

Code No: R21013

R10**SET - 1**

II B. Tech I Semester, Regular Examinations, Nov – 2012
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 Questions from any one part

PART-A

1. a) State and explain Ohms law and its limitation
b) Two resistances of 50Ω and 40Ω respectively are connected in parallel. A third resistance of 10Ω is connected in series with the combination and a D.C supply of 220 V is applied to the ends of the completed circuit. Calculate the current in each resistance.
2. With a neat sketch explain the main parts of the DC machine and state the material of which each part is made and their function
3. a) From the fundamentals, derive the expression for the EMF equation of a single phase transformer.
b) A transformer has a primary winding of 600 turns and a secondary turns of 300. When the load current on the secondary is 50A at 0.85 p.f lagging, the primary current is 25A at 0.707 lagging. Determine the no load current of the transformer and the phase angle with respect to the voltage.
4. a) Explain the slip-torque characteristics of three phase induction motor
b) Find the no-load phase and line voltage of a star-connected 3-phase, 6-pole alternator which runs at 1200 rpm, having flux per pole of 0.1 wb sinusoidally distributed. Its stator has 54 slots having double layer winding. Each coil has 8 turns and the coil is chorded by 1 slot.

PART-B

5. a) Explain the working of P-N junction diode
b) What is a rectifier? Discuss the operation of half wave rectifier with a neat circuit diagram.
6. a) Explain the concept of feedback amplifier
b) If a transistor with $\alpha = 0.96$ and emitter to base resistance 80Ω is placed in common emitter configuration, find the gains of A_i , A_v , and A_p ?
7. a) What are the various types of induction heating?
b) Explain Dielectric Heating with a neat diagram.
8. Explain the following with neat diagram
 - i) LVDT
 - ii) Thermistors

Code No: R21013

R10**SET - 2**

II B. Tech I Semester, Regular Examinations, Nov – 2012
ELECTRICAL AND ELECTRONICS ENGINEERING
 (Com. to CE, ME, CHEM, PE, AME, MM)

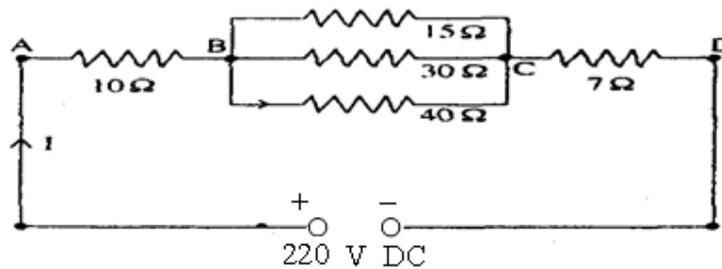
Time: 3 hours

Max. Marks: 75

All Questions carry Equal Marks

Note: Answer any FIVE Questions, not exceeding Three Questions from any one part**PART-A**

- state and explain Kirchoffs laws
 - In the circuit shown in below figure, find the current in the each resistance.

**Figure 1**

- Compare DC generator and DC motor with respect to principle of operation of mention the application of each machine
- Explain the principle of operation of transformer
 - In a 25 kVA, 2000/200V, 50Hz single phase transformer, the iron and full load copper losses are 350 and 400 W respectively. Calculate the efficiency at unity power factor on full load and half load.
- Explain the principle of operation of alternator
 - A 3-phase induction motor has 2 poles and is connected to 400V, 50Hz, supply. Calculate the actual rotor speed and rotor frequency when the slip is 4%.

PART-B

- Draw and explain the equivalent circuit of the P-N junction diode
 - An a.c. voltage of peak value 20V is connected in series with a silicon diode and load resistance of 500Ω. If the forward resistance of diode is 10Ω, find the following:
 - peak current through diode
 - peak output voltage
 What will be these values if the diode is assumed to be ideal?
- Explain the V-I characteristics of common emitter configuration
 - Explain the static characteristics of the SCR?
- Explain the dielectric heating with necessary diagrams? List out its merits and give some applications.
- Explain the working principle of the following with neat diagrams
 - Strain gauge
 - Piezo-electric transistors

Code No: R21013

R10**SET - 3**

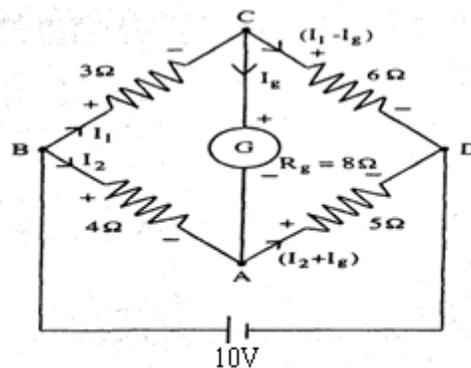
II B. Tech I Semester, Regular Examinations, Nov – 2012
ELECTRICAL AND ELECTRONICS ENGINEERING
 (Com. to CE, ME, CHEM, PE, AME, MM)

Time: 3 hours

Max. Marks: 75

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

1. A Wheatstone bridge consists of $AB = 4\Omega$, $BC=3\Omega$, $CD=6\Omega$ and $DA=5\Omega$. A 10V cell is connected between B and D and a galvanometer of 8Ω is connected between A and C. Find the current through the galvanometer.

