



7 0 3 5

*

C20-EE-CHPP-102

7035

BOARD DIPLOMA EXAMINATION, (C-20)

JUNE/JULY—2022

DEEE – FIRST YEAR EXAMINATION

ENGINEERING MATHEMATICS-I

Time : 3 hours]

[Total Marks : 80

PART—A

3×10=30

Instructions : (1) Answer all questions.

(2) Each question carries three marks.

1. A function f is defined by $f(x) = x^2 - 1$ then find (a) $f(1)$, (b) $f(0)$ and (c) $f(5)$.

2. Resolve $\frac{1}{(x-2)(x-7)}$ into partial fractions.

3. If $A = \begin{bmatrix} 0 & 1 & 2 \\ 2 & 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 & 0 \\ 2 & -3 & 1 \end{bmatrix}$, compute $3A - 4B$.

4. If $\tan A = \frac{5}{6}$ and $\tan B = \frac{1}{11}$ then show that $A + B = \frac{\pi}{4}$.

5. Show that $\frac{1 + \cos 2A}{\sin 2A} = \cot A$.

6. Find the modulus and additive inverse of $z = 1 + i\sqrt{3}$.

7. Find the slope of line joining two points (1, -1) and (2, 1).

/7035

1

[Contd...

*

8. Evaluate $\lim_{x \rightarrow 0} \frac{\sin 3x}{x}$.
9. If $y = \sin(2x - 3)$ then find $\frac{dy}{dx}$.
10. If $u = x^2 + 2xy + y^2$ then find $\frac{\partial u}{\partial x}$ and $\frac{\partial u}{\partial y}$.

PART—B

8×5=40

- Instructions : (1) Answer all questions.
 (2) Each question carries eight marks.

11. (a) If " w " is the cube root of unity then show that $\begin{vmatrix} 1 & w & w^2 \\ w & w^2 & 1 \\ w^2 & 1 & w \end{vmatrix} = 0$.

(OR)

- (b) Solve the following system of linear equations by using Cramer's Rule :

$$x + 2y + 3z = 6, 2x + 4y + z = 7, 3x + 2y + 3z = 8$$

*

12. (a) Show that $\frac{\sin 8A + \sin 6A}{\cos 8A + \cos 6A} = \tan 7A$.

(OR)

(b) Show that $\tan^{-1}\left(\frac{1}{3}\right) + \tan^{-1}\left(\frac{1}{7}\right) = \tan^{-1}\left(\frac{1}{2}\right)$.

*

13. (a) Solve $2\sin^2\theta + 3\cos\theta - 3 = 0$.

(OR)

(b) In a $\triangle ABC$, show that $\cot A + \cot B + \cot C = \frac{a^2 + b^2 + c^2}{4\Delta}$.

14. (a) Find the equation of the circle having (4, 2) and (1, 5) as the extremities of the diameter.

(OR)

(b) Find the equation of the parabola whose focus is at (1, -1) and directrix $3x + 4y + 5 = 0$.

15. (a) Find $\frac{dy}{dx}$, if $y = e^x \tan x + \frac{1 + \sin x}{1 - \sin x}$.

(OR)

(b) If $y = a \cos \theta$ and $x = a \sin \theta$ then find $\frac{dy}{dx}$ at $\theta = \frac{\pi}{4}$.

PART—C

10×1=10

Instructions : (1) Answer the following questions.

*

(2) The question carries 10 marks.

16. Find the lengths of the tangent, normal, sub-tangent and subnormal to the curve $x^2 + y^2 - 6x - 2y + 5 = 0$ at the point (2, -1).



*