

 $c_{14-C/CM-102}$

4015

BOARD DIPLOMA EXAMINATION, (C-14) MARCH/APRIL—2017

DCE—FIRST YEAR EXAMINATION

ENGINEERING MATHEMATICS—

Time: 3 hours

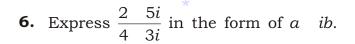
Total Marks: 80

PART-A

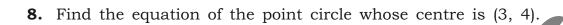
 $3 \times 10 = 30$

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. Resolve $\frac{1}{(x-5)(x-7)}$ into partial fractions.
- **2.** If $\begin{pmatrix} x & 3 & x & 4y & 5 & 2 \\ z & 2 & x & z & 4 & 4 \end{pmatrix}$, find x, y, z.
- **4.** Prove that $\sin^2 45 \quad \sin^2 15 \quad \frac{\sqrt{3}}{4}$.
- **5.** Show that $\frac{\tan 2}{1 \sec 2}$ tan.



7. Find the equation of the straight line passing through (3, 4) and perpendicular to the line x y 1 0.



9. Evaluate:

$$\lim_{x \to 0} \frac{\sin 7x}{\sin 11x}$$

10. Find the derivative $e^{3x} \sin 2x$ of with respec



 $10 \times 5 = 50$

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.

Solve the equations by Cramer's rule x + 2y + z + 1, 2x + y + 2z + 1, x + y + z + 2

$$x$$
 2 y z 1, 2 x y 2 z 1, x y z 2

(a) If $A \ B \ C \ 180$, then prove that

$$\cos 2A \cos 2B \cos 2C$$
 1 $4\cos A\cos B\cos C$

(b) Prove that $\tan^{-1}\frac{1}{4}$ $\tan^{-1}\frac{3}{5}$ $\frac{3}{4}$.

- **13.** (a) Sole the equation $2\sin^2 \sin 1 = 0$.
 - (b) In any triangle ABC, prove that $\sin A \sin B \sin C = \frac{S}{R}$
- **14.** (a) Find the vertex, focus, directrix, axis and length of latus rectum of the parabola y^2 16x.
 - (b) Find the equation of the ellipse, eccentricity $\frac{1}{2}$ whose focus is the point (3, 1) and directrix is the lien $x \neq y \neq 0$.
- **15.** (a) Find $\frac{dy}{dx}$ if $y (\sin x)^{\tan x}$.
 - (b) If $y = \sqrt{\sin x} = \sqrt{\sin x}$ terms, show that $\frac{dy}{dx} = \cos x$
- **16.** (a) If $y \log(x \sqrt{1 + x^2})$, show that $(1 + x^2)y_2 + xy_1 = 0$.
 - (b) If $u \sin \frac{1}{x} \frac{x^2 + y^2}{y}$, show that $x \frac{u}{x} + y \frac{u}{y} + \tan u$.
- **17.** (a) Find the lengths of the tangent, normal, sub-tangent and sub-normal to the curve $y = x^3 + 2x^2 + 4$ at (2, 4).
 - (b) The radius of a circle is increasing at the rate of 2 cm/sec. Find the rate of change of area when the radius is 24 cm.
- **18.** (a) Find the maximum and minimum values of $2x^3 9x^2 12x 15$
 - (b) Find the approximate value of $\sqrt[3]{123}$.

* * *