**Figure 1**

2. a) Derive the emf equation of a DC generator
 b) A 4-pole DC motor is fed at 400V and takes an armature current of 35A. The resistance of the armature circuit is 0.2Ω . The armature winding is wave connected with 800 conductors and useful flux per pole is 0.023 Wb. Calculate the speed of the motor.
3. a) What are the different losses occurring in a transformer on load? and what are the tests required for finding these losses.
 b) Short-circuit test is conducted on a 5kVA, 400V/100 V single phase transformer with 100 V winding shorted. The input voltage at full load current is 40 V. The wattmeter, on the input reads 250 W. Find the power factor for which regulation at full load is zero.

Code No: R21013

R10**SET - 3**

4. a) Explain the regulation of alternator by synchronous impedance method
b) A 3-phase induction motor is wound for 4 poles and is supplied from 50 Hz systems. Calculate (i) the synchronous speed, (ii) the speed of the motor when slip is 4% and (iii) the rotor current frequency when the motor runs at 600 r.p.m.

PART-B

5. a) Explain the forward current, peak inverse voltage and reverse current in a P-N junction diode
b) Compare half wave and full wave rectifiers and their output voltage waveforms
6. a) Explain the V-I characteristics of SCR?
b) A transistor is operated at a forward current of $2\mu\text{A}$ and with the collector open circuited. Calculate the junction voltages V_c and V_e the collector to emitter voltage V_{ce} assuming, $I_{C0}=2\mu\text{A}$, $I_{E0}=1.6\mu\text{A}$, $\alpha_n=0.98$.
7. a) What are the various core type induction furnaces? Explain one of them.
b) Discuss the industrial applications of dielectric heating.
8. a) Explain the working of CRO with neat diagram.
b) Explain the working of digital multimeter.

Code No: R21013

R10**SET - 4**

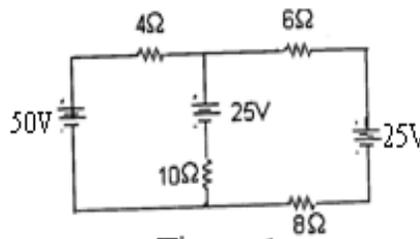
II B. Tech I Semester, Regular Examinations, Nov – 2012
ELECTRICAL AND ELECTRONICS ENGINEERING
 (Com. to CE, ME, CHEM, PE, AME, MM)

Time: 3 hours

Max. Marks: 75

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

- Three equal resistances of value R ohms are connected in a delta fashion. This is to be replaced by an equivalent star connected resistance R_1 , R_2 and R_3 . What are the values of R_1 , R_2 and R_3 in terms of R .
 - By applying Kirchoff's law, find the current through all the elements in the circuit as shown in the figure?

**Figure 1**

- What is DC generator and explain the basic principle of operation of a DC generator?
 - Derive the torque equation of a DC motor.
- State and prove the condition for maximum efficiency of a transformer?
 - In a 25KVA, 2000/200V transformer the constant and variable losses are 350 W and 400 W respectively calculate the efficiency on u.p.f at i) Full load and ii) Half full load.
- Explain the principle of operation of alternator
 - A 6-pole, 3-phase, 50 Hz induction motor is running at full-load with a slip of 4%. The rotor is star-connected and its resistance and standstill reactance are 0.25Ω and 1.5Ω per phase. The e.m.f. between slip rings is 100 V. Find the rotor current per phase and p.f., assuming the slip rings are short-circuited.

PART-B

- With a neat circuit diagram, explain the operation of centre tap full wave rectifier
 - The applied input a.c. power to a half-wave rectifier is 100 watts. The d.c. output power obtained is 40 watts. i) What is the rectifier efficiency? ii) What happens to remaining 60 watts?
- Compare the characteristics of transistor amplifiers in the three configurations?
 - Explain the necessary conditions for oscillators
- Explain the generation of ultrasonic's and mention the applications
 - Explain the principle of induction heating.
- Draw the schematic diagram of a CRO and explain its principle of working
 - Explain the working of a thermocouples.