

## C16-M/CHOT/RAC-102

## 6052

# BOARD DIPLOMA EXAMINATION, (C-16) MARCH/APRIL—2017 DME—FIRST YEAR EXAMINATION

# ENGINEERING MATHEMATICS—I

Time: 3 hours [ Total Marks: 80

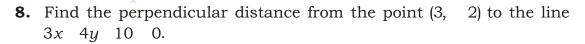
#### PART—A

 $3 \times 10 = 30$ 

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

- (2) Each question carries **three** marks.
- **1.** Resolve  $\frac{x}{(x-2)(x-3)}$  into partial fractions.
- 4 2 6 1 1 2 **2.** If A 1 4 5 and B 1 3 4, find X such that A B X 0 2 3 3
- **3.** Find the value of  $\begin{vmatrix} a & h & g \\ h & b & f \\ g & f & c \end{vmatrix}$ .
- **4.** If A B 45, then show that  $(1 \tan A)(1 \tan B) 2$ .
- **5.** Show that  $\frac{\sin 2}{1 \cos 2}$  cot.
- **6.** Express  $\frac{2}{3} \frac{i}{4i}$  in the form of A iB.
- **7.** Find the equation of the line passing through the points (1, 2) and (-2, 3).

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- **9.** Evaluate Lt  $\frac{x^3}{x^5} = \frac{8}{32}$ .
- **10.** Differentiate  $3\cos x + 2\log x + 21x + 5$ .

### PART—B

 $10 \times 5 = 50$ 

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

- (2) Each question carries ten marks.
- **11.** (a) Solve the equations  $2x \ y \ 3z \ 9$ ,  $x \ y \ z \ 6$ ,  $x \ y \ z \ 2$  by Cramer's method.
  - (b) Show that  $\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^2 & b^2 & c^2 \end{vmatrix}$   $(a \ b)(b \ c)(c \ a)$ .
- **12.** (a) Prove that cos 20 cos 40 cos 80 0
  - (b) If  $\tan^{-1} x \tan^{-1} y \tan^{-1} z = \frac{1}{2}$ , then prove that  $xy \ yz \ zx \ 1$ .
- **13.** (a) Solve  $2\cos^2 3\cos 1 0$ .
  - (b) Solve the triangle ABC given a=9 unit, B=65, C=15.
- **14.** (a) Find the equation of the circle with (2, 3) and (6, 9) as the end points of a diameter. Also find the radius, centre of the circle.
  - (b) Find vertices, foci, directices and the length of latusrectum of the ellipse  $4x^2$   $9y^2$  36.
- **15.** (a) Find  $\frac{dy}{dx}$ , if  $y \log(\sin(\cos 3x))$ .
  - (b) If U(x, y) tan 1(x/y), then find  $\frac{u}{x}, \frac{u}{y}$ .
- **16.** (a) Differentiate  $e^{\tan^{-1}}x$  w.r.t.  $\tan^{-1}x$ .
  - (b) If  $y = \sin(\log x)$ , then show that  $x^2y_2 = xy_1 + y = 0$ .

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- **17.** (a) Find the length of tangent, normal, sub-tangent and sub-normal to the curve  $y x^3 2x 5$  at the point (1, 4).
  - (b) Each side of square is increasing at the rate of 1.5 cm/sec.Find the rate at which the area of the square increases, when the side is 12 cm.
- **18.** (a) Find the dimensions of a rectangle of maximum area having a perimeter of 24 ft.
  - (b) If the radius of a spherical balloon is increased by 0.1%, find the approximate percentage increases in its volume.

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