RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. SECOND SEMESTER EXAMINATION, SEPTEMBER 2020

FIRST YEAR [BATCH 2019-22]

Date : 28/09/2020 **PHYSICS (General)**

Time : 11.00 am – 1.00 pm **Paper : II** Full Marks : 25

Answer **any five** questions : [5×5]

1. a) What do you mean by polarisation of charge?

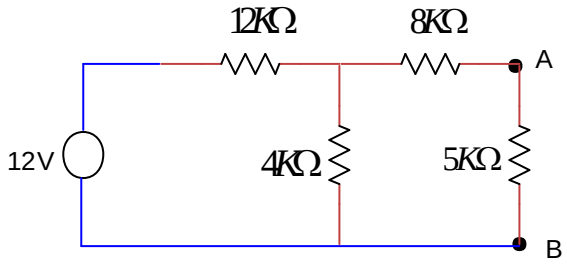
   b) Why there is no free charge inside a conductor?

   c) Establish the relation $\vec{D} = \vec{P} + \in \cdot \vec{E}$ [1+2+2]

2. a) How small current loop behaves as a magnetic dipole?

   b) A UHF television loop antenna has a diameter of 11 cm. The magnetic field of a TV signal is normal to the plane of the loop and at one instant of time its magnitude is changing at the rate 0.16 T/S. The magnetic field is uniform. What emf is induced in the antenna? [2+3]

3. Draw the Thevenin's and Norton's equivalent circuit of the following circuit and find out power at load for both the case. [2.5+2.5]



4. Write a full-wave rectifying circuit using p-n junction diodes. What is the significance of the π filter (using capacitors and inductors) on it? [2.5+2.5]

5. What is Raman effect? Compare between Raman effect and Compton effect. [1+4]

6. What is photo-electric effect? How can Einstein's photo electric equation explain the principal facts relating to photo-electric cell? Comment on the dual aspect of light. [1+3+1]

7. a) Derive from Bohr's theory, an expression for the total energy of an atom in its nth stationary state. [3]

   b) State Pauli's exclusion principle. What is its significance? [2]

———— × ————