3002

C09-A/AA/AEI/C/CM/EC/EE/CH/
CHST/FW/IT/M/MNG/MET/PKG/TT-**102**

3002

BOARD DIPLOMA EXAMINATION, (C-09)
OCTOBER/NOVEMBER-2018
FIRST YEAR EXAMINATION

ENGINEERING MATHEMATICS-I

Time : 3 Hours] [Total Marks: 80

PART-A

3X10=30

Instructions :
1. Answer **All** questions.
2. Each question carries **Three** marks.
3. Answer should be brief and straight to the point and shall not exceed five simple sentences.

1. Simply 4x – [3y-2 {3x-3(6y-2x)}].
2. Express $x^2 + 7x + 12$ in the form X^2-A^2.
3. Resolve $\frac{2x+3}{(x+1)(x-3)}$ into partial fractions.
4. If A+B = $\frac{\pi}{4}$, prove that (1-cotA) (1- cotB) = 2
5. Prove that $\frac{1-cos2\theta}{Sin2\theta} = tan\theta$.
6. Find the real and imaginary parts of $\frac{4+2i}{1-2i}$.
7. Find the distance between the parallel lines 3x-4y-8 = 0 ; 6x-8y+5 = 0.
8. Find the equation to the circle having the points (3m-4) and (-2,5) as the ends of a diameter.
9. Evaluate $Lt_{n\to\propto}\left(\frac{1^2+2^2+3^2+0.....+n^2}{n^3}\right)$
10. Find the derivative of $(e^x + x^2\ secx)$.

PART-B

10X5=50

Instructions : 1. Answer any **Five** questions,

2. Each question carries **ten** marks.

3. Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

11. (a) Prove that $\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^3 & b^3 & c^3 \end{vmatrix} = (a-b)(b-c)(c-a)(a+b+c)$.
    (b) Solve the following equations by matrix inversion method x+y+z = 6 ; x-y+z=2 ; 2x+y-z=1.
12. (a) Prove that $\text{Cos}20^0.Cos30^0.Cos40^0.Cos80^0 = \frac{\sqrt{3}}{16}$.
    (b) If $tan^{-1}x + tan^{-1}y + tan^{-1}z = \pi$, prove that x+y+z = xyz.
13. (a) Solve sinΘ + CosΘ = $\sqrt{2}$.
    (b) In any ΔABC, show that if a,b,c are in A P then Cot $\left(\frac{A}{2}\right)$, Cot $\left(\frac{B}{2}\right)$, Cot $\left(\frac{C}{2}\right)$ are also in A.P.
14. (a) Find the equation of the parabola whose focus is (2,-3), and whose directrix is 2x-3y+4 = 0.
    (b) Find the eccentricity, foci, length of latusrectum of the ellipse $16x^2 + 9y^2 = 144$.
15. (a) Find the eccentricity of the hyperbola whose vertices are (2,3), (-2,3) and eccentricity 5/2.
    (b) Show that the points (1,2,3) (7,0,1) and (-2, 3, 4) are collinear.
16. (a) If $x^y = e^{x-y}$ them prove that $\frac{dy}{dx} = \frac{logx}{(1+\text{log}x)^2}$.
    (b) If u= $x^2 + y^2 + z^2$, show that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} + z\frac{\partial u}{\partial z} = 2u$.
17. (a) Find the equations of tangent and normal to the curve y=$x^2 - 3x + 4$ at the point (0,4).
    (b) A circular metal plate expands by heat so that its radius is increasing at the rate of 0.02 cm/sec. At what rate its area increasing when the radius is 20 cm?.
18. (a) The sum of two numbers is 24. Find them so that their product is to be maximum.
    (b) 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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