

C14-C-102/C14-CM-102

4015

BOARD DIPLOMA EXAMINATION, (C-14) MARCH/APRIL—2016 DCE—FIRST YEAR EXAMINATION

ENGINEERING MATHEMATICS—I

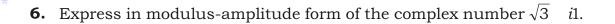
Time: 3 hours [Total Marks: 80

PART—A

 $3 \times 10 = 30$

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

- (2) Each question carries **three** marks.
- 1. Resolve $\frac{7x}{(x-1)(x-2)}$ into partial fractions.
- 2. Solve for x, if $\begin{vmatrix} 1 & 0 & 1 \\ 2 & x & 3 \\ 1 & 3 & 2 \end{vmatrix}$ 3.
- 3. If $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ and $B = \begin{pmatrix} 3 & 8 \\ 7 & 2 \end{pmatrix}$, then find the matrix X such that 2X + A + B.
- **4.** Prove that $\frac{\cos(A \ B)}{\cos A \sin B}$ $\tan A \ \cot B$.
- **5.** If $\tan 2$, then find $\cos 2$.



- **7.** Find the point of intersection of the lines 2x + 4y + 6 and x + 4y + 3.
- **8.** Find the equation of the circle with (1, 2) and (4, 5) as the end points of a diameter of the circle.
- **9.** Evaluate:

$$Lt \int_{x}^{1} \frac{\cos 2x}{\sin 2x}$$

10. Find
$$\frac{dy}{dx}$$
 if y ct and x $\frac{c}{t}$.

PART—B

 $10 \times 5 = 50$

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

- (2) Each question carries ten marks.
- 11. (a) Find the inverse of A 3 9 4 , if exists.
 - (b) Solve the following equations by Cramer's rule : $x \ y \ z \ 0$, $2x \ y \ z \ 1$ and $3x \ 2y \ 2z \ 5$
- **12.** (a) If $\tan^{-1} x \tan^{-1} y \tan^{-1} z = \frac{1}{2}$, then show that $xy \ yz \ zx \ 1$.
 - (b) Prove that $\cos 10^{\circ} \cos 50^{\circ} \cos 70^{\circ}$ $\frac{\sqrt{3}}{8}$.

- **13.** (a) If $b\cos^2\frac{C}{2} + c\cos^2\frac{B}{2} + \frac{3a}{2}$, show that the sides of the triangle are in AP.
 - (b) Solve $\cos 5 \cos 3$.
- **14.** (a) Find the equation of the rectangular hyperbola whose focus is (1, 3) and the directrix is x 2y 7 0.
 - (b) Find the coordinates of the centre, vertices, eccentricity, foci, length of the latus rectum of the ellipse $25x^2$ $16y^2$ 1600.
- **15.** (a) Find the derivative of $\log[\sin(\cos(e^x))]$ with respect to x.
 - (b) Differentiate tan $\frac{1}{1} \frac{2x}{x^2}$ with respect to x.
- **16.** (a) Find $\frac{dy}{dx}$, if $y = \frac{(x-1)^2(2x-3)^2}{(x^2-2)^2(x^3-3)^3}$.
 - (b) If $u x^2 y^2 z^2$, then show that $x \frac{u}{x} y \frac{u}{y} z \frac{u}{z} 2u$.
- **17.** (a) Find the lengths of tangent, normal, sub-tangent and sub-normal to the curve $y x^3 2x 5$ at the point (1, 4).
 - (b) A ladder is 13 m long leans against a vertical wall. If the lower end is pulled away from the wall at the rate of 1 m/sec along the horizontal floor, how fast is the top descending when the lower end is 12 m away from the wall?
- **18.** (a) The sum of the lengths of the sides of a rectangle is constant. If the area is to be maximum, then show that the rectangle is a square.
 - (b) The radius of a sphere was determined as 10·01 cm instead of 10 cm. Find approximately the errors in its volume and surface area.

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