Code No: R21013 **R10** SET - 1

II B. Tech I Semester Supplementary Examinations, May/June - 2017
ELECTRICAL AND ELECTRONICS ENGINEERING
(Com. to CE, ME, CHEM, PE, AME, MM)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Derive the relationship between line voltage and phase voltage in star connected system. (8M)
   b) Find current through 4Ω resistance of the network shown in Figure 1. (7M)

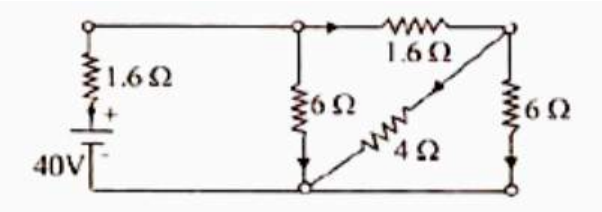

Figure 1

2. a) Derive the EMF equation of DC generator. (8M)
   b) A 220V, 4-pole, wave connected dc series motor has armature and field resistances of 0.15Ω and 0.85Ω respectively. The armature of motor has 60 conductors per pole. The flux developed in the air gap is 20mWb. Find the speed of the motor. (7M)

3. a) Why the transformer rating is expressed in kVA? Give the expression for load kVA at which maximum efficiency occurs. (7M)
   b) A single phase 50 Hz transformer has 100 turns on the primary and 400 turns on the secondary winding. The net cross-sectional area of core is 250 cm^2. If the primary winding is connected to a 230 V, 50 Hz supply, determine (8M)
   i) The EMF induced in the secondary winding
   ii) The maximum value of flux density in the core.

4. a) Explain the principle of operation of 3-phase induction motor with neat sketch (8M)
   b) Explain the regulation of alternator by synchronous impedance method. (7M)
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5. a) Explain the action of a full wave rectifier and sketch the wave forms of input and output voltages. (8M)
   b) Explain the various breakdown mechanisms present in a p-n junction (7M)

6. a) Explain the operation of transistor as an amplifier. (8M)
   b) For a p-n-p transistor in CE mode, $\beta = 100$. What is the value of α? If $I_{co} = 12\mu A$, what is the collector current for an emitter current of 2 mA? (7M)

7. a) Explain the theory of dielectric heating and its applications in industries. (8M)
   b) Discuss the application of ultrasonics for flow detection and also state its other applications. (7M)

8. Write a short note on the following (15M)
   a) Strain gauge
   b) Piezo-electric transducer
   c) Digital multi-meter