

S2 CABM
TED (15)–2252

(REVISION — 2015)

Reg. No.....

Signature

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/
MANAGEMENT/COMMERCIAL PRACTICE — APRIL, 2018

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 $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -2 \\ -3 & 4 \end{bmatrix}$, Find $(A + B)^T$.

2. Define sample space.

3. Find the derivative of $x^3 e^x$

4. Evaluate $\int \operatorname{cosec}(9x + 7) \cot(9x + 7) dx$.

5. Evaluate $\int x e^x dx$.

(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 $\begin{vmatrix} 2 & 3 & 5 \\ 2 & x & 5 \\ 3 & -1 & 2 \end{vmatrix} = 0$.

2. 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 that $A(B + C) = AB + AC$

3. Two dice are thrown, find the probability of

(i) Sum of the face numbers is '5'

(ii) The number on one die is double the number on the other

(iii) Both dice show the same number.

4. Find $\frac{dy}{dx}$, (i) $y = x^2 \sec x$ (ii) $y = \log (\operatorname{cosec} x - \cot x)$.

5. Find $\frac{dy}{dx}$, if $x^3 + y^3 = 3xy$

6. Evaluate $\int \frac{3\cos x + 4}{\sin^2 x} dx$

7. Evaluate $\int x^2 \log x dx$

(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) Evaluate $\begin{vmatrix} -2 & 4 & 1 \\ 2 & -6 & 1 \\ 5 & 4 & 1 \end{vmatrix}$ 5

(b) If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ show that $A^2 - 4A - 5I = 0$ 5

(c) For the matrices A and B, given below, compute AB and BA and hence

show that $AB \neq BA$. $A = \begin{bmatrix} 1 & 2 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 0 \\ 5 \\ 4 \end{bmatrix}$ 5

OR

IV (a) If $\begin{vmatrix} 2 & 1 & x \\ 3 & -1 & 2 \\ 1 & 1 & 6 \end{vmatrix} = \begin{vmatrix} 4 & x \\ 3 & 2 \end{vmatrix}$ find x. 5

(b) If $A = \begin{bmatrix} 2 & 3 \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 4 \\ 2 & 1 \end{bmatrix}$ show that $(A + B)^T = A^T + B^T$ 5

(c) Solve $2A - 3 \begin{bmatrix} 3 & 0 & 5 \\ 2 & 1 & 4 \end{bmatrix} = \begin{bmatrix} 1 & 2 & 3 \\ 3 & -1 & 2 \end{bmatrix}$ 5

UNIT — II

Marks

- V (a) Define (i) mutually exclusive events (ii) Probability of an event. 5
- (b) Find the probability of a number selected at random from the numbers 1 to 20. Which is an even number. 5
- (c) If A and B are two independent events, $P(A) = \frac{2}{3}$ and $P(B) = \frac{3}{5}$ find $P(A \cap B)$. 5

OR

- VI (a) Given $P(A) = \frac{3}{5}$, $P(B) = \frac{1}{5}$ find $P(A \cup B)$, if A and B are mutually exclusive. 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) Find the probability that a leap year selected at random will contain 53 Sundays. 5

UNIT — III

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

(i) $e^x \log x$ (ii) $\frac{\log x}{x}$ 5

(b) If $x = a \sec \theta$, $y = b \tan \theta$, find $\frac{dy}{dx}$ 5

(c) Find $\frac{dy}{dx}$, if $y = \frac{x \sec x}{3x + 2}$ 5

OR

VIII (a) Differentiate, $y = x^2 \sin(x^2)$ 5

(b) Find $\frac{dy}{dx}$, if $x^2 + y^2 = 25$ 5

- (c) Differentiate the following with respect to x.

(i) $y = x^3 e^x$ (ii) $y = \frac{x}{x-1}$ 5

UNIT — IV

IX (a) Evaluate $\int \frac{x^2 + 2x + 1}{x^2} dx$ 5

(b) Find $\int \sqrt{1 + \sin 2x} dx$ 5

(c) Evaluate $\int x \cos x dx$ 5

OR

X (a) Find $\int (\tan x + \cot x)^2 dx$ 5

(b) Find $\int e^{\sin x} \cos x dx$ 5

(c) Find $\int \log x dx$ 5