

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER 2018

ENGINEERING MATHEMATICS – II

[Time : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

I Answer *all* questions. Each question carries 2 marks.

1. Find a unit vector in the direction of the vector  $2\bar{i} + \bar{j} - 2\bar{k}$ .

2. Evaluate  $\begin{vmatrix} 1 & 2 & -1 \\ 2 & 0 & 3 \\ -2 & -4 & 2 \end{vmatrix}$

3. If  $A = \begin{bmatrix} 0 & 2 \\ -1 & 3 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 & 1 \\ 3 & -1 \end{bmatrix}$ , find  $(A+B)^T$

4. Find  $\int (3x^2 - 2x + 1) dx$

5. Solve  $\frac{d^2y}{dx^2} = \sin x$

(5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. The constant forces  $2\bar{i} - 5\bar{j} + 6\bar{k}$ ,  $-\bar{i} + 2\bar{j} - \bar{k}$  and  $2\bar{i} + 7\bar{j}$  act on a Particle such that the particle is displaced from the position  $4\bar{i} - 3\bar{j} - 2\bar{k}$  to  $6\bar{i} + \bar{j} - 3\bar{k}$ . Find the total work done.

2. Find the term independent of  $x$  in the expansion of  $\left(3x^2 - \frac{1}{2x^3}\right)^{10}$

3. If  $A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$ , find  $A^2 - 5A + 6I$

4. Find the inverse of the matrix  $\begin{bmatrix} 3 & -2 & 3 \\ 2 & 1 & -1 \\ 4 & -3 & 2 \end{bmatrix}$