

C16-EE/CHPP-102

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BOARD DIPLOMA EXAMINATION, (C-16) MARCH/APRIL—2017

DEEE—FIRST YEAR EXAMINATION

ENGINEERING MATHEMATICS—I

Time: 3 hours] [Total Marks: 80

PART—A

3×10=30

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Instructions: (1) Answer all questions.

(2) Each question carries three marks.

1. Resolve

$$\frac{1}{(x 1)(x 3)}$$

nto partial fractions.

12: If

then find 2A 3B.

3. Using Laplace expansion, evaluate the determinant

- **4.** Show that $\cos^2 15 \quad \cos^2 75 \quad \sqrt{3} / 2$.
- **5.** If $\cos A = 3/5$, then find $\cos 2A$, $\sin 2A$, $\cos 3A$.

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- 6. Find the multiplicative inverse and additive inverse of $(3 \ 2i)(1 \ 2i).$
- **7.** Find the equation of the line passing through the points (1, 2) and (3, 5).
- 8. Find the angle between the lines $2x \quad 3y \quad 5 \quad 0.$
- 9. Evaluate

Lt
$$x = 5$$

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

Instructions: (1) Answer any five questions.
(2) Each question carries ten r

(2) Each question carries ten marks.

(a) Prove that

$$\begin{vmatrix} a & b & 2c & a & b \\ & c & b & c & 2a & b \\ & c & a & c & a & 2b \end{vmatrix} = 2(a \ b \ c)^3$$

- (b) Solve the equations x y z 6, x y z 2 $2x \quad y \quad z \quad 1$ by Cramer's method.
- **12.** (a) If $\sin x + \sin y + 3/4$ and $\sin x + \sin y + 2/5$, then prove that $8 \cot ((x \ y) / 2) \ 15 \cot ((x \ y) / 2)$.
 - (b) Show that $\sin^{-1}(3/5)$ $\sin^{-1}(5/13)$ $\cos^{-1}(33/65)$.

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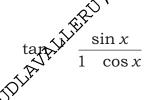
- **13.** (a) Solve $\sqrt{3} \cos x \sin x \sqrt{2}$.
 - (b) In any triangle ABC, if A 60 then prove that

$$\frac{c}{a \quad b} \quad \frac{b}{a \quad c}$$

14. (a) Find the centre and radius of the circle

$$5x^2$$
 $5y^2$ $20x$ $30y$ 1 8^2

- (b) Find the equation of rectangle hyporbola with focus (3, 4) and directrix as 4x + 3y + 1
- **15.** (a) Differentiate



- w.r.t. x.

 (b) Differentiate $\sin^m x \cos^n x$ w.r.t. x.
- 16. (a) Find all second-order partial derivatives for u(x, y) x^3 3xy y^3
 - Differentiate $\cos^{-1}(4x^3 3x)$ w.r.t. $\sin^{-1}x$.
- (a) Find the length of the tangent, normal, sub-tangent and sub-normal to the curve $y = 2x^2 + 4x = 5$ at the point (3, 1).
 - (b) A particle is moving along a line whose movement is governed by $S t^2 6t 8$ (t in sec). Find the velocity and acceleration at t 2 sec. Also find the initial velocity.
 - **18.** (a) The sum of two numbers is 10. Find them so that the sum of their squares is minimum.
 - (b) Find approximately the value of $\sqrt{82}$ using derivatives.

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