

CO9-CM-102

3022

BOARD DIPLOMA EXAMINATION, (C-09) MARCH/APRIL—2014 DCME—FIRST YEAR EXAMINATION

ENGINEERING MATHEMATICS—I

Time: 3 hours [Total Marks: 80

PART—A

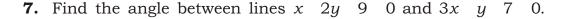
 $3 \times 10 = 30$

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

- (2) Each question carries three marks.
- (3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.
- **1.** Find the value of $4C_2$ $4P_2$.
- **2.** Solve x^2 22x 57 0.
- **3.** Resolve $\frac{7x-1}{(2x-1)(3x-1)}$ into partial fractions.
- **4.** If $\tan \frac{1}{2}$ and $\tan \frac{1}{3}$, then prove that $\tan ($) 1.
- **5.** Prove that

$$\frac{\cos \sin 2}{\sin (1 \cos 2)} \cot$$

6. Find the multiplicative inverse of $\frac{50}{3 \ 4i}$.



- **8.** Find the equation of the polar of the point (4, 5) with respect to the circle x^2 y^2 4x 6y 12 0.
- 9. Evaluate:

$$\lim_{x \to 0} \frac{\sqrt{5} \quad x}{x} \quad \frac{\sqrt{5} \quad x}{x}$$

10. If $\sqrt[3]{x^2} \sin x$, then find $\frac{dy}{dx}$.

PART—B

 $10 \times 5 = 50$

Instructions: (1) Answer any five questions.

- (2) Each question carries ten marks.
- (3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.
- 11. (a) Solve the following equation by Cramer's rule:

(b) If

then find A^2 .

- **12.** (a) In any triangle ABC, prove that $\sin 2A + \sin 2B + \sin 2C + 4 \sin A \sin B \sin C$.
 - (b) Prove that

$$2 \tan^{-1} \frac{1}{3} \tan^{-1} \frac{1}{7} = \frac{1}{4}$$
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- **13.** (a) Solve cos 2 cos 8 cos 5.
 - (b) In any triangle ABC, prove that $\sin A \sin B \sin C = \frac{s}{R}$.
- **14.** (a) Find the equation of parabola whose focus is (5, 2) and vertex is (3, 2).
 - (b) Find foci, length of latus rectum and equation of directrices of the ellipse $4(x \ 1)^2 \ (y \ 1)^2 \ 4$.
- **15.** (a) Find the equation of the hyperbola whose foci is (1, 1) and directix is $2x \ y \ 1$, eccentricity is $\sqrt{3}$.
 - (b) Find the angle between the lines whose direction ratios are respectively (1, 1, 2) and $(\sqrt{3} 1, \sqrt{3} 1, 4)$.
- **16.** (a) If $x = a \cos^3$, $y = b \sin^3$, then find $\frac{dy}{dx}$.
 - (b) Find the derivative of $\frac{1 + \log x}{\sin x + e^x}$.
- **17.** (a) Find the equation of tangent and normal to the curve $y x^3 3x^2 x 5$ at (1, 2).
 - (b) A boy 1.6 m tall is walking away from a lamp post 10 m tall. If the boy is walking at a speed of 1.2 m/sec. How fast his shadow is increasing?
- **18.** (a) The sum of two numbers is 24. Find the numbers when the sum of their squares is a minimum.
 - (b) A circular plate expands upon heating so that its radius increased by 2%. Find the approximate increase in the area of the plate if the radius of the plate before heating is 10 cm.

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