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

II B. Tech I Semester Supplementary Examinations, Jan - 2015
ELECTRICAL AND ELECTRONICS ENGINEERING
(Com. to CE, ME, CHEM, PE, AME, MM)

Time: 3 hours Max. Marks: 75

All Questions carry **Equal** Marks
Note: Answer any FIVE Questions, not exceeding Three Question from any one part

PART-A

1. a) Classify Network elements and give their volt-ampere relations.
   b) State Kirchhoff's voltage law and Kirchhoff's current law.
   c) What are the different types of energy sources? Explain.
   d) Reduce the network shown in figure 1 to a single loop network by successive source transformation to obtain the current in the 12 Ω resistor.

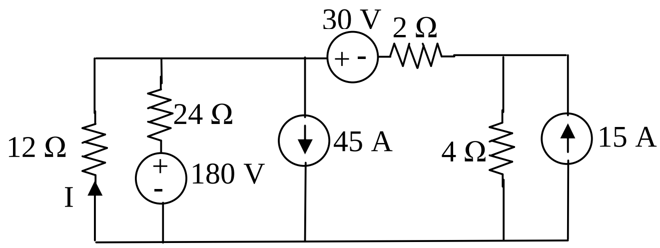

Figure 1

2. a) Explain the working principle of DC Generator.
   b) A 100 kW, 240 V shunt generator has a field resistance of 55Ω and armature resistance of 0.067 Ω. Find the full load generated voltage, power developed by the armature.

3. a) Derive the EMF equation of Transformer.
   b) What are the various Losses occur in a transformer and how they can be minimized.

4. Explain how to determine the regulation of alternator by synchronous impedance method.

PART-B

5. a) Draw and explain V-I characteristics of a diode when it is forward and reverse biased.
   b) Explain the operation of half wave diode rectifier with a neat diagram. Define rectifier efficiency.

6. a) Explain the working of n-p-n and p-n-p transistors.
   b) Explain the operation of the transistor as an amplifier in Common-Emitter (CE) configuration.

7. a) Explain about the theory of induction heating.
   b) What are the applications of induction heating in industries?

8. a) Explain about Strain Gauge.
   b) What are the applications of an Oscilloscope?

Code No: R21013 **R10** SET - 2

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Time: 3 hours Max. Marks: 75

All Questions carry **Equal** Marks
Note: Answer any FIVE Questions, not exceeding Three Question from any one part

PART-A

1. a) Obtain the delta transformation for a star connected network having resistance of RΩ.
   b) State Kirchhoff's Laws.
   c) In the network shown in figure 1, find all branch currents and voltage drops across all resistors.

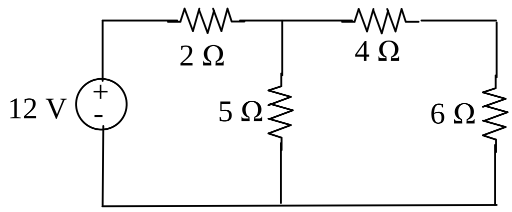

Figure 1

2. a) Derive the EMF equation of a DC Generator.
   b) A 6-pole lap wound DC generator has 600 conductors on its armature. Flux per pole is 0.02 Wb, speed is 1500rpm. Calculate EMF generated. Also calculate EMF generated if the generator is wave wounded.

3. a) Explain Open circuit (OC) test of a 1-phase transformer.
   b) Define: i) efficiency and All day efficiency of a transformer
   c) Why the transformer rating is in KVA?

4. Explain the working principle of a 3-phase induction motor. Draw its slip-torque characteristics and explain.

PART-B

5. a) Explain how Zener diode works as voltage stabilizer.
   b) A crystal diode having internal resistance r_f=20Ω is used for half wave rectification. If applied voltage is V=50sinωt and load resistance R_L=800Ω. Find I_m, I_{dc}, I_{rms} and DC output voltage.

6. a) Draw and explain the frequency response of single stage CE Amplifier.
   b) Discuss the concepts of feedback amplifier and give the advantages of a negative feedback amplifier.

