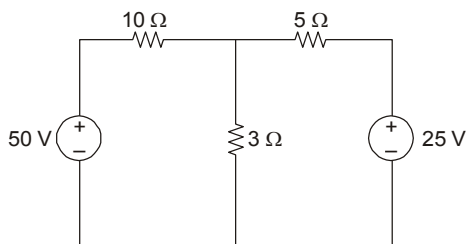


# Solved Paper 2012

## Electrical Engineering (Paper II)

1. (a) For the network shown in figure find the current in each resistor using super position principle. (30)



Figure

- (b) Three impedances  $(6 + 15j)\Omega$ ,  $(8 - 16j)\Omega$  and  $(8 + j10)\Omega$  are connected in parallel. Calculate the current in each branch when the total current is 20 A. (30)
2. (a) What are the various methods for the measurement of three phase power? Explain two-wattmeter method for star-connected three phase balanced circuits. Also derive the expression for power factor. (30)
- (b) Derive the e.m.f and torque equation of d.c. machines. Also discuss the significance of back emf in d.c. machines. (30)
3. (a) A 400 KV A, 5000/320 V, 1 phase transformer has a primary winding resistance of  $0.5\Omega$  and secondary winding resistance of  $0.001\Omega$ . The iron loss is 2.5 KW. Determine the efficiency of transformer at full load and half load at 0.85 p.f. lagging. (30)
- (b) Explain the open circuit and short circuit tests on single phase transformer. (30)
4. (a) Explain the principle of operation of three phase synchronous motor. Discuss the various applications of three phase synchronous motor. (20)
- (b) A 415 V, three phase, 50Hz, 4 pole star connected induction motor runs at 24 rps on full load. The rotor resistance and reactance per phase are  $0.35\Omega$  and  $3.5\Omega$  respectively and the effective rotor - stator turns ratio is 0.85:1. Calculate
- synchronous speed
  - the slip
  - the full load torque
  - the power output if mechanical losses amount to 770 W
  - the maximum torque. (40)
5. (a) Discuss the various types of transmission lines. Derive the expression for voltage regulation of single phase short transmission line. (30)
- (b) Write short notes on any two of the following: (30)
- Power factor improvement
  - Buchholz Relay
  - Advantages of Inter connection of power stations
6. (a) Explain the various starting methods for three phase induction motors in detail. (20)
- (b) A lamp having a Candle power of 300 in all directions is provided with a reflector that directs 70% of total light uniformly on a circular area 40 m diameter. The lamp is hung at 15 m above the area. Calculate: (40)
- The illumination
  - The illumination at the center
  - The illumination at the edge of the surface without reflector.