

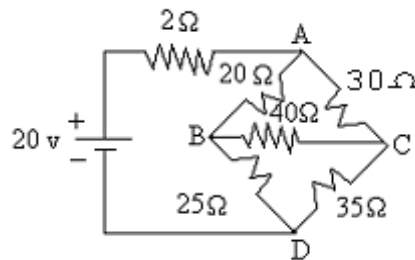
II B.Tech I Semester Supplementary Examinations, May 2005
PRINCIPLES OF ELECTRICAL ENGINEERING & NETWORKS
 (Computer Science & Engineering)

Time: 3 hours

Max Marks: 70

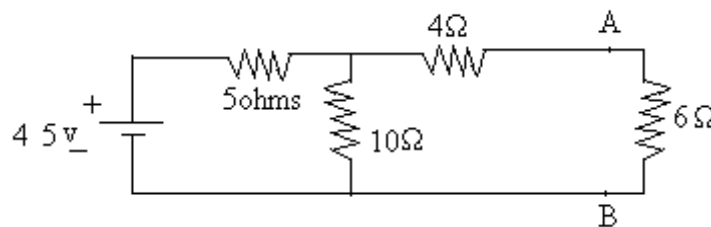
Answer any FIVE Questions
 All Questions carry equal marks

1. (a) Define RMS value, Average value and form factor of an alternating quantity and derive the values for full-wave rectified sine wave.
- (b) State and explain Kirchhoff's wave.
- (c) Find the total current delivered by the battery for the following circuit, using star/delta or delta/star transformation.



2. (a) Derive the relationship between phase and line voltages for a balanced star connected system.
- (b) Three similar coils, each having a resistance of 20 ohms and air inductance of 0.05H are connected in
 - i. star
 - ii. delta to a three phase, $50H_z$, 400 v supply.
 Calculate the total power absorbed and the line current in each case.
3. (a) Derive the emf equation of a d.c. generator.
- (b) Explain under what condition the d.c. generator will not be able to generate emf.
- (c) In a 120 V compound generator, the resistances of armature shunt and series windings are 0.06ohms, 25 ohms. 0.04 ohms respectively. The load current is 100A at 120V. Find the induced emf and the armature current when the machine is connected as
 - i. long shunt
 - ii. short shunt.
4. (a) Derive the torque equations of a d.c. motor.
- (b) Explain the characteristics of a d.c. shunt motor.

- (c) Determine the developed torque and shaft torque of 220V, 4 pole series motor with 800 conductors wave connected supplying a load of 8.2 kW by taking 45A from the mains. The flux per pole is 25 mwb and its armature resistance is 0.6ohms.
5. (a) Explain the principle of working of a transformer as no-load.
 (b) Derive the conditions for maximum efficiency of a transformer.
 (c) Consider a 4 kVA, 200/400V, ring phase transformer supplying full-load current at 0.8 power factor. The O.C./S.C. tests results are as follows:
 O.C. Test : 200v, 0.8A, 70w (L.v.side)
 S.C. Test: 20v, 10A, 60w (h.v.side)
 determine:
 i. The efficiency and regulation at 0.8 p.f. lag and lead
 ii. Maximum efficiency.
6. (a) Explain the principle of working a three phase induction motor.
 (b) Derive the emf equation of an alternator.
 (c) A 4 pole, three phase, $50H_Z$ star-connected alternator, has 60 slots, with 4 conductor per slot. Coils are short pitched by 3 slots. If the phase spread is 60° , find the line voltage induced for a flux per pole of 0.943 wb distributed sinusoidally. All the turns per phase are in series.
7. (a) State and explain superposition theorem.
 (b) Find the Thevenin's voltage and impedance for the following circuit and hence find the load current through AB. Also find the maximum power transmitted to the load.



8. Write short notes on:

- (a) Norton's theorem
 (b) Duality
 (c) 3-point starter.
