SUBJECT CODE : 11MT/AC/BM34

B. Com. DEGREE EXAMINATION, NOVEMBER 2012
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. Write down the product AB of the two matrices A and B

    where A = $(1 \quad 2 \quad 3 \quad 4)$ and B = $\begin{pmatrix} 1 \\ 2 \\ 3 \\ 4 \end{pmatrix}$..

2. Find the values of x, y, z, w if $\begin{pmatrix} x+y & 2z+w \\ x-y & z-w \end{pmatrix} = \begin{pmatrix} 3 & 5 \\ 1 & 4 \end{pmatrix}$.

3. If $f(x) = ax + 3$ and $g(x) = 4x - 3$, Find a such that $f \circ g = g \circ f$.

4. Evaluate $\lim_{x \to 0} \dfrac{x^2 + 2x - 15}{x^2 - 9}$.

5. Determine the equation of the straight line passing through (-1,2) and having slope $\dfrac{2}{7}$.

6. If $2x + 9y : 3x + 4y = 3 : 4$, Find the ratio of x to y.

7. Find the simple interest for Rs. 5000 at 10% for 3 years.

8. Define elasticity of a function.

9. Differentiate $\dfrac{x^2 + 5x + 6}{x}$ with respect to x.

10. Evaluate $\displaystyle\int \dfrac{x dx}{x^2 + 5x}$

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

11. Solve $x + 2y = \begin{pmatrix} 4 & 6 \\ -8 & 10 \end{pmatrix}$; $x - y = \begin{pmatrix} 1 & 0 \\ -2 & -2 \end{pmatrix}$

12. Solve the equations $2x + 2y - z - 1 = 0, x + y - z = 0, 3x + 2y - 3z = 1$ by Cramer's rule.

13. Find the principal if the difference between S.I. and C.I. is Rs. 61 at 5 % per annum in 3 years.

14. Differentiate with respect to x. (i) $\dfrac{(x-1)(x-2)}{(x+1)(x+2)}$ (ii) $\dfrac{\log x}{\sin x}$

15. The cost function for producing x units of a product is
$C(x) = x^3 - 12x^2 + 48x + 11$ (in rupees) and the revenue function is
$R = 83x - 4x^2 - 21$. Find the output for which profit is maximum.

16. A trader mixes two kinds of tea in the ratio 2 :1 and makes a profit of 25% by selling the mixture at Rs. 70 per kg. He makes profit of the same rate on mixing them in the ratio 3:2 and selling the mixture at Rs. 72 per kg. Find the prices at which he bought them.

17. Evaluate $\displaystyle\int \dfrac{x^2 dx}{\left(4x+1\right)^{\frac{5}{2}}}$

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

18. a) Find the inverse of the matrix $\begin{pmatrix} -1 & 2 & 1 \\ 0 & 2 & 3 \\ 1 & 1 & 4 \end{pmatrix}$

b) The data below are about an economy of two industries P and Q. The values are in millions of rupees.

Producers	User		Final Demand	Total Output
	P	Q		
P	14	6	8	28
Q	7	18	11	36

Find the outputs when the final demand changes to 20 for P and 30 for Q.

(10+10)

19. a) Two vessels A and B contain mixtures of spirit and water. A mixture of 3 parts from A and 2 parts from B is found to contain 29% of spirit and a mixture of 1 part from A and 9 parts from B is found to contain 34% of spirit. Find the percentages of spirit in A and B.

b) If $f(x) = x^2 - 1$, $g(x) = x + 1$, $h(x) = 1 - x$, Verify that
$h \circ (g \circ f) = (h \circ g) \circ f$.

(10+10)

20. a) A firm produces x tones of output at a total cost $C(x) = Rs. 15 + 9x - 6x^2$. Find x when the total cost is minimum.

b) The marginal cost of manufacturing x units of product is $MC = 3x^2 - 10x + 3$. The total cost of producing one unit of the product is Rs.7. Find the total cost and average cost function. (10+10)

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