

F.Y.B.SC. SEM – II (2014 Course) : SUMMER - 2019
SUBJECT: PHYSICS: ELECTRICITY AND MAGNETISM (P-22)

Day : Monday
Date : 15/04/2019

S-2019-0953

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

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

- a) State and prove Gauss's law in dielectrics.
- b) Define dielectrics. Explain polar and non-polar molecules in dielectrics.
- c) An aluminum wire of diameter 0.6 cm carries current of 20 Ampere. Find the magnetic induction of the surface of the wire.

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

- a) 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 [$\epsilon_0 = 8.85 \times 10^{-12} \text{ C}^2/\text{nm}^2$]
- b) With the help of neat circuit diagram explain p-n junction diode as full wave rectifier.
- c) Obtain an expression for magnetic induction inside solenoid.

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

- a) Explain how current decays in L-R circuit.
- b) Explain the terms inductor filter and π filter.
- 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.4 Attempt any **FIVE** of the following: **(10)**

- a) Draw neat labeled diagram of L-C-R series resonance circuit.
- b) Define diamagnetic and paramagnetic substance.
- c) Define magnetism \vec{M} . Write its SI unit.
- d) A circuit has a resistance and reactance, each equal to 100Ω . Find its power factor.
- e) State Ampere's law. Give its mathematical equation.
- f) Draw neat and labeled circuit diagram for transistor as common-emitter amplifier.
- g) Define current. State its unit.

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