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

4002

BOARD DIPLOMA EXAMINATION, (C-14)

JUNE-2019

FIRST YEAR (COMMON) EXAMINATION

ENGINEERING MATHEMATICS-I

Time:3 Hours | Max. Marks:80

PART-A

10x3=30M

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 sentence

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

2) If $A=\begin{bmatrix}1 & -1\\ 0 & 1\\ 2 & 3\end{bmatrix}$ and $B=\begin{bmatrix}2 & 1\\ 3 & 0\\ 0 & 1\end{bmatrix}$, then find x such that 2A-3B-5x=0

3) If the matrix $\begin{bmatrix}1 & 2 & -2\\ 2 & 3 & b\\ a & 4 & 5\end{bmatrix}$ is symmetric then find the value of a+b.

4) prove that $\sin^2 75^0-\cos^2 45^0 = \frac{\sqrt{3}}{4}$.

5) Prove that $\cos 20^0 . \cos 40^0 . \cos 60^0 . \cos 80^0 = \frac{1}{16}$

6) Find the modulus of the complex number $\frac{4+7i}{7-4i}$

7) Find the acute angle between the straight lines 2x+y+5=0 and 3x-y-9=0.

8) Find the centre and radius of the circle whose equation is $x^2+y^2-4x+2y-11=0$.

9) Evaluate $\lim_{\theta \to 0} \frac{\sin 9\theta}{\tan 7\theta}$.

10) Differentiate $3.\cos x+2.\log x+ 21.x^2-5$ with respect to x.

PART-B

5x10=50M

Instructions: 1) Answer any **five** questions
2) Each question carries **ten** marks.
3) The anwer should be comprehensive and the criteia for valuation are the content but not the lenght of the anwer

11) a) Show that $\begin{vmatrix} a+b+2c & a & b \\ c & b+c+2a & b \\ c & a & c+a+2b \end{vmatrix} = 2(a+b+c)^3$.

b) Sove the system of equations x+y+z=9, 2x+5y+7z=52, 2x+y-z=0 using Cramer's rule.

12) (a) If $A+B+C=180^O$, prove that cos 2A + cos2B + cos2C = -1 -4 cos A cosB cos C

(b) Show that $\text{Tan}^{-1}\frac{2}{3} + \text{cot}^{-1}\frac{4}{3} = \text{Cot}^{-1}\frac{6}{17}$.

13) (a) Solve, $\sin 6\theta . \cos 2\theta = \sin 5\theta . \cos\theta$

(b) Solve the ΔABC if b=1.c=$\sqrt{3}$ and $A=30^0$.

14) a) Find the centre, vertices, eccentricity, foci, length of latus rectum, equations of directrices, and axes of the ellipse $9x^2+25y^2=225$.

b) The porch of a palace is in the shape of a parabola, its greatest height is 8 m ad its span is 12m. Find the height at a point 4m from one end.

15) (a) Find the derivative of $\sqrt{\cos\sqrt{x}}$ With respect to x.

(b) Differentiate e^{4x^2} with respect to $\sqrt{1+4x^2}$.

16) (a) if $x^y=y^x$, show that $\frac{dy}{dx}=\frac{y(x\log y-y)}{x(y\log x-x)}$.

(b) if $u=\sin^{-1}\left(\frac{X^2+y^2}{X+y}\right)$,then show that $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}=\tan u$.

17) a) Show that the two curves $4x^2+9y^2=72$ and $x^2-y^2=5$ cut orthogonally

b) The volume of a sphere is increasing at the rate of 400 cc/sec. Find the rate at which its radius and surface area are increasing at the instant when its radius is 40 cm

18) a) The sum of two numbers is 24. Find them if their product is to be a maximum.

b) The radius of a circle is measured to be 2.01 cm instead of the actual value 2 cm. Find approximately the absolute error and percentage error committed in calculating its area.

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