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Reg. No. : .....

Name : .....

Combined First and Second Semester B.Tech. Degree Examination, March 2018
(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 superposition theorem.

2. Explain the concept of time constant in an electrical circuit.

3. Define bandwidth and Q factor for a series resonant circuit.

4. Differentiate between statically induced emf and dynamically induced emf.

5. What is active power in an ac circuit ? How is power factor obtained ?

6. Explain the working principle of a moving coil instrument.

7. Derive the emf equation of a transformer.

8. Why is earthing essential ? How is it done ?

9. Draw and explain the working of a diode rectifier circuit.

10. Explain the construction and working of an SCR.

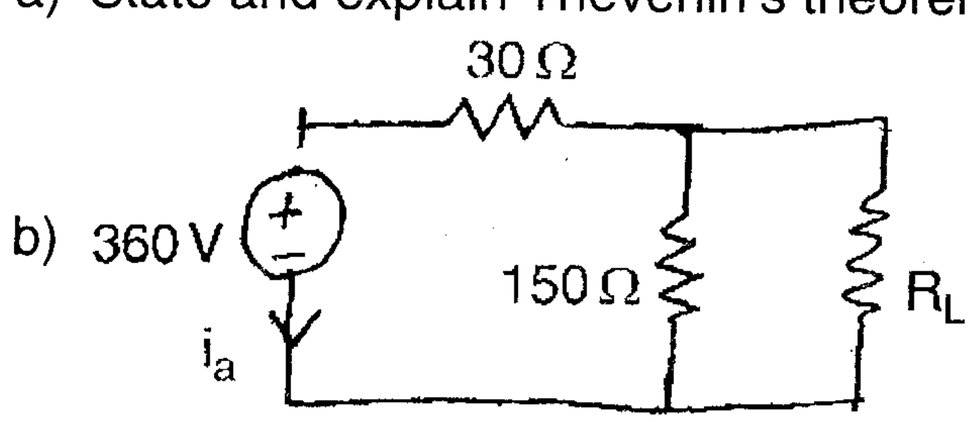
P.T.O.

PART – B

Answer **any one full** question from **each** Module. **Each** question carries **20** marks.

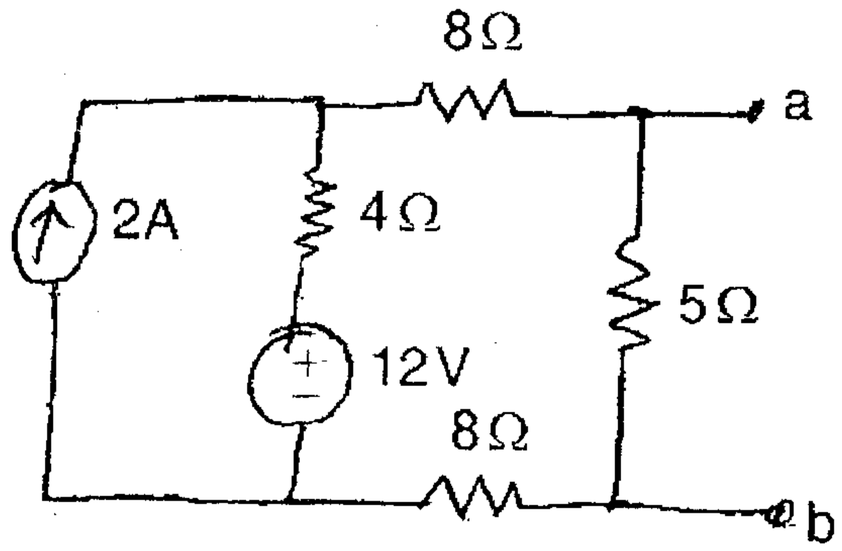
MODULE – I

11. a) State and explain Thevenin's theorem. **5**

b) 

i) Find R_L that results in maximum power transferred to R_L.
ii) Find the corresponding maximum power delivered to R_L. **7**

c) Find the Norton equivalent circuit of the following circuit :



8

OR

12. a) Derive an equation for step response of a series R_L circuit. **7**
b) Derive an expression for resonant frequency of a two-branch parallel circuit consisting of R_L – L and R_C – C branches. **8**
c) Explain the variation of admittance for a parallel resonant circuit. **5**

MODULE – II

13. a) Derive the relation between line and phase voltages of a balanced star connected three phase system. **5**
b) Find the rms value and average value of a half rectified sine wave. **7**
c) A resistor of 10 Ω, an inductance of 0.3 H and a capacitance of 100 μF are connected in series across a 230 V, 50 Hz supply.
Find :
1) Circuit impedance
2) Current
3) Power in watts
4) Power factor **8**

OR

14. a) A mild steel ring of 30 cm mean circumference has a cross sectional area of 6cm^2 and has a winding of 500 turns on it. An air gap of 1 mm is cut in the magnetic circuit. It is found that a current of 4 A in the winding provides a flux density of 1T in the air gap. Find
    i) relative permeability of mild steel.
    ii) inductance of the winding. 7

    b) A 50 Hz sinusoidal voltage (40 + j 30) V is applied to a series R-L circuit resulting in a sinusoidal current of (4 + j1) A. Calculate
    1) impedance of the circuit
    2) power factor of the circuit. 7

    c) Briefly explain the working principle of a digital multimeter. 6

MODULE – III

15. a) Explain the classification of dc generators. 6

    b) What is the role of fuses, MCBs and ELCBs in an electrical system ? 6

    c) Explain the different types of single phase induction motor. 8

OR

16. a) Derive the condition for maximum efficiency of a transformer. 6

    b) Briefly explain how a stepper motor works. 7

    c) Explain the construction of a dc machine. 7

MODULE – IV

17. a) Explain the working of zener voltage regulator. 7

    b) Explain the amplification action of a BJT. 7

    c) Explain the working of a solar cell. 6

OR

18. a) Compare the ripple factor for a half wave rectifier and a full wave rectifier. 7

    b) Explain the significance of pinch off voltage in a JFET. 7

    c) Explain the working principle of UPS. 6