



C16-EE/CHPP-102

6035

BOARD DIPLOMA EXAMINATION, (C-16)

MARCH/APRIL—2018

DEEE—FIRST YEAR EXAMINATION

ENGINEERING MATHEMATICS—I

Time : 3 hours]

[Total Marks : 80

PART—A

3×10=30

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

1. Resolve $\frac{1}{(x-1)(x-3)}$ into partial fractions.

2. If $A = \begin{pmatrix} 0 & 1 & 2 \\ 1 & 3 & 4 \end{pmatrix}$ and $B = \begin{pmatrix} 0 & 2 & 1 \\ 4 & 3 & 2 \end{pmatrix}$, then find $2A - 3B$.

3. If $A = \begin{pmatrix} 2 & 3 & 1 \\ 5 & 7 & 0 \end{pmatrix}$ and $B = \begin{pmatrix} 2 & 3 \\ 1 & 0 \\ 5 & 4 \end{pmatrix}$, then find AB .

4. Prove that $\tan(45^\circ - A) \tan(45^\circ + A) = 1$.

5. Prove that $\frac{1 - \cos 2\theta}{\sin 2\theta} = \tan \theta$.

6. Find the modulus of complex number $(2 - i)(1 + i)$.

7. Find the equation of the line passing through the point $(-2, 5)$ and have slope $\frac{3}{4}$.

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15. (a) Find $\frac{dy}{dx}$, if $y = \tan^{-1} \sqrt{\frac{1 + \cos 2x}{1 - \cos 2x}}$.

(b) Find $\frac{dy}{dx}$, if $y = \sqrt{\cos x \sqrt{\cos x \sqrt{\cos x \dots}}}$

16. (a) If $y = a \cos(\log x) + b \sin(\log x)$, then show that

$$x^2 y_2 + xy_1 - y = 0$$

(b) If $u = \log(x + y)$, then show that $x \frac{y}{x} + y \frac{x}{y} = 1$.

17. (a) Find the lengths of tangent, normal, subtangent and subnormal (in units) to the curve

$$y = x^3 - 2x^2 + 4 \text{ at } (2, 4)$$

(b) The radius of a spherical balloon is increasing at the rate of 3 cm/sec. Find the rate at which the volume is increasing when radius is 10 cm.

18. (a) Find the minimum and maximum values of

$$f(x) = 2x^3 - 9x^2 + 12x - 10$$

(b) The time T of a complete oscillation of a simple pendulum of length l is given by $T = 2\sqrt{\frac{l}{g}}$, where g is a constant. Show that

the approximate error in the calculated value of T corresponding to an error of 2% in the value of l is 1%.
