Nistarini College, Purulia
Internal Assessment Examinations, 2020
Mathematics (Generic Elective)
Semester-III

Full Marks-10 **Paper-GE1** **Code: BMTMGEHT10**

1. Answer ***any five*** questions: **2x5=10**

(i) If ω be an imaginary cube root of unity, then prove that $(1+\omega)(1+\omega^2)(1+\omega^4)(1+\omega^8)=1$.

(ii) If α,β,γ be the roots of the equation $x^3+px+q=0$, find the value of $\alpha^2+\beta^2+\gamma^2$.

(iii) If A and B are orthogonal matrices of same order then AB is also orthogonal.

(iv) Solve by matrix method, the system of equations: $2x+y+z=5, x-y=0, 2x+y-z=1$

(v) If $x^y=e^{x-y}$, find $\frac{dy}{dx}$.

(vi) A function $f(x)$ is defined by

$$f(x)=x, \quad 0<x<1$$
$$=2-x, 1\le x\le 2$$
$$=x-\frac{1}{2}x^2, x>2$$

Show that $f'(2)$ exists.

(vii) If $\log y=\tan^{-1}x$ then prove that $(1+x^2)y_2+(2x-1)y_1=0$.

(viii) Find $\vec{\nabla}\phi$ where $\phi=r, r=|\vec{r}| \& \vec{r}=x\hat{i}+y\hat{j}+z\hat{k}$

Note:
Submit the Answer Script to the Dept. of Mathematics as per notification, if not possible send through Whatsapp No.: 8918248052 OR e-mail: rajib_basu.kasba@yahoo.com