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

II B. Tech I Semester Supplementary Examinations, September – 2014
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) State and explain ohm's law. What are its limitations?
   b) Calculate the value of resistance 'R' in the figure 1(b). Assume all resistances values are in ohms.

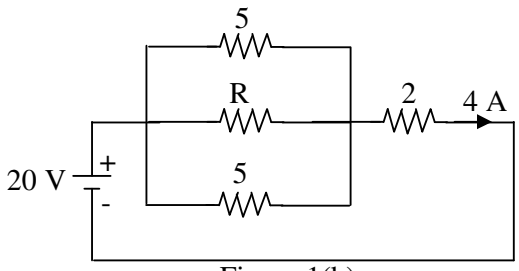

Figure 1(b)

2. a) Explain the operation of 3-point starts used in the DC motors with neat diagram.
   b) A 200 V DC shunt motor takes a total current of 100 amperes and runs at 750 rpm. The resistances of armature and shunt field winding are 0.1 Ω and 40 Ω respectively. Find the torque developed by armature.

3. a) Derive an e.m.f equation of a single phase transformer.
   b) A single phase transformer has 350 primary and 1050 secondary turns. The net cross-sectional area of the core is 55 cm^2. If the primary winding in connected to a 400 V, 50 Hz single phase supply. Calculate: i) the maximum value of flux density in the core and ii) the voltage induced in the secondary winding.

4. a) Explain the principle of operation of alternators.
   b) A 3-phase, 2-pole 50 Hz induction motor has a slip of 4% at no-load and 6% at full load. Find: i) Synchronous speed ii) Full-load speed iii) No-load speed iv) Frequency of rotor current at stand still v) Frequency of rotor current at full load.

Part – B

5. a) Explain the working of bridge rectifier with a neat circuit diagram. Give its merits and demerits.
   b) Explain the applications of the diodes.

6. a) Explain a feedback amplifier with the help of a block diagram.
   b) Explain the frequency response of CE amplifier.

7. a) Explain the principle of dielectric heating.
   b) Briefly describe the process of annealing of brass and bronze items with induction heating.

8. a) Explain the principle of strain gauge.
   b) Explain the principle of CRO and write its applications.

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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) State and explain Kirchhoff's laws with an example.
   b) Three resistors of 50 ohms, 100 ohms, and 150 ohms are joined in parallel. If the current in 100 ohms resistor is 5 A, what is the current in other resistors and total current? What is the voltage across each resistor?

2. a) Explain different types of DC generators in detail.
   b) A short shunt compound generator supplies 200 A at 100 V. The resistance of armature, series field and shunt field is 0.04 ohms, 0.03 ohms, and 60 ohms respectively. Find e.m.f generated.

3. a) Explain the principle of operation of a single-phase transformer when it supplies lagging power factor load.
   b) The required no-load voltage ratio in a single phase, 50 Hz, transformer is 5000V/500 V. Find the number of turns in each winding if the flux is to be 0.05 Wb.

4. a) Explain the principle of operation of three phase induction motors.
   b) Discuss the applications of induction motor.

Part - B

5. a) Explain the working of the half wave rectifier circuit and draw the input and output waveforms of the circuit.
   b) Show that full wave rectifier is twice as efficient as half wave rectifier. Derive the expression for ripple factor of a full wave rectifier.

6. a) Draw and explain the circuit diagram of a general oscillator and write the expression for conditions of oscillations.
   b) Explain the operation of transistor as an amplifier.

7. a) Draw the circuit and briefly describe the working of high frequency power source for induction heating.
   b) Explain the application of ultrasonics for flow detection.

8. a) Explain the operating principle of linear variable differential transformer (LVDT) with a neat diagram.
   b) Write short note on thermocouple.

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

II B. Tech I Semester Supplementary Examinations, September – 2014
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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) Briefly explain the types of electrical elements available and write their volt-ampere relationships.
   b) If the total power dissipated in the circuit shown in figure 1(b) is 40 W, find the value of R and current through each resistor and voltage across each resistor. Assume all resistances values are in ohms.

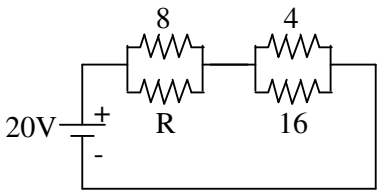

Figure 1(b)

2. a) Derive the e.m.f equation of DC generator.
   b) Explain the characteristics of DC motors.

3. a) The maximum flux density in the core of 250 /3000 V, 50 Hz single phase transformer is 1.2 Wb per square meter. If the e.m.f per turn is 8 volts determine primary and secondary turns and area of the core.
   b) Explain various losses that occur in a single phase transformers.

4. Explain the procedure to determine regulation of alternator by synchronous impedance method with neat circuit diagram.

Part - B

5. a) Draw the circuit diagram of full wave rectifier and explain its operation.
   b) Derive the expressions for average value of current and r.m.s value of current for a half wave rectifier.

6. a) Draw and explain the V-I characteristics of SCR. Discuss the applications of SCR.
   b) Compare different types of transistor configurations with necessary circuit diagrams using NPN transistor.

7. a) Explain the principle of dielectric heating and list the applications of dielectric heating.
   b) Describe any two industrial applications of ultrasonic waves.

8. a) What is a thermocouple? Explain the operating principle of a thermocouple.
   b) Write short note on thermistor.

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

II B. Tech I Semester Supplementary Examinations, September – 2014
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(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) Compare the series and parallel circuits.
   b) Calculate the value of resistance 'R' in the figure 1(b). Assume all resistances values are in ohms.

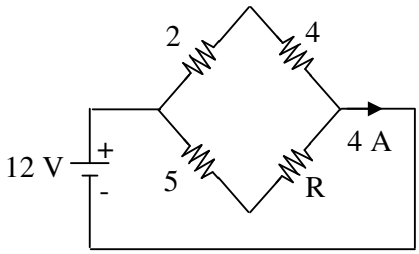

Figure 1(b)

2. a) Explain the principle of operation and characteristics of DC Generators.
   b) Explain the applications of DC Generators.

3. a) Calculate the flux in the core of a single-phase transformer having a primary voltage of 230 V, at 50 Hz and 50 turns. If the flux density in the core is 1 Tesla, calculate the net cross-sectional area of the core.
   b) Explain about the efficiency and regulation of transformer.

4. Explain the slip-torque characteristics and application of induction motors.

Part - B

5. a) Explain about forward bias and reverse bias in case of P-N junction diode. Draw the characteristics in both the regions.
   b) An half wave rectifier supplies a power to a 1 kΩ load. The input supply voltage is 220 V (rms). Neglecting the forward resistance of the diode, calculate: i) V_{dc} ii) I_{dc} iii) ripple voltage (r.m.s value).

6. a) What do you mean by feedback in amplifiers? Define negative and positive feedback.
   b) Explain the input and output characteristics of a transistor in CB configuration.

7. a) Explain different methods of generating ultrasonic waves.
   b) Describe any two industrial applications of dielectric heating.

8. a) Explain the use of CRO for the measurement of voltage, current and frequency.
   b) Write a short note on digital multimeters.