

UNIT-2 7 - Marks Questions

- Q-1 Derive the eq. for resonant freq. in the case of a series R-L-C circuit, and draw the phasor diagram of resultant voltage & current in a series R-L-C circuit in resonant condition.
- Q-2 Give the mathematical relationship between phase & line eq. quantities in a 3- ϕ star configuration with the help of phasor diagram.
- Q-3 Determine the mathematical expression for instantaneous power & average power in the case of R & L elements connected in series across a single phase AC supply of voltage $v = V_m \sin \omega t$. Also draw the instantaneous power waveform.
- Q-4 Determine the mathematical expression for instantaneous power and average power in case of R-L-C elements connected in series across a single phase AC supply of voltage $v = V_m \sin \omega t$. Also draw the instantaneous power waveform.
- Q-5 Three impedances of $(70.7 + j70.7) \Omega$, $(120 + j160) \Omega$ & $(120 + j90) \Omega$ are connected in parallel across a 250V, supply. Determine (i) admittance of the circuit (ii) supply current & (iii) circuit power factor.
- Q-6 Derive an expression of bandwidth in case of series resonating circuit.
- Q-7 Derive the expression for resonant frequency & quality factor for an AC circuit under the condition of parallel resonance.

UNIT-3 - Transformer

- Q.1. Define the terms: Permeability, Reluctance, Magnetic field density, Magnetic field intensity.
- Q.2. How does magnetic circuit differ from electric circuit.
- Q.3. Explain the principle of operation of a transformer. Derive E.M.F equation of single phase transformer.
- Q.4. List the various losses occurring in transformer & the condition for maximum efficiency.
- Q.5. Draw and explain the full load phasor diagrams of single phase transformer for lagging, leading & unity power factor load.
- Q.6. A 250/125 V, 5 kVA single phase transformer has primary resistance of $0.2\ \Omega$ & reactance of $0.75\ \Omega$. The secondary resistance is $0.05\ \Omega$ & reactance of $0.2\ \Omega$.
(i) Determine its regulation while supplying full load on 0.8 leading power factor. (ii) The secondary terminal voltage on full load and 0.8 leading p.f.
- Q.7. What is voltage regulation of transformer? state its significance.

UNIT-4 Electrical Machine

Q.1 State working principle & constructional details of D.C. Machine

Q.2 Derive EMF eq. of D.C. Generator.

Q.3 Derive Torque eq. of D.C. Motor.

Q.4 Application of D.C. Generator & D.C. Motor.

D.C. Gen. → Separately excited → Electroplating, Electro-refining of materials.

Shunt Gen. →

→ Commonly used in battery charging & ordinary lighting purpose.

Series Gen. →

→ used as boosters on D.C. feeders, as a constant current generators for welding generators & arc lamps.

Cumulatively Compound Generator →

→ for domestic lighting purposes & to transmit energy over long distance.

Differential Compound Generator →

→ used for special application like electric arc welding.

D.C. Motor →

① Shunt Motor → Elevators, fans, lathe machine, Milling Machine, Drilling Machine,

② Series Motor → ~~Elevators~~ Cranes, Elevators, Trolleys, Conveyors, Electric locomotives & electric Traction.

③ Cumulative Compound Motor → Rolling Mills, Punches, Shears, Heavy ~~Planers~~ Planers, Elevators

④ Differential Compound Motor → Not suitable for any practical application.

Q.5 Enlist different types of D.C. Gen. & D.C. Motor along with circuit diagram & equations.

Induction Machine

- Q.1 Explain slip. Draw slip-torque characteristics.
- Q.2 Explain working principle of 3- ϕ Induction Motor. Difference between squirrel-cage rotor & wound rotor.
- Q.3 Why single-phase Induction Motor is not self-starting? Explain the starting methods of 1- ϕ Induction Motor?
- Q.4 Why is the synchronous motor not self-starting? Explain the advantages & disadvantages along with applications of synchronous motor.

UNIT-5

- Q.1 What is Switch fuse unit? Describe any switch fuse unit with neat diagram?
- Q.2 What is MCCB and how does it differ from MCB. Explain its operation mechanism.
- Q.3 What is earthing? What is need of earthing electrical installation? Discuss any one method of earthing.
- Q.4 Describe the various types of wires or cables used in ~~wiring~~.
- Q.5 What is difference between Primary ~~cell~~ Battery & Secondary Battery? What are the factors that affect the battery capacity. Define battery back-up?