





## PART – B

(5×16=80 Marks)

11. a) i) Derive the EMF equation of DC machines. (8)
- ii) Explain brake test with connection diagram and give its merits and demerits. (8)

(OR)

- b) i) Explain the load characteristics of compound generators with neat sketch. (8)
- ii) Derive from the first principles an expression for the torque developed in DC motor. (8)

12. a) i) Derive the EMF equation of transformer. (8)
- ii) A 100 KVA, 606 KV/415 V single phase transformer has an effective impedance of  $(3 + j8)\Omega$  referred to HV side. Estimate the full load voltage regulation at
- i) 0.8 pf lagging and (4)
- ii) 0.8 pf leading. (4)

(OR)

- b) i) Explain the open circuit and short circuit test on transformer. (12)
- ii) Write the advantages of transformer tests. (4)

13. a) Explain the principle, construction and operation of three phase induction motor. (16)

(OR)

- b) i) The power input to the rotor of a 440 V, 50 Hz, 6 pole, 3 $\phi$  induction motor is 80 kW. The rotor electromotive force is observed to make 100 complete alternations per minute. Calculate :
- a) The slip (1½)
- b) The rotor speed (1½)
- c) Mechanical power developed (1½)
- d) Rotor copper loss per phase (1½)
- e) Rotor resistance per phase if the rotor current is 65A. (2)



- ii) A) Why single phase induction motors are not self starting ?
  - B) What are the types of single phase induction motor based on the starting methods used ?
  - C) Draw the Torque-slip characteristics of 3 $\phi$  Induction Motor.
  - D) What are the advantages of 3 $\phi$  Induction Motor. (4 $\times$ 2=8)
14. a) i) Explain the MMF method of synchronous generator. (8)
- ii) Derive the EMF equation of alternator. (8)
- (OR)
- b) i) Explain the construction, operation, characteristic and applications of hysteresis motors. (12)
- ii) Define step angle and resolution. (4)
15. a) i) Compare HVDC and EHVAC systems. (8)
- ii) What are the characteristics of insulators ? Explain suspension type insulator. (8)
- (OR)
- b) Explain the structure of a typical electric power systems. (16)

