SUBJECT CODE : 11MT/AC/BM34

B. Com. DEGREE EXAMINATION, NOVEMBER 2015
CORPORATE SECRETARYSHIP
THIRD SEMESTER

COURSE : ALLIED – CORE
PAPER : BUSINESS MATHEMATICS
TIME : 3 HOURS   MAX. MARKS : 100

SECTION – A   **(10 X 2 = 20)**
ANSWER ALL THE QUESTIONS

1. If $A = \begin{pmatrix} 2 & 6 \\ -1 & 4 \end{pmatrix}$, then find $3A$ and $-A$.

2. Is the matrix $\begin{pmatrix} 1 & 2 \\ 2 & 4 \end{pmatrix}$ singular?

3. What is a quadratic function?

4. Find $\dfrac{dy}{dx}$, if $y = 5x^3 - 3x^2 + 2$.

5. Define annuity.

6. If $0.75 : x :: 5 : 8$, then find x.

7. Define an increasing function.

8. A certain manufacturing concern has total cost function $C = 15 + 9x - 6x^2 + x^3$. Find x, when the total cost is minimum.

9. Evaluate $\int \sin(2x + 3)dx$.

10. What is the elasticity of demand for a given demand function?

SECTION – B   **(5 X 8 = 40)**
ANSWER ANY FIVE QUESTIONS

11. If $A = \begin{bmatrix} 1 & 8 \\ 4 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 3 \\ 7 & 4 \end{bmatrix}$, $C = \begin{bmatrix} -4 & 6 \\ 3 & -5 \end{bmatrix}$, then prove that
   (i) $AB \neq BA$ (ii) $A(B + C) = AB + AC$ (iii) $AI = IA = A$.

12. Find x if $\begin{vmatrix} 1 & x & -4 \\ 5 & 3 & 0 \\ -2 & -4 & 8 \end{vmatrix} = 0$.

13. Find the slope of the curve $y = \dfrac{x^2 - 12}{x - 4}$ $(x \neq 4)$ at the point $(0, 3)$.

14. (a) If income of Ram and Shyam are in the ratio of 3 : 5 and that of Shyam and Mohan are in the ratio of 7 : 4, then find the ratio of incomes of Ram, Shyam and Mohan.
    (b) A, B and C enter into a partnership investing Rs.35000, Rs.45000 and Rs.55000. Find their respective shares in annual profit of Rs.40500.

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15. (a) What will be the compound interest on Rs. 25000 after 3 years at the rate of 12% per annum.

(b) If the price of 23 toys is 276, then what will the price of 12 toys?

16. Differentiate $x^2 e^x \log x$ with respect to x.

17. The marginal cost function for producing x units is $MC = 23 + 16x - 3x^2$ and the total cost for producing 1 unit is Rs.40. Find the total cost function and the average cost function.

SECTION – C   **(2 X 20 = 40)**
ANSWER ANY TWO QUESTIONS

18. (a) Show that the equations $x + y + z = -3$; $3x + y - 2z = -2$; $2x + 4y + 7z = 7$ are not consistent.

(b) Evaluate (i) $\lim_{x \to 0} \dfrac{\log(1 + x)}{x}$ (ii) $\lim_{x \to 0} \dfrac{5^x - 6^x}{x}$

(10+10)

19. (a) The demand curve for a monopolist is given by $x = 100 - 4p$
    (i) Find the total revenue, average revenue and marginal revenue
    (ii) At what value of x, the marginal revenue is equal to zero?

(b) A is twice as good as workman as B and together they finish a piece of work in 18 days. In how many days will B alone finish the work.

(10+10)

20. (a) A company uses annually 24,000 units of raw materials which costs Rs. 1.25 per unit, placing each order costs Rs.22.50 and the holding cost is 5.4% per year of the average inventory. Find the EOQ, time between each order, total number of orders per year. Also verify that at EOQ carrying cost is equal to ordering cost

(b) Evaluate $\displaystyle\int \dfrac{x}{(x^2 + 4)(x + 1)}\, dx$

(12+8)

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