

- b. With a neat diagram, explain the pipe earthing. (05 Marks)
- c. A circuit consists of a resistance of 10Ω , an inductance of 16mH and a capacitance of $150\mu\text{F}$ connected in series. A supply of 100V at 50Hz is given to the circuit. Find the current, p.f and power consumed by the circuit. Draw the vector diagram. (06 Marks)

OR

- 6 a. Prove that the current in a purely inductive circuit lags behind the applied voltage by 90° . (05 Marks)
- b. With relevant circuit diagrams and switching table, explain three way controls of Lamps. (05 Marks)
- c. Two circuits A and B are connected in parallel across 200V , 50Hz supply circuit A consists of 10Ω resistance and 0.12H inductance in series while circuit B consists of 20Ω resistance in series with $40\mu\text{F}$ capacitor. Calculate :
- Current in each branch
 - Supply current
 - Total power factor. (06 Marks)

Module-4

- 7 a. For a three phase star connection, find the relation between line and phase values of current and voltages. Also derive the equation for the three phase power. (05 Marks)
- b. Obtain the expression for emf of an alternator and give the significance of the winding factor. (05 Marks)
- c. Two wattmeter's connected to measure the power in a 3 phase circuit read 5kW and 1kW . The latter being read after reversing the current coil. Calculate the power, power factor, total volt-amperes and reactive volt amperes. (06 Marks)

OR

- 8 a. With necessary sketches distinguish between salient pole and cylindrical pole type synchronous generator. (05 Marks)
- b. Show that two wattmeter's are sufficient to measure power in 3-phase balanced star connected circuit with neat circuit and phasor diagram. (05 Marks)
- c. A 6 pole 3 phase, 50Hz alternator 12 slot per pole and 4 conductor per slot. The winding is $\frac{5}{6}$ full pitched. A flux of 25 mwb per pole is sinusoidally distributed along the air gap. Determine the line e.m.f if the alternator is star connected. (06 Marks)

Module-5

- 9 a. Explain the various losses that occur in a transformer. (05 Marks)
- b. Define slip. Derive an expression for frequency of rotor current. (05 Marks)
- c. A 10KVA , $400/200\text{V}$, 50Hz single phase transformer has a full load copper loss of 200W and has a full load efficiency of 96% at 0.8pf lagging. Determine the iron loss. What would be the efficiency at half of the full load and unity p.f? (06 Marks)

OR

- 10 a. Explain the principle of operation of a 3 phase Induction motor and give reason for an induction motor cannot run at synchronous speed. (05 Marks)
- b. Derive the EMF equation of a transformer. (05 Marks)
- c. A 4 pole 3ϕ 50Hz induction motor runs at a speed of 1470 rpm . Find the synchronous speed, the slip and frequency of the induced emf in the rotor under this condition. (06 Marks)
