



Reg. No. :

