

Question Bank

Q1: Explain the Construction, in detail, of 1-phase transformer with neat diagram.

Q2: Explain the basic principle of working of DC Machine and derive the EMF equation.

Q3: Describe the advantages of using small DC Generator in parallel over the use of single large generator. Explain various conditions to be fulfilled for parallel operation of DC Generator.

Q4: Explain, in detail, armature reaction in DC machine with suitable diagrams and its effects on the performance of DC machine. How it is minimized?

Q5: Draw OCC, Internal and external characteristics of

- (1) D.C Shunt Generator
- (2) D.C Series Generator
- (3) Compound Generator

Which characteristics is more suitable for traction purpose and why?

Q6: Explain the parallel operation of followings with suitable diagrams and Characteristics Curves

- (1) DC Compounded Generator
- (2) DC Shunt Generator

Q7: Draw the torque vs speed and armature current vs speed characteristics of

- (1) D.C shunt motor
- (2) D.C Series motor
- (3) Compound motor

Which characteristics is more suitable for traction purpose and why?

Q8: Write short notes on following

- (1) Armature reaction in DC motor and few remedies to adverse its effects
- (2) Ward-Leonard Method
- (3) Drive Torque Equation of DC motor

Q9: Why is electric braking of electric motor superior to mechanical braking? How is dynamic braking of D.C shunt motor done?

Q10: Explain various method for speed control of

- (1) D.C shunt motor
- (2) D.C Series motor

Q11. Explain the principle of operation of DC motor and derive the torque equation of a DC motor

Q12. Write the advantage and disadvantage of parallel operation of transformer

Q13. Explain the V-V connection for 3 phase transformer. Prove that in V-V connection each transformer will supply 57.7% of the load. The parameter of the equivalent circuit of a 150-KVA, 2400/240 V transformer are:

$$R_1 = 0.2 \, \Omega$$

$$R_2 = 2 \times 10^{-3} \, \Omega$$

$$X_1 = 0.45 \, \Omega$$

$$X_2 = 4.5 \times 10^{-3} \, \Omega$$

$$R_i = 10 \, \text{K}\Omega$$

$$X_m = 1.6 \, \text{K}\Omega \text{ (as seen from 2400 V side)}$$

Calculate:

1. Open-circuit current, power and pf when LV is excited at rated voltage
2. The voltage at which the HV should be excited to conduct a short-circuit test (LV shorted) with full load current flowing. What is the input power and its pf?

Q14. Explain the Construction, in detail, of DC Machine with neat diagram

Q15. A 100 KVA, 50 Hz, 440/11000 V, 1-phase transformer has an efficiency of 98.5% when supplying full-load current at 0.8 power factor lagging and an efficiency of 99% when supplying half full load current at unity power factor. Find the core losses and the copper losses corresponding to full-load current. At what value of load current will the maximum efficiency be attained?

Q16. Write the advantage and disadvantage of auto-transformer.

Q17. A 3-phase stepdown transformer is connected to 6600 volts mains and takes 10 A. Calculate the secondary line voltage, line current and output for the following connections.

Δ - Δ ;

Y-Y;

Δ -Y;

Y- Δ

The ratio of turns per turns per phase is 12. Neglect losses.

Q18. Why is electric braking of electric motor superior to mechanical braking? Explain, in detail various types of braking used in DC motor

Q19. Explain in detail following

- a) Swinburne's test
- b) Hopkinson test
- c) Retardation test.

Q20. Explain

- a) Differentiate between core and shell type transformer
- b) Why transformer is rated in KVA not in KW?
- c) Draw OCC and Internal characteristics of D.C Shunt Generator
- d) Drive the induced EMF equation of a transformer. What is Voltage Regulation?
- e) Draw the Exact phasor diagram of Transformer on full load.

Q21. Explain

- a) Draw the Exact phasor diagram of Transformer on full load
- b) What are the various losses in the transformer?
- c) What are the conditions for satisfactory parallel operation of 1- ϕ transformer?
- d) Write a short note on lap and wave winding
- e) Write the characteristics of an ideal transformer

Q22. Explain, in detail, armature reaction in DC machine with suitable diagrams and its effects on the performance of DC machine. How it is minimized?

Q23. A transformer has its maximum efficiency of 0.98 at 15 kVA at unity pf. Compare its all-day efficiencies for the following load cycles:

- a. Full load of 20 kVA 12 hours/day and no-load rest of the day.
- b. Full load 4 hours/day and 0.4 full-load rest of the day.

Assume the load to operate on unity pf all day.

Q24. Write:

- a) SCOTT connection for phase conversation in transformer
- b) Ward –Leonard method for speed control of DC motor
- c) Dynamic braking of D.C shunt motor.

Q25. Explain the Need of Starter in DC motors. Explain 3-point and 4-point Starter