TED (15) – 2252

(REVISION — 2015)

Reg. No. .....

Signature .....

SECOND SEMESTER DIPLOMA EXAMINATION IN CABM — OCTOBER, 2016

BUSINESS MATHEMATICS

[*Time* : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

I Answer all questions. Each question carries 2 marks.

1. If $A = \begin{bmatrix} 1 & 2 \\ 3 & -4 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 0 \\ 1 & 5 \end{bmatrix}$, find A + 2B.
2. If three coins are tossed, write down the sample space.
3. Differentiate sin^2x with respect to x.
4. Evaluate $\int (x^2 + 5x - 6)\, dx$
5. Evaluate $\int cosec5x cot5x\, dx$ (5×2 = 10)

PART— B

(Maximum marks : 30)

II Answer *any five* questions from the following. Each question carries 6 marks.

1. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & -1 & 5 \\ 1 & 6 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 0 & 0 & 2 \\ 5 & -1 & 3 \\ 9 & 6 & 2 \end{bmatrix}$. Compute AB + BA.
2. Solve using determinants
   $x + 2y - z = -3$, $3x + y + z = 4$, $x - y + 2z = 6$
3. The probability that a student passes statistics test is $\frac{2}{3}$ and the probability that he passes both statistics and mathematics is $\frac{14}{45}$. The probability that he passes at least one test is $\frac{4}{5}$. What is the probability that he passes mathematics test.
4. Differentiate sin x with respect to x using first principle.

Marks

VI (a) A die is thrown twice. What is the probability that at least one of the two number is 4 ? 5

(b) In a single throw of 2 dice, find the probability of getting a total of 9 or 11. 5

(c) Four coins are thrown simultaneously. What is the probability of getting atleast one head ? 5

UNIT – III

VII (a) If $y = \frac{e^x - 1}{e^x + 1}$, find $\frac{dy}{dx}$ 5

(b) Differentiate $\log\left(x + \sqrt{1 + x^2}\right)$, with respect to x. 5

(c) Find $\frac{dy}{dx}$ if $x^3 + y^3 = 3\,axy$. 5

OR

VIII (a) Differentiate $\frac{sin2x}{1 + cos2x}$ with respect to x. 5

(b) Differentiate $x^5 cosec(x^5)$ 5

(c) Find $\frac{dy}{dx}$ when $x = a\,(\theta - sin\theta)$, $y = a\,(1 - \cos\theta)$ 5

UNIT – IV

IX (a) Evaluate $\int \sqrt{1 + sin2x}\, dx$ 5

(b) Evaluate $\int x sin(x^2)\, dx$ 5

(c) Evaluate $\int \log x\, dx$ 5

OR

X (a) Evaluate $\int (tanx + cotx)^2\, dx$ 5

(b) Evaluate $\int \frac{sin(3 + 2\,logx)}{x}\, dx$ 5

(c) Evaluate $\int \frac{3x + 2}{5x - 3}\, dx$. 5

Marks

5. Find $\frac{dy}{dx}$ when

$$x = 3\cos\theta - \cos^3\theta$$

$$y = 3\sin\theta - \sin^3\theta$$

6. Evaluate $\int \frac{1}{1 + \sin x}\, dx$

7. Evaluate $\int x^2 \sin x\, dx$ (5×6 = 30)

PART— C

(Maximum marks : 60)

(Answer *one* full question from each unit. Each full question carries 15 marks.)

UNIT – I

III (a) If $A(\theta) = \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$. Show that $A(\theta).A(\theta^T) = A(\theta + \theta^T)$ 5

(b) Solve for x if $\begin{vmatrix} 3 & 1 & 9 \\ 2x & 2 & 6 \\ x^2 & 3 & 3 \end{vmatrix} = 0$. 5

(c) Express the matrix $A = \begin{bmatrix} 1 & 4 & 5 \\ 2 & 2 & 3 \\ 3 & 1 & 0 \end{bmatrix}$ as the sum of a symmetric and skew symmetric matrices. 5

OR

IV (a) If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$. Show that $A^2 - 4A - 5I = 0$. 5

(b) If A is a square matrix prove that $A + A^T$ is symmetric and $A - A^T$ is skew symmetric. 5

(c) Solve $A + 2B = \begin{bmatrix} 2 & 1 & 0 \\ 1 & -1 & 2 \end{bmatrix}$, $2A + 3B = \begin{bmatrix} 1 & 2 & -1 \\ 2 & 0 & 1 \end{bmatrix}$ 5

UNIT – II

V (a) A card is drawn from a well shuffled pack of playing cards. Find the probability that it either a diamond or a king. 5

(b) The probability that a contractor will get a plumbing contract is $\frac{2}{3}$, and the probability that he will not get an electric contract is $\frac{5}{9}$. If the probability of getting at least one contract is $\frac{4}{5}$. What is the probability he will get both the contracts ? 5

(c) What is the probability that a leap year selected at random will contain 53 Sundays. 5

OR