

B.C.S. GOVT P.G. COLLEGE, DHAMTARI (C.G.)

ASSIGNMENT -2019-20

B.Sc. I Year (REGULAR)

MATHEMATICS

PAPER FIRST

(ALGEBRA AND TRIGONOMETRY)

DATE:30-9-2020

M.M.: 50

Note: Answer any five questions. Each question carries equal marks.

1. a) State Cayley -Hamilton theorem.

[4 + 6 = 10]

b) Verify Cayley -Hamilton theorem for the matrix $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$.

2. a) Define Reciprocal Equation.

[4 + 6 = 10]

b) solve the Reciprocal Equation $x^4 - 10x^3 + 26x^2 - 10x + 1 = 0$.

3. a) Define Group.

[4 + 6 = 10]

b) Prove that necessary and sufficient condition for a non empty subset H of a group G for subgroup is $HH^{-1} = H$.

4. a) Define subring.

[4 + 6 = 10]

b) Show that intersection of two subring is also a subring.

5. a) Define integral domain.

[4 + 6 = 10]

b) Prove that every field is an integral domain but converse need not be true.

6. Prove that: $1 + \frac{1}{3} - \frac{1}{5} - \frac{1}{7} + \frac{1}{9} + \dots \dots \infty = \frac{\pi}{2\sqrt{2}}$.

[10]