

SECOND SEMESTER DIPLOMA EXAMINATION IN CABM  
**BUSINESS MATHEMATICS**

[Time : 3 hours]

(Maximum marks : 100)

Marks

PART – A

(Maximum marks : 10)

I Answer all questions. Each question carries 2 marks.

1. If  $A = \begin{bmatrix} 1 & 2 \\ 0 & -1 \end{bmatrix}$ ,  $B = \begin{bmatrix} 3 & 1 \\ 5 & 6 \end{bmatrix}$ , Find  $(A + B)^T$
2. Define mutually exclusive events
3. Differentiate  $e^{\sin x}$  with respect to  $x$ .
4. Evaluate  $\int x^2(x^3 + 1) dx$
5. Evaluate  $\int \tan^2 x dx$

(5x2=10)

PART – B

(Maximum marks : 30)

II Answer any five questions. Each question carries 6 marks.

1. If  $A = \begin{bmatrix} 1 & 2 & 3 \\ 5 & 0 & -1 \\ 3 & 0 & 9 \end{bmatrix}$ ,  $B = \begin{bmatrix} 1 & 2 & 3 \\ 7 & 1 & 9 \\ 6 & 8 & 5 \end{bmatrix}$ ,  $C = \begin{bmatrix} 6 & 1 & 5 \\ 1 & -1 & 3 \\ 2 & 6 & 8 \end{bmatrix}$ . Verify  $A(B+C) = AB+AC$

2. Solve using determinants

$$x - 2y = 3, \quad 2x + y = 5$$

3. Two dice are thrown. Describe
  - a. Getting an even number on 1<sup>st</sup> die
  - b. Getting an odd number on 1<sup>st</sup> die
  - c. Getting the sum of numbers on dice  $\leq 5$
4. Differentiate  $\operatorname{cosec} x$  with respect to  $x$  using first principle
5. Find  $\frac{dy}{dx}$

$$y = x^2 \cos(x^2)$$

6. Evaluate  $\int \cos^3 x dx$
7. Evaluate  $\int \cos 4x \cdot \cos 2x dx$

(5x6=30)

PART – C

(Maximum marks :60)

Answer one full question from each unit. Each full question carries 15 Marks

MODULE-I

III

- a) If  $A = \begin{bmatrix} 1 & 3 & 5 \\ 2 & 2 & 3 \\ 1 & 0 & 9 \end{bmatrix}$ . Show that  $A.A^T$  is symmetric 5
- b) Solve the following using Cramer's rule  
 $x + 2y - z = 6, 2x - y + 6z = 8, x - 3y + 5z = 9$  5
- c) If  $A = \begin{bmatrix} 1 & 2 & 3 \\ 5 & 6 & 2 \\ 3 & 1 & 9 \end{bmatrix}$ , Find  $A^2 - 5A + I$  5

OR

IV

- a) Solve for x  $\begin{vmatrix} 1 & 2 & 3 \\ x & 2x & 4 \\ x & 3x & 5 \end{vmatrix} = 0$ . 5
- b) If  $A = \begin{bmatrix} 1 & 2 & 3 \\ 5 & 6 & 1 \end{bmatrix}$ ,  $B = \begin{bmatrix} 3 & 1 \\ 5 & 0 \\ -1 & 2 \end{bmatrix}$ , Compute AB and BA 5
- c) Express  $\begin{bmatrix} 1 & 3 & 4 \\ 5 & 0 & 6 \\ 2 & 8 & 4 \end{bmatrix}$  as the sum of symmetric and skew symmetric matrices 5

MODULE II

V

- a) There are 4 men and 6 women on a city council. If a council member is selected for committee how likely is it that it is a woman 5
- b) A letter is chosen at random from the word ASSASSINATION. Find the probability that letter is a  
i) Vowel  
ii) Consonant 5
- c) Given  $P(A) = \frac{3}{5}$ ,  $P(B) = \frac{1}{5}$ , Find  $P(A \text{ or } B)$ , if A and B are mutually exclusive 5

OR

VI

- a) A die is thrown twice. What is the probability that at least one of the two numbers is 5. 5
- b) In a single throw of 2 dice, find the probability of getting a total less than 5 or greater than 9. 5

- c) 3 coins are thrown simultaneously. What is the probability of getting atleast one tail, also find probability of getting atmost one tail 5

### MODULE III

VII

- a) If  $y = \frac{x}{x-1}$ , Find  $\frac{dy}{dx}$  5
- b) Find  $\frac{dy}{dx}$  when  $x^2 + y^2 = 25$ . 5
- c) Find  $\frac{dy}{dx}$  if  $x = a\cos^3 t, y = b\sin^3 t$  5

OR

VIII

- a) Differentiate  $\frac{\sin 2x}{x}$  with respect to x 5
- b) Differentiate  $\log(\operatorname{cosec} x - \cot x)$  with respect to x 5
- c) Find  $\frac{dy}{dx}$  when  $ax^2 + 2hxy + by^2 = 0$  5

### MODULE IV

IX

- a) Evaluate  $\int \tan x \, dx$  5
- b) Evaluate  $\int \frac{x}{\sqrt{x^2+a^2}} \, dx$  5
- c) Evaluate  $\int x \cos x \, dx$  5

OR

X

- a) Evaluate  $\int \frac{3\sin x + 4}{\cos^2 x} \, dx$  5
- b) Evaluate  $\int \frac{\cos x}{2 + \sin x} \, dx$  5
- c) Evaluate  $\int (\log x)^2 \, dx$  5