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)

MARCH / APRIL-2019

FIRST YEAR (COMMON) EXAMINATION

ENGINEERING MATHEMATICS-I

Time: 3Hours] [Max.Marks:80

PART-A

10x3=30M

Instructions: 1) Answer all questions and each question carries 3 marks.
2) Answers should be brief and straight to the point and shall not exceed five simple sentences.

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

2) If A= $\begin{pmatrix} 1 & -2 \\ -1 & 5 \\ 3 & 1 \end{pmatrix}$ and B= $\begin{pmatrix} 1 & 2 \\ 3 & -1 \end{pmatrix}$ then compute AB and BA.

3) If w is cube root of unity.Show that $\begin{vmatrix} 1 & w^2 & w \\ w & 1 & w^2 \\ w^2 & w & 1 \end{vmatrix} = 0$

4) If A+B = 135^0 show that (1+cot A) (1+cot B) =2.

5) Prove that $\frac{\sin 2\theta}{1-\cos 2\theta} = \cot\theta$

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6) Express the complex number $\frac{(2+i)(1-i)}{(1+i)}$ in the form of $a+ib$.

7) Find the equation of the line perpendicular to the line $5x+3y-1=0$ and passing through the point (3, -4).

8) Find the center and radius of the circle whose equation is $x^2+y^2-8x-6y-24=0$

9) Evaluate $\lim_{x\to 0}\frac{\sqrt{1+x+x^2}-1}{x}$.

10) Find the derivative of $3\tan x-4\log x-7x^3+9$ with respect to x.

PART-B

5x10=50M

Instructions: 1) Answer any five questions
2) Each question carries 10 marks.
3) The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer.

11) (a) Show that $\begin{vmatrix} b+c & a & a \\ b & c+a & b \\ c & c & a+b \end{vmatrix} = 4abc$

(b) Solve the equations $x+y+3z=6, x-y+2z=2$ and $2x-y+3z=9$ by matrix inversion method.

12) (a) If A+B+C =180^0 prove that $\sin 2A+\sin 2B+\sin 2C=4\sin A.\sin B.\sin C$.

(b) Show that $2\tan^{-1}\left(\frac{1}{3}\right)+\tan^{-1}\left(\frac{1}{7}\right)=\frac{\pi}{4}$.

13) (a) Solve $2\sin^2\theta-\sin\theta-1=0$.

(b) In any Δ^{le} ABC, show that $\sum\frac{a^2\sin(B-C)}{\sin A}=0$.

14) (a) Find the equation of the parabola whose directrix is parallel to y-axis and passing through the points (-1, 2), (2,0) and (0,4).

(b) Find the equation of the ellipse with axes as co-ordinate axes and whose latus rectum is of length 15 and distance between the foci is 10.

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15) (a) Find the derivative of $\tan^{-1}\left(\frac{2x}{3x+4}\right)$ with respect to x.

(b) Find $\frac{dy}{dx}$, if $y=(\sin x)^{\log x}$.

16) (a) Find $\frac{dy}{dx}$, if $\sin y = x\sin(a+y)$

(b) If $u=x^2y+y^2z+z^2x$, then show that $\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y}+\frac{\partial u}{\partial z}=(x+y+z)^2$.

17) (a) Find the equation of tangnt and normal to the curve $y^2=5x$ at (5,5)

(b) The side of an equilateral triangle is increasing at the rate of 8cm./ sec. Find the rate of change of its area when the side is 6cm.

18) (a) Find the maximum and minimum values of the function $2x^3-6x^2-18x+21$.

(b) Find the approximate value of $\sqrt[4]{624}$ using the concept of errors and approximations.

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