

F.Y.B.SC. SEM – II (2014 COURSE) : SUMMER - 2018
SUBJECT: PHYSICS: ELECTRICITY AND MAGNETISM (P-22)

Day : **Wednesday**
Date : **18/04/2018**

Time: **03.00 PM TO 05.00 PM**
Max. Marks: 40.

S-2018-0694

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the **RIGHT** indicate full marks.
- 3) Draw neat labeled diagrams **WHEREVER** necessary.
- 4) Use of logarithmic table/ calculator is **ALLOWED**.
- 5) All the symbols have their usual meaning unless otherwise stated.

Q.1 Attempt any **TWO** of the following: **(10)**

- a) With the help of neat circuit diagram explain p-n junction diode as full wave rectifier.
- b) Obtain an expression for magnetic induction at a point within solenoid.
- c) The parallel plate capacitor of plate area 0.01 m^2 is filled with dielectric of dielectric constant 5. Its capacitance is 2×10^{-10} farad and it has been charged to 50 volt. Find electric intensity in dielectric and induced surface charge on the dielectric [$\epsilon_0 = 8.85 \times 10^{-12} \text{ C}^2/\text{nm}^2$]

Q.2 Attempt any **TWO** of the following: **(10)**

- a) Obtain an expression for impedance of resistor, pure inductor and capacitor connected to series across alternating e.m.f.
- b) State and prove Gauss's law in dielectrics.
- c) Current through the conductor is 160 mA. Calculate how many electrons pass through the conductor in one minute [Charge of electron (e) = $1.6 \times 10^{-19} \text{ C}$].

Q.3 Attempt any **TWO** of the following: **(10)**

- a) Explain how current decays in L-R circuit.
- b) Write note on: (i) Inductor filter (ii) Capacitor filter
- c) A coil of 20 cm radius has 15 turns and carries a current of 3 ampere. Find magnetic induction at the centre of coil [$\mu_0 = 4\pi \times 10^{-7} \text{ Wb/Am}$]

Q.4 Attempt any **FIVE** of the following: **(10)**

- a) State Ampere's law. Give its mathematical equation.
- b) Distinguish between polar and non-polar molecule.
- c) Define current density. State its SI unit.
- d) A circuit has a resistance and reactance, each equal to 100Ω . Find its power factor.
- e) Draw neat and labeled circuit diagram for transistor as common-emitter amplifier.
- f) Write the characteristics of paramagnetic substance.
- g) Define: (i) Dielectric constant (ii) Electric polarization vector.

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