

**NORTH GAUHATI COLLEGE**  
**DEPARTMENT OF PHYSICS**  
**PAPER: 302**  
**ASSIGNMENT-2**

**Total marks: 15**

1. Answer the following: 1×3 = 3
  - a) What is magnetic dipole?
  - b) What is the magnetic moment due to a current carrying loop?
  - c) State Ampere's circuital law.
2. What is vector potential? Find its expressions? 1+2 = 3
3. Find the magnetic vector potential at a distance  $d$  from a wire carrying current  $I$ . 3
4. A charge particle of charge  $q$  is moving in a circular path of radius  $r$  with velocity  $v$ .  
Show that magnetic moment is given by  $\frac{1}{2}qvr$ . 3
5. A cyclotron is operating with flux density of  $3 \text{ Wb/m}^2$ . The ion which enters the field is proton having a mass of  $1.67 \times 10^{-27} \text{ kg}$ . If the maximum radius of the orbit of particle is  $0.5 \text{ m}$ . Find
  - a) The maximum velocity of the proton.
  - b) The period for a half cycle. 2×1.5 = 3

**Submission date: 10/08/21**