supply function $P = \dfrac{1}{2}Q + 60$.

(9 × 1 = 9 weightage)

Unit III

Answer any **five** *questions.*

22. Find the equation of a line passing through (–2, 5) and parallel to $y = 3x + 7$.

23. Solve by completing the square $3x^2 + 24x + 30 = 0$.

24. Graph the function $f(x) = x^2 - 6x + 9$. Also identify vertex and axis.

25. Find the break-even for a firm operating on monopolistic competition given that revenue is $R = 72x - 4x^2$ and total cost is TC = $16x + 180$.

26. Given the average cost function $AC = 2Q^2 - 5Q + 7 + \frac{210}{Q}$. Find the marginal cost.

27. How ling it will take to treble at 10% interest compounded quarterly ?

28. Use implicits differentiation to find $\frac{dy}{dx}$ if $x^2 + y^2 = xy$.

(5 × 2 = 10 weightage)

Unit IV

Answer any **two** *questions.*

29. (a) Find $\frac{dy}{dx}$ given $y = \frac{10x^4}{x^2 + 8x + 25}$.

(b) Find $\frac{\partial^2 z}{\partial x^2}$ and $\frac{\partial^2 z}{\partial y^2}$ when $z = 5x^2 y^3$.

30. Find the level of output at which the profit π is maximum when total revenue is $R = 1400Q - 2Q^2$ and total cost is $C = Q^3 - 2Q^2 + 200Q + 800$.

31. (a) Evaluate $\int 3x^2 (x^3 + 7)^5 \, dx$.

(b) Find the effective rate of interest for P = Rs. 500 at 12% when compounded quarterly.

(2 × 4 = 8 weightage)