

1st Internal Examination 2022
Semester I
Department of Mathematics
Nabadwip Vidyasagar College

F.M.: 20

Time: 60 Minutes

MATH-H-CC-T-01

1. Answer the following questions.

$5 \times 2 = 10$

a) A sphere of radius r passes through $(0,0,0)$ and meets co-ordinate axes at A,B,C . Find the locus of the centroid of the triangle ABC .

b) Find the Pedal equation of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ with respect to the centre as pole.

MATH-H-CC-T-02

2. Answer any two questions

$5 \times 2 = 10$

a) Express $1 + i\sqrt{3}$ in polar form. Using Descartes rule of Sign find the nature of the roots of the equation $x^4 + 16x^2 + 7x - 11 = 0$. State Division Algorithm.

$1 + 2 + 2$

b) Solve $x^3 - 9x + 28 = 0$ by Cardan's Method.

c) A permutation is given by $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 5 & 6 & 2 & 4 & 1 & 3 \end{pmatrix}$. Prove that it is a odd permutation. Find the order of the permutation.

d) If R be a relation in the set of integers Z defined by $R = \{(x, y): x \in Z, y \in Z, (x - y) \text{ is divisible by } 6\}$ then show that R is an Equivalence Relation.