E 7525 (Pages : 3) Reg. No.....

Name.....

B.B.A. DEGREE (C.B.C.S.S.) EXAMINATION, MAY 2019

Second Semester

Complementary Course—MATHEMATICS FOR MANAGEMENT

(2013–2016 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A

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

1. The perpendicular distance from a point to the x-axis is ————.
2. Define concurrent lines.
3. Equation of a straight line whose x-intercept = 3 and y intercept = 4.
4. Explain concentric circles.
5. Define saving function.
6. What is market equilibrium ?
7. $\lim_{x \to 1}\left[x^4 + \frac{1}{x^2} + 3\right]$.
8. $\lim_{x \to \infty}\left[\frac{3x^3 + 2x}{x^3}\right]$.
9. Find the second derivative of $y = (2 - 2x)^2$.
10. $\int MR\,dx$ = ———— where MR is marginal revenue.

$(10 \times 1 = 10)$

Part B

Answer any **eight** *questions.*
Each question carries 2 *marks.*

11. Express the equation $3x + 2y - 6 = 0$ in the slope form and hence find the value of slope and y-intercept.
12. Evaluate $\lim_{x \to 0} \log \frac{4x+1}{2x}$.
13. Differentiate $(x + 3)^2 \cdot (x + 4)^3 \cdot (x + 5)^4$.
14. Prove that the points $(1, 1), (-1, -1), \left(-\sqrt{3}, \sqrt{3}\right)$ are the points of vertices of an equilateral triangle.

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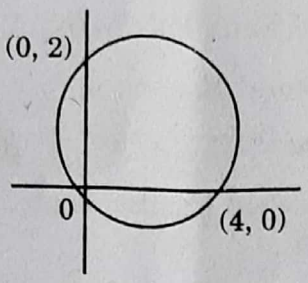
15. If a point on a straight line is (– 2, 3) and slope of the line is 0.2, find its equation.

16. Find the equation of the circle in the picture given below :



17. Price charged per item is 9, quantity of production is q, cost for one unit of production is ₹ 3, fixed cost is ₹ 500. Then find the profit for 100 units of production.

18. Find $\lim_{x \to 3} \frac{x^8 + 3x^3}{x^2 + 6}$.

19. Differentiate $x^3 \log x$.

20. Differentiate $(x^3 + 2x^2) \log (1 + x)$.

21. Find the elasticity of demand with respect to price for the demand function, $x = \frac{9}{p^{2/3}}$ [x-quantity demanded].

22. Integrate $(2x^2 - 1)^2$.

(8 × 2 = 16)

Part C

Answer any **six** *questions.*
Each question carries 4 *marks.*

23. Find the equation of the bisectors of the angle between the lines $3x + 4y + 2 = 0$ and $5x - 12y - 6 = 0$.

24. Prove that the following points (3, – 2), (7, 6), (– 1, 2), (– 5, – 6) are the vertices of a rhombus.

25. Find the area of the triangle whose vertices are (– 3, – 2), (4, – 6), (– 5, 8).

26. $\lim_{x \to \infty} \frac{4x + 2x^2}{5x^2 + 3}$.

27. If $y = 3e^{2x} + 2e^{3x}$, prove that $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = 0$.

28. A TV manufacturer produces x TV sets per week at a total cost of ₹$x^2 + 52x + 1450$. The demand function is $7x = 500 - p$ where 'p' is the price per unit. When is the net revenue maximum ? What is the price per set then ?

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29. Prove that the function $f(x) = \log x$ do not have maxima or minima.

30. Integrate $\frac{x^3 - x^2 + x - 1}{x - 1}$.

31. Evaluate $\int_2^3 \frac{x dx}{x^2 + 1}$.

(6 × 4 = 24)

Part D

Answer any **two** *questions.*
Each question carries 15 *marks.*

32. (a) Find the co-ordinates of the centre and length of the radius of the circles :

(i) $x^2 + y^2 - 2x - 4y - 11 = 0$.

(ii) $2x^2 + 2y^2 + 2y - 8 = 0$.

(b) Show that the line $4x + 3y + 10 = 0$ and $5x - 12y + 26 = 0$ are equidistant from origin.

33. Differentiate :

(i) $e^x + (x + 1)^{2/3}$.

(ii) $\frac{(2x+3)^2}{x^{-5/4}}$.

34. Find values of maxima and minima :

(i) $x^3 - 9x^2 + 15x + 20$.

(ii) $x^2 + \frac{x^2 - 1}{2(x+1)}$.

(iii) $2x^3 + 3x - \frac{2}{x}$.

35. Integrate :

(i) $\frac{x+2}{(2x-1)(x^2-1)}$.

(ii) $x^5 \log (x + 1)$.

(iii) $e^{-2x} + e^x + 1$.

(2 × 15 = 30)

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