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

PART—A

4×5=20

Instructions :　(1) Answer *any* **five** questions.

　　　　　　　　(2) Each question carries **four** marks.

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

2. Simplify by removing the brackets :

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

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

4. Prove that $(45° + A). \tan(45° - A) = 1$.

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 $\lim\limits_{x \to 1} \dfrac{x^3 + x^2 + x + 1}{x^2 + 2x + 5}$.

10. Find $\dfrac{dy}{dx}$, 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 $A + B + C = 180°$, prove that

$\sin 2A + \sin 2B + \sin 2C = 4 \sin A \sin B \sin C$

13. Show that $\sin^{-1}\left(\dfrac{4}{5}\right) + \sin^{-1}\left(\dfrac{5}{13}\right) = \cos^{-1}\left(\dfrac{16}{65}\right)$.

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 $\dfrac{dy}{dx}$.

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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