

3002
BOARD DIPLOMA EXAMINATION, (C-09)
MARCH/APRIL - 2019
DIPLOMA IN AUTOMOBILE ENGINEERING
ENGINEERING MATHEMATICS - I (COMMON)
FIRST YEAR EXAMINATION

Time: 3 Hours

Total Marks: 80

PART - A (10 x 3 = 30 Marks)

Note 1: Answer all questions and each question carries 3 marks

2: Answers should be brief and straight to the point and shall not exceed 5 simple sentences

1. Solve the equation $x + \frac{1}{x} - 5 = 0$
2. If $p = 2a - 3b$, $q = 3b - 4c$, $r = 5a - 2b$, Find $3p + 2q - 5r$.
3. Resolve $\frac{4}{(x-2)(x-5)}$ into partial fractions
4. Prove that $\tan 13A - \tan 9A - \tan 4A = \tan 13A \cdot \tan 9A \cdot \tan 4A$
5. Express $\frac{2-3i}{3+4i}$ in the form of $a + i b$
6. Prove that $\cos \theta \cdot \cos(60+\theta) \cdot \cos(60-\theta) = \frac{1}{4} \cos 3\theta$
7. Find the Equation of the Circle with $(3, -4)$ and $(-2, 5)$ as end points of a diameter.
8. Find the perpendicular distance from the point $(3, 2)$ to the line $4x + 5y + 6 = 0$
9. Differentiate $e^{3x} \cos 7x$ w.r.t x
10. Find $\lim_{x \rightarrow -2} \frac{x^3 + 8}{x^2 - 4}$.

PART - B (5 x 10 = 50 Marks)

Note 1: Answer any five questions and each question carries 10 marks

2: The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer

- * 11. a) If $A = \begin{bmatrix} 1 & -2 & 3 \\ 2 & 3 & 1 \\ -3 & 1 & 2 \end{bmatrix}$ Find A^2
- b) Find the Ad joint of $\begin{bmatrix} 0 & 8 & 2 \\ 3 & 9 & 5 \\ 6 & 0 & 6 \end{bmatrix}$

12. a. Show that $\frac{\sin 17A + \sin 7A}{\cos 17A + \cos 7A} = \tan 12A$

b. Show that $\tan^{-1} \frac{2}{3} + \cot^{-1} \frac{4}{3} = \tan^{-1} \frac{17}{6}$

13. (a) Solve $\sin 6\theta + \sin 2\theta - \sin 4\theta = 0$

(b) Solve the ΔABC if $a = 2, b = 1, c = \sqrt{3}$

14. (a) Find the equation of parabola with focus (1, 4) and directrix $x - y - 1 = 0$.
 (b) Find the Equation of the ellipse whose foci are (3, 4) and (-5, 4) with eccentricity $e = 1/\sqrt{2}$.
15. (a) Find the equation of the rectangular hyperbola with focus as (-1, -3) and directrix $2x + y + 1 = 0$.
 (b) Find the centroid of the triangle formed by the points (5, 0, 6), (3, -1, 2)(2, 1, 4).
16. a) If $y = \sqrt{x + \sqrt{x + \sqrt{x + \dots}}}$ to ∞ show that $\frac{dy}{dx} = \frac{1}{2y-1}$
 b) Find all the second order partial derivatives for $u = xy^2 + x^2y$
17. (a) Find the maximum and minimum values of the function $x^3 - 6x^2 + 9x + 1$.
 (b) If an error of 2% is made in measuring the side of a square plate find the corresponding percentage error in its area.
18. (a) Find the equations of the tangent and normal to the curve $y = x^3 - 2x + 5 =$ at the point (1, 4).
 (b) The side of a square plate is expanding at a rate of 1 cm/sec. Find the rate at which its area is increasing when its side is 10cm?

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