



C14-M/CHOT/RAC-102

4050

BOARD DIPLOMA EXAMINATION, (C-14)
MARCH/APRIL—2017
DME—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 $\frac{1}{(x-3)(x-1)}$ into partial fractions.

2. If $A = \begin{bmatrix} 3 & 2 & 1 \\ 1 & 5 & 4 \\ 2 & 3 & 7 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 & 1 \\ 2 & 1 & 2 \\ 1 & 2 & 1 \end{bmatrix}$, find $5A - 3B$.

3. Using Laplace expansion, evaluate the determinant $\begin{vmatrix} 0 & q & r \\ q & 0 & p \\ r & p & 0 \end{vmatrix}$.

4. Show that $\frac{\cos 37^\circ \sin 37^\circ}{\cos 37^\circ \sin 37^\circ} = \cot 8^\circ$.

5. Show that $\cos^4 A - \sin^4 A = \cos 2A$.

6. Find the conjugate of the complex number $(3 - 4i)(2 - 3i)$.

/4050

1

[Contd...

WWW.MANARESULTS.CO.IN

7. Find the perpendicular distance from the point (3, 2) to the line $4x + 5y - 6 = 0$.

8. Find the equation of the circle with centre (2, -3) and radius is 4.

9. Evaluate $\lim_{x \rightarrow 0} \frac{\sin 3x}{\sin 5x}$.

10. Differentiate $\log(\cos x)$ w.r.t. x .

PART—B

10×5=50

Instructions : (1) Answer *any five* questions.

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

11. (a) Find the inverse of $\begin{bmatrix} 2 & 2 & 4 \\ 2 & 3 & 2 \\ 1 & 1 & 1 \end{bmatrix}$.

(b) Solve the equation by Cramer's method :

$$\begin{matrix} x & y & z & 9; & 2x & 5y & 7z & 52; & 2x & y & z & 0 \end{matrix}$$

12. (a) In any $\triangle ABC$, show that

$$\sin 2A + \sin 2B + \sin 2C = 4 \cos A \cos B \sin C$$

(b) Show that $\tan^{-1} \frac{2}{3} + \tan^{-1} \frac{3}{4} = \tan^{-1} \frac{17}{6}$.

13. (a) Solve $\cos 5\theta = \cos 3\theta$.

(b) In any $\triangle ABC$, show that $(b+c)\cos A = a$.

14. (a) Find vertices, foci, directrices and the length of latus rectum of the hyperbola $4x^2 - 9y^2 = 36$.

(b) Find the equation of the ellipse whose focus (-1, 1) and directrix is $x + y - 3 = 0$ and eccentricity is $1/2$.

15. (a) Differentiate $x^{\tan x}$ w.r.t. X .
 (b) Find $\frac{dy}{dx}$, if $x^2 + y^2 + 2axy = 1$.
16. (a) Find $\frac{dy}{dx}$, if $x = 4t^2$ and $y = 8t$.
 (b) Differentiate $\tan^{-1} \frac{2x}{1-x^2}$ w.r.t. $\sin^{-1} \frac{2x}{1-x^2}$.
17. (a) Find the equation of tangent and normal to the curve $y = x^2 - 3x + 5$ at the point (2, 3).
 (b) A circular metal plate expands by heat, so that its radius increases at the rate of 0.02 cm/sec. At what rate its area is increasing, when the radius is 20 cm?
18. (a) The sum of two numbers is 10. Find the numbers, so that the sum of their squares is a minimum.
 (b) The circumference of a circle is measured as 28 cm with an error of 0.04 cm. Find the approximate percentage error in the area of the circle.

*