2018-21

Full Marks : 60

Time : 3 hours

Answer all the Groups as directed.

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable

GROUP - A
(Short Answer Type Questions)

1. Answer any *three* of the following: 4 × 3

   (a) Define electrical susceptibility and dielectric constant.

   (b) State and prove uniqueness theorem.

   (c) Explain ideal constant voltage and constant current sources.

   (d) What do you mean by polarisation of dielectric ?

   (e) Obtain Gauss' law in differential form.

   (f) Show that the electrostatic field is conservative in nature.

GROUP - B
(Long Answer Type Questions)

Answer any *four* of the following: 12 × 4

2. Define magnetic field induction $\bar{B}$, Magnetisation vector $\bar{M}$, Magnetic intensity $\bar{H}$. Find the relation between $\bar{B}$, $\bar{H}$, and $\bar{M}$.

3. Give the theory of parallel resonance circuit. Discuss its dynamic resistance. Why is it called a rejector circuit ?

4. Explain three-phase electrical supply. Calculate line voltage and current in case of star and delta distribution of three phase power supply.

5. Give the theory of oscillating discharge of a capacitor through a circuit containing inductance and resistance Obtain expression for frequency

6. Describe with vector diagram Owen's bridge method for the measurement of inductance.

7. Write short notes on the following :

   (a) Logarithmic and electromagnetic damping

   (b) Quality factor

8. Give an account of multipole expansion of charge distribution and identify different forms of expression for potentials.

9. (a) State and prove Thevenin's theorem.

   (b) State and prove superposition theorem.