TED (15) – 2252

(REVISION — 2015)

Reg. No. .....

Signature .....

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — APRIL, 2019

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 $A = \begin{bmatrix} 1 & 0 & 5 \\ 2 & 7 & 3 \\ 8 & 5 & 3 \end{bmatrix}$, find 9A.
2. A die is thrown find the probability of getting a prime number.
3. Define Exhaustive events.
4. Find the derivative of x log x.
5. Evaluate $\int \frac{2\cos x}{3\sin^2 x}\, dx$.

(5 × 2 = 10)

PART — B

(Maximum marks : 30)

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

1. Solve for x if $\begin{vmatrix} 1 & 2 & 0 \\ x & 3 & 1 \\ 0 & 5 & 4 \end{vmatrix} \neq 0$
2. For the following matrices A and B, verify that (AB)' = B'A'.

$$A = \begin{bmatrix} 1 \\ -4 \\ 3 \end{bmatrix}, \quad B = [-1 \quad 2 \quad 1].$$

3. A die is rolled and a coin is tossed, find the probability that the die shows an odd number and the coin shows a head.
4. If $x = a\cos^3\theta$, $y = a\sin^3\theta$, find the value of $\frac{dy}{dx}$.
5. Find $\frac{dy}{dx}$,
   (i) $y = x^2 \sec x$ (ii) $y = e^{\sec x + \tan x}$
6. Evaluate $\int \frac{\sec^2 x}{\operatorname{cosec}^2 x}\, dx$.
7. Evaluate $\int x^2 e^{2x}\, dx$.

(5 × 6 = 30)

[26]

Marks

PART — C

(Maximum marks : 60)

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

UNIT — I

III (a) If $\begin{vmatrix} x+1 & x-1 \\ x-3 & x+2 \end{vmatrix} = \begin{vmatrix} 4 & -1 \\ 1 & 3 \end{vmatrix}$, find the value of x. 5

(b) If $A = \begin{bmatrix} 3 & -5 \\ -4 & 2 \end{bmatrix}$, show that $A^2 - 5A - 14I = 0$ 5

(c) If $A = \begin{bmatrix} \cos\alpha & -\sin\beta \\ \sin\beta & \cos\alpha \end{bmatrix}$ then for what value of α and β, A will be an Identity matrix. 5

OR

IV (a) Evaluate $\begin{bmatrix} 13 & -4 & 2 \\ 0 & 12 & 1 \\ 0 & 0 & 14 \end{bmatrix}$ 5

(b) Find the value of y – x from the following equation.

$$2\begin{bmatrix} x & 5 \\ 7 & y-3 \end{bmatrix} + \begin{bmatrix} 3 & -4 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 7 & 6 \\ 15 & 14 \end{bmatrix}$$ 5

(c) If $A = \begin{bmatrix} 1 & 2 & 1 \\ 3 & 4 & 2 \\ 1 & 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 \\ 5 & 2 \\ 1 & 7 \end{bmatrix}$ verify that $(AB)^T = B^T A^T$. 5

UNIT — II

V (a) Define sample space with example. 3

(b) A card is drawn at random from a deck of cards. Find the probability of getting

(i) 3 of diamond (ii) a queen (iii) a king of heart 6

(c) Three coins are tossed once. Find the probability of getting

(i) atleast 3 heads (ii) exactly 1 tail 6

OR

VI (a) Given P (A) = $\frac{1}{4}$ and P(B) = $\frac{3}{5}$. Find P(A or B), if A and B are mutually exclusive events. 2

(b) Two dies are thrown, what is the probability of following events.

(i) Getting the sum of numbers on the dies less than 3.

(ii) Getting two numbers whose product is even.

(iii) Getting first is an even number. 8

(c) A bag contains 10 red balls, 12 blue balls and 30 white balls. If a ball is drawn at random. What is the probability that is red ? 5

Marks

UNIT — III

VII (a) Differentiate the following with respect to x.

(i) $\log(\sin x)$ (ii) $\frac{\cos x}{\sqrt{x}}$ 5

(b) If $x = a(\theta - \sin\theta)$, $y = a(1 - \cos\theta)$, find $\frac{dy}{dx}$. 5

(c) Find $\frac{dy}{dx}$, if $y = x^2 e^x \sin x$. 5

OR

VIII (a) Differentiate the following with respect to x

(i) $e^{\tan x}$ (ii) $e^x \sin x$ 5

(b) Find $\frac{dy}{dx}$ if $y = \frac{x^2-1}{x^2+1}$ 5

(c) If $y = e^{\sin x - \cos x}$, find $\frac{dy}{dx}$ 5

UNIT — IV

IX (a) Evaluate $\int \frac{\log(\sin x)}{\tan x} dx$ 4

(b) Find $\int \frac{\cos(\sqrt{x})}{\sqrt{x}} dx$. 4

(c) Evaluate $\int x^2 \sin x \, dx$. 7

OR

X (a) Find $\int \sin 5x \sin 3x dx$. 4

(b) Find $\int \frac{\sin(x-a)}{\sin(x+a)} dx$ 4

(c) Find $\int (\log x)^2 x \, dx$. 7