

E 2259

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Reg. No.....

Name.....

B.B.A. DEGREE (C.B.C.S.S.) EXAMINATION, MAY 2015

Second Semester

Complementary Course—MATHEMATICS FOR MANAGEMENT

(2013 Admission onwards)

Time : Three Hours

Maximum : 80 Marks

Part A (Short answer questions)

Answer all questions.

1 mark each.

1. State section formula.
2. What is the distance between the points (0, 0) and (p, q) ?
3. Write the equation of a line in two point form.
4. Write the equation of a circle with centre at origin.
5. Give an example for an odd function.
6. What is the derivative of $y = 2x + x^2$.
7. State quotient rule for the derivative of quotient of two functions.
8. What is the value of $\int 0 dx$?
9. If $\int y dx = x^2 + 1$, what is the value of y ?
10. What is the value of $\int \frac{1}{\sqrt{1-x^2}} dx$?

(10 × 1 = 10)

Part B (Brief answer questions)

Answer any eight questions.

2 marks each.

11. If the point (a, 3) is at a distance of $\sqrt{5}$ units from the point (2, a), find a.

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12. Find the co-ordinates of the point which divides the points (8, 9) and (-7, 4) internally in the ratio 2 : 3.
13. Find the equation of a straight line parallel to the y-axis and passing through the point (-3, -2).
14. Find the equation of the circle whose centre is (4, 5) and the radius is 7.
15. What do you mean by a function ? Explain domain and range of a function.
16. Draw the graph of the function $y = \frac{1}{x}$.
17. Find $\frac{dy}{dx}$ if $y = (3x^2 + 1)(x^2 + 2x)$.
18. Find $\frac{dy}{dx}$ if $x = a(t - \sin t)$, $y = a(1 - \cos t)$.
19. Find the fourth derivative of $\sqrt{3x + 4}$.
20. Evaluate : $\int \frac{dx}{\sqrt{x+1}}$.
21. Integrate $\sqrt{1+2\sin 2x}$ with respect to x .
22. Evaluate $\int \frac{dx}{x(\log x)^2}$.

(8 × 2 = 16)

Part C (Descriptive/Short Essay type questions)

Answer any six questions.

4 marks each.

23. Find the area of the triangle whose vertices are (2, 3), (5, 7) and (-3, 4).
24. Prove that the points (a, b + c), (b, c + a) and (c, a + b) are collinear.
25. Find the co-ordinates of the foot of the perpendicular from (a, 0) on the line $y = mx + \frac{a}{m}$.

26. Find the value of k for which the lines $x - y = 6$, $4x - 3y - 20 = 0$ and $6x + 5y + k = 0$ are concurrent.

27. Evaluate $\lim_{x \rightarrow 0} \frac{\sqrt{1+x} - \sqrt{1-x}}{x}$.

28. Find the derivative of $\sin^{-1} \left(\frac{2x}{1+x^2} \right)$ with respect to x .

29. Find the maximum and minimum values of the function $x^4 + 2x^3 - 3x^2 - 4x + 4$.

30. Evaluate $\int \frac{dx}{\sqrt{1-e^{2x}}}$.

31. Evaluate $\int \frac{e^x + e^{-x}}{e^x - e^{-x}} dx$.

(6 × 4 = 24)

Part D (Long Essay)

Answer any two questions.

15 marks each.

32. (a) Find the co-ordinates of the circumcentre of a triangle whose co-ordinates are $(3, -2)$, $(4, 3)$ and $(-6, 5)$. Hence find the circum radius.

(b) Prove that the quadrilateral with vertices $(2, -1)$, $(3, 4)$, $(-2, 3)$ and $(-3, -2)$ is a rhombus.

33. (a) Find the equations of two straight lines through the point $(2, -1)$ and making an angle of 45° with the line $6x + 5y - 1 = 0$. Show that these lines are at right angles to one another.

(b) Find the orthocentre of the triangle formed by the straight lines $x - y = 5$, $2x - y = 8$, and $3x - y = 9$.

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34. 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 :
- (a) maximize total revenue ; (b) minimize marginal cost.
35. The marginal revenue function of a product is given by $MR = 500 - 0.01x$ and the marginal cost function is given by $MC = 100 + 0.006x$. The fixed cost is Rs. 1,50,000. Find the profit function.

(2 × 15 = 30)