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**C09-A-AA-AEI-BM-C-CM-CH-  
CHPC-CHPP-CHOT-CHST-  
EC-EE-IT-M-MET-MNG-  
PET-TT-RAC-102**

**3002**

**BOARD DIPLOMA EXAMINATION, (C-09)  
MARCH/APRIL—2021  
FIRST YEAR (COMMON) EXAMINATION  
ENGINEERING MATHEMATICS - I**

*Time : 3 hours ]*

*[ Total Marks : 80*

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**PART—A**

4×5=20

**Instructions :** (1) Answer *any five* questions.  
(2) Each question carries **four** marks.

1. Simplify :  $\frac{a+b}{a-b} - \frac{a-b}{a+b}$ .

2. Simplify by removing the brackets :

$$2a - [3b - (2b + c) - a - 2b]$$

3. Resolve  $\frac{1}{(x+2)(x+4)}$  into partial tractions.

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[ Contd...

4. Prove that  $(45^\circ + A) \cdot \tan(45^\circ - A) = 1$ .
5. If  $\tan A = \frac{1}{2}$ , then find the value of  $\tan 2A$ .
6. Simplify  $(3 - 7i)(2 + 4i)$ .
7. Find the equation of the straight line passing through  $(-1, 1)$  and whose slope is 2.
8. Find the centre of the circle  $x^2 + y^2 - 4x + 8y - 2 = 0$ .
9. Evaluate  $\lim_{x \rightarrow 1} \frac{x^3 + x^2 + x + 1}{x^2 + 2x + 5}$ .
10. Find  $\frac{dy}{dx}$ , if  $y = 3 \tan x - 4 \sec x + 2 \log x$ .

### PART—B

15×4=60

- Instructions :** (1) Answer *any four* questions.  
 (2) Each question carries **fifteen** marks.

11. If  $A = \begin{bmatrix} 1 & -2 & 3 \\ 3 & 4 & 7 \\ 5 & -2 & 1 \end{bmatrix}$ ;  $B = \begin{bmatrix} -2 & 4 & 3 \\ 1 & 7 & -2 \\ 3 & 5 & -1 \end{bmatrix}$ , then find  $3A + 4B$ .
12. If  $A + B + C = 180^\circ$ , prove that  
 $\sin 2A + \sin 2B + \sin 2C = 4 \sin A \sin B \sin C$
13. Show that  $\sin^{-1}\left(\frac{4}{5}\right) + \sin^{-1}\left(\frac{5}{13}\right) = \cos^{-1}\left(\frac{16}{65}\right)$ .

14. Find the equation of the Parabola passing through the points (1, 0), (0, 4) and (-1, 1) and having its axis is parallel to the  $x$ -axis.
15. Find the perimeter and centroid of the triangle formed by the points (2, 3, 7), (-4, 1, 0) and (-5, -11, 3).
16. If  $Y = x^{\sin x}$ , find  $\frac{dy}{dx}$ .
17. Find the equation to the tangent and normal to the curve  $y = 2x^2 - 4x + 5$ , at (3, 11).
18. If there is an error of 1% in measuring the side of a square plate, find the percentage error in its area.

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