TB171430F

Reg. No:.....

Name:.....

B. A. DEGREE (C.B.C.S.S.) EXAMINATION, OCTOBER 2018

(2015 & 2016 Admissions Supplementary & 2017 Admissions Improvement / Supplementary)

SEMESTER I - COMPLEMENTARY COURSE (MATHEMATICS)

MT1CE01B –GRAPHING FUNCTIONS, EQUATIONS AND FUNDAMENTAL CALCULUS

(For Economics)

Time: Three Hours **Maximum Marks: 80**

PART A

I Answer all the questions. Each question carries 1 mark.

1. Simplify $x^{1/2}x^3$
2. Find the y-intercept of $7x - 4y = 56$
3. Evaluate $g(x) = x^3 - 2x^2 + 1$ at $x = 1$
4. Determine the total revenue TR where $P = 15Q + 200$
5. Differentiate $y = 10x^3$
6. Evaluate $\int 35x^4 - 8x^3\, dx$.

(6 x 1 = 6)

PART B

II. Answer any seven questions. Each question carries 2 marks.

7. Solve $\frac{36}{x-5} - \frac{25}{2x} = \frac{26}{x-5}$
8. Simplify
   (i) $x\sqrt{x}$
   (ii) $5xx^{2/3}$
9. Find the slope of the line joining the points (5, 8), (7, 14).
10. Find the break-even point of the firm
    $R(x) = 18x + 60$; $C(x) = -22x + 1260$
11. Find the equilibrium level of income given $Y = C + I, C = 90 + 0.25\,Y, I = 20$
12. Check whether the function $f(x) = \frac{x+2}{x^2-4}$ is continuous at $x = 2$
13. Find the average function of $TC = Q^2 + 12Q + 13$ at $Q = 5$
14. Determine whether the function $f(x) = 7x^2 + 19x - 24$ is concave or convex at $x = 3$
15. Show that $\int_{-3}^{3}(6x^2 + 18x)dx = \int_{-3}^{0}(6x^2 + 18x)dx + \int_{0}^{3}(6x^2 + 18x)dx$.
16. Use Integration by substitution to determine the indefinite integral
    $\int 60x^2(x^3 + 5)^4 dx$

(7 x 2 = 14)

PART C

III Answer any six questions. Each question carries 5 marks.

17. Find
    (i) $\frac{12}{x^2-81} + \frac{7x}{x+9.}$
    (ii) $\frac{9}{x-3} + \frac{6x}{x^2-8x+15}$

18. Determine the equation of the line passing through (6, 4) and perpendicular to the line y = 2x+15.
19. Given the total revenue $R(x) = -7x^2 + 4100x$ and total cost $C(x) = 600x + 12500$ express the profit function π as a function of x and determine the maximum level of profit by drawing the graph of $\pi(x)$.
20. Solve the system of equations $5x + y = 26$, $8x - 3y = 60$
21. Differentiate $y = (20x^2 + 7)(2x - 5)$
22. Use $MR = MC$ method to maximize the profit function and check the second order conditions given $TR = 440Q - 3Q^2$ and $TC = 14Q + 225$
23. Evaluate $\int x\,(x-8)^3 dx$ by using Integration by Parts.
24. Draw the graph of the given function and evaluate the area between the curves over the stated interval $y_1 = 8 - x^2$ and $y_2 = -x + 6$ from x = -1 to x = 2.

(6 x 5 = 30)

PART D

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

25. Find the successive derivatives of

    a) $f(x) = (7 - 3x)^6$ b) $f(x) = (7x + 5)(5x - 7)$

26. Optimize $y = 4x^4 - 48x^3 - 288x^2 + 229$

27. Simplify

    (i) $y = \sqrt{169x^2} + \sqrt{49x^2}$.

    (ii) Find the equation of the line passing through the points (3,-17) and (0, 19).

28. a. Use integration by Parts to evaluate $\int (x + 5)e^x dx$.

    b. A firm's Marginal cost function MC $= x^2 - 6x + 125$, where x is the number of units produced. Fixed costs are $280. Find the total cost TC of producing x units.

(2 x 15 = 30)