

# VP & RPTP Science College-Vallabh Vidyanagar

Internal Test: 2017

T Y BSc [Semester-VI]

Subject-Physics US06CPHY04

Date: 09/03/2017 Thursday

Time: 11.00 am to 12.30 pm

Total Marks-25

**Q-1** Multiple Choice Questions: [Attempt all]

3

(i) The charge density inside a conductor is \_\_\_\_\_.

- (a) Zero (b) Positive  
(c) Negative (d) Imaginary

(ii) The magnetic moment of the gyrating particle to be \_\_\_\_\_.

- (a)  $\mu = \frac{1}{2}mv_{\perp}^2 / B$  (b)  $\mu = -\frac{1}{2}mv_{\perp}^2 / B$   
(c)  $\mu = mv_{\perp}^2 / B$  (d)  $\mu = -mv_{\perp}^2 / B$

(iii) The neutral fluid will interact with the ions and electrons only through \_\_\_\_\_.

- (a) Collision (b) Pressure  
(c) Mixing (d) Reaction



**Q-2** Answer the following questions in short [Attempt any two].

4

- (a) Write Poisson's equation. In what case the Poisson's equation reduces to Laplace's equation.  
(b) Give three criteria for plasma.  
(c) Discuss equation of state for plasma.

**Q-3** Discuss bound charges and show that total potential  $V(r) = \frac{1}{4\pi\epsilon_0} \oint \frac{\sigma_b}{r} da' + \frac{1}{4\pi\epsilon_0} \oint \frac{\rho_b}{r} d\tau'$ . 6

OR

**Q-3** Define conductor and discuss basic properties of conductor in detail. 6

**Q-4** Discuss Debye's shielding and quasi-neutrality in detail. 6

OR

**Q-4** Discuss motion of a single particle moving in the uniform magnetic field B. Obtain the expression for the Larmor radius. 6

**Q-5** Discuss fluid drift parallel to magnetic field B. 6

OR

**Q-5** Discuss plasma oscillations and derive expression for plasma frequency  $\omega_p$ . 6