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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)

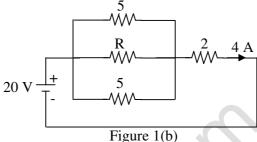
Time: 3 hours Max. Marks: 75

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.



- 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 $0.1~\Omega$ and $40~\Omega$ 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 cm². 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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SET - 2

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Time: 3 hours Max. Marks: 75

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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.

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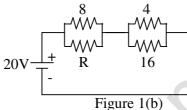
Time: 3 hours Max. Marks: 75

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.



- 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.

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Time: 3 hours Max. Marks: 75

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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.

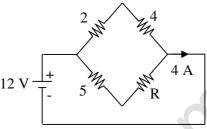


Figure 1(b)

- 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.

<u>Part - B</u>

- 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 k Ω 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.

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