7. a) Explain about the theory of dielectric heating and application to industry.
   b) Discuss in detail about ultasonics.

8. a) Explain CRO Principle and its applications.
   b) Discuss in detail about LVDT.

Code No: R21013 **R10** SET - 3

II B. Tech I Semester Supplementary Examinations, Jan - 2015
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Time: 3 hours Max. Marks: 75

All Questions carry **Equal** Marks
Note: Answer any FIVE Questions, not exceeding Three Question from any one part

PART-A

1. a) Define any four
   i) Active and Passive elements. ii) Unilateral and Bilateral elements.
   iii) Linear and non-linear elements. iv) Lumped and distributed elements.
   v) Time variant and time-invariant elements.
   b) For the circuit shown in figure 1, find the current through 20Ω resistor.

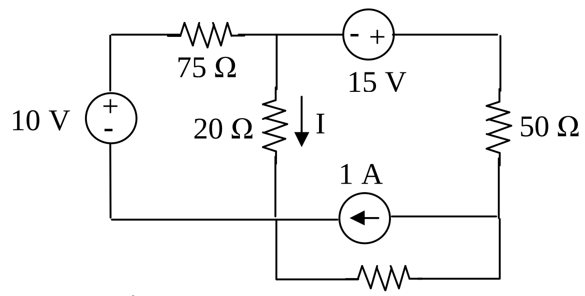

Figure 1

2. a) Explain the operation of a 3-point starter.
   b) What are the applications of DC shunt, series and compound motors?

3. a) Obtain the equivalent circuit of a transformer.
   b) In a 50 kVA transformer, iron loss is 500W and full load copper loss is 800W. Find the efficiency at half load and full load at 0.8 p.f lagging.

4. a) Draw and explain Torque-slip characteristics of an induction motor. Explain its applications.
   b) Define synchronous speed and slip and derive the relationship between them in terms of other parameters.

PART-B

5. a) Define: i) DC forward resistance ii) AC forward resistance.
   iii) Reverse resistance. iv) Peak inverse voltage.
   b) Discuss about the advantages and disadvantages of half wave and full wave rectifiers.
   c) What are the applications of diodes?

6. a) Obtain the input and output characteristics of Common-Emitter (CE) amplifier.
   b) Draw and explain V-I characteristics of SCR.

7. a) Explain about the ultrasonics.
   b) Discuss about Dielectric heating and its industrial applications.

8. a) Explain about principle and operation of thermocouple.
   b) Discuss briefly about the digital multimeters.

Code No: R21013 **R10** SET - 4

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Time: 3 hours Max. Marks: 75

All Questions carry **Equal** Marks
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PART-A

1. a) Derive necessary formulae for star-delta and delta-star transformations for a resistive network.
   b) Determine the branch currents in the network shown in figure 1.

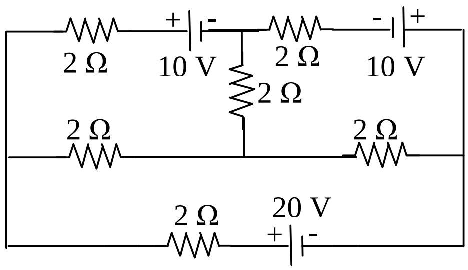

Figure 1

2. a) Classify different types of DC machines and give their applications.
   b) Derive the torque equation for a DC motor.

3. a) Explain OC and SC tests of a transformer.
   b) Define transformer. Derive the e.m.f equation of a transformer.

4. a) Explain procedure to determine the regulation of alternator by synchronous impedance method.
   b) Explain the Principle of operation of alternators.

PART-B

5. a) What are the different types of rectifiers with neat sketches?
   b) Derive the formula for efficiency of half wave and full wave rectifiers.

6. a) Obtain the input and output characteristics of Common-Base (CB) connection.
   b) Derive the necessary condition for oscillators.

7. a) Explain about the ultrasonics and discuss how it is used in flow detection.
   b) Discuss about Dielectric heating and industrial applications.

8. Write a short note on:
   a) LVDT b) Piezo-electric transistors. c) thermister