



Reg. No. :

Name :

**Combined First and Second Semester B. Tech. Degree
Examination, October 2014
(2013 Scheme)**

13.108 : BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (FR)

Time : 3 Hours

Max. Marks : 100

PART – A

(Answer **all** questions. **Each** question carries **2** marks)

1. State and explain Kirchoff's current law.
2. Find the unit step response of the RC series circuit if $R = 1 \Omega$ and $C = 1F$. Assume initial voltage across the capacitor is zero.
3. State Faraday's laws of electromagnetic induction.
4. Two impedances, $Z_1 = (3 + j1) \Omega$ and $Z_2 = (4 + j3) \Omega$ are connected in parallel. Find the resultant impedance Z_{eq} .
5. A 3-phase 400 V, 50 Hz balanced supply is connected to a star-connected pure resistive balanced load with $R_L = 10 \Omega$. Find the line current.
6. What are the characteristics of an ideal transformer ?
7. What are the different types of losses in a dc generator ?
8. What is the function of MCB ?
9. Draw the output voltage and current waveforms of a half wave rectifier with pure resistive load.
10. Define DC current gain of the common base transistor.

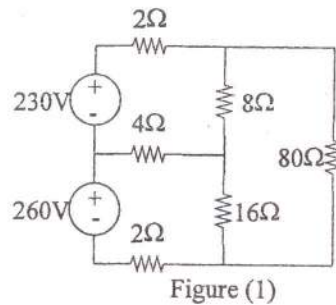


PART – B

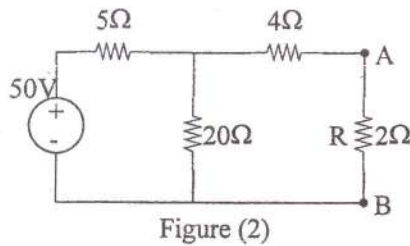
(Answer **any one** full question from **each** Module. **Each** question carries **20** Marks).

Module – I

11. a) Using node analysis, find the power dissipated in 80Ω resistor shown in Figure (1). 10



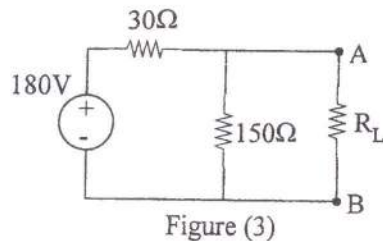
- b) For the network shown in Figure (2), find the current through $R = 2\Omega$ resistor using Norton's theorem. 10



OR

12. a) In a series RLC circuit, $R = 50\Omega$, $L = 0.05\text{ H}$ and $C = 20\ \mu\text{ F}$. Find the resonant frequency bandwidth and quality factor. 10

- b) For the network shown in Figure (3), find the value of load resistance R_L that will result in maximum power delivered to the load. Also determine the maximum power P_{\max} . 10





Module – II

13. a) An iron ring with a mean circumference of 140 cm and cross-section of 12 cm^2 is wound with 500 turns of wire. When the exciting current is 2A, the flux is 1.2 mWb. What is the relative permeability of iron ? 10
- b) A balanced delta connected load has impedance $8 + j6 \Omega$ in each phase. The supply is 3- phase 230 V, 50 Hz. Find
- i) phase current
 - ii) line current
 - iii) power factor
 - iv) active power and
 - v) reactive power. 10

OR

14. a) A circuit has three impedances Z_A , Z_B and Z_C . Z_C is connected in series with parallel combination of Z_A and Z_B . $Z_A = (10 + j8) \Omega$, $Z_B = (9 - j6) \Omega$ and $Z_C = (3 + j2) \Omega$. A single phase 230 V, 50 Hz supply is connected across the circuit.
Find :
- i) the total impedance
 - ii) current drawn from the supply and
 - iii) active power. 10
- b) Explain the working principle of an electro-dynamometer type wattmeter with a neat sketch. 10

Module – III

15. a) Derive the emf equation of a 1-phase transformer. 10
- b) Explain the principle of operation of a capacitor-start capacitor-run 1-phase induction motor. 10

OR



16. a) What is the necessity of earthing ? Explain any one type of earthing. **10**
- b) A 4-pole DC generator running at 1500 rpm has an armature with 90 slots and 6 conductors per slot. The flux per pole is 10 m Wb. Determine the induced emf if the armature winding is
- i) lap connected and
 - ii) wave connected. **10**

Module – IV

17. a) Draw and explain the static characteristics of a diode. **6**
- b) Explain the working of a common emitter transistor amplifier. **8**
- c) Explain the working of a zener voltage regulator. **6**

OR

18. a) Explain the working of a 1-phase diode bridge rectifier connected to a pure resistive load with necessary waveforms.
- Find :
- i) the rms value and average value of the load voltage and
 - ii) ripple factor. **10**
- b) Compare between switched mode power supply and linear power supply. **5**
- c) Compare between BJT and FET. **5**
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