



C14-A-AA-AEI-BM-C-CM-CH-CHPC-
CHPP-CHOT-CHST-EC-EE-IT-M-MET-
MNG-PET-TT-RAC-PCT-102

4002

BOARD DIPLOMA EXAMINATION, (C-14)
MARCH/APRIL—2021
DBME - 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. Resolve $\frac{1}{(x-1)(x-3)}$ into partial tractions.

2. If $A = \begin{bmatrix} 0 & -1 \\ 3 & 1 \end{bmatrix}$; $B = \begin{bmatrix} 2 & 0 \\ 3 & 1 \end{bmatrix}$, find $2A + B$.

* 3. Find the value of $\begin{vmatrix} 1 & 0 & 1 \\ 2 & 1 & 0 \\ 1 & -1 & 1 \end{vmatrix}$.

4. Show that $\tan(45^\circ + A) \tan(45^\circ - A) = 1$.

- * 5. Show that $\frac{\sin 2\theta}{1 + \cos 2\theta} = \tan \theta$.
6. Find the additive inverse of $(2 + 3i)$.
7. Find the equation of the straight line passing through the points $(1, 1)$ and $(0, 2)$.
8. Find the equation of the circle whose centre is $(2, 5)$ and radius is 2 units.
9. Evaluate $\lim_{\theta \rightarrow 0} \left(\frac{\sin 3\theta}{\tan 2\theta} \right)$.
10. Find $\frac{dy}{dx}$, if $y = xe^x$.

PART—B

15×4=60

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

11. If $A = \begin{bmatrix} 3 & -2 \\ 4 & 1 \end{bmatrix}$. Find $A^2 - 3A + 2I$, where I is uni-matrix of order 2.

12. If $\cos x + \cos y = \frac{1}{3}$ and $\sin x + \sin y = \frac{1}{4}$, find $\tan\left(\frac{x+y}{2}\right)$.

13. Solve the triangle ABC . $a = 1; b = \sqrt{3}; c = 2$.

* 14. Find the equation of the Parabola whose focus is the point $(3, 4)$ and whose directrix is the line $3x + y - 8 = 0$.

15. Differentiate $\tan^{-1}(\cos \sqrt{x})$ with respect to x .

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16. Evaluate $\frac{\partial u}{\partial x}$, $\frac{\partial u}{\partial y}$, $\frac{\partial^2 u}{\partial x^2}$ and $\frac{\partial^2 u}{\partial y^2}$ if $u = x^2 + xy + y^2$.

17. Find the lengths of the tangent and normal to the curve $y = x^3$ at (1, 1).

18. Find the maximum and minimum values of $2x^3 - 9x^2 + 12x + 15$.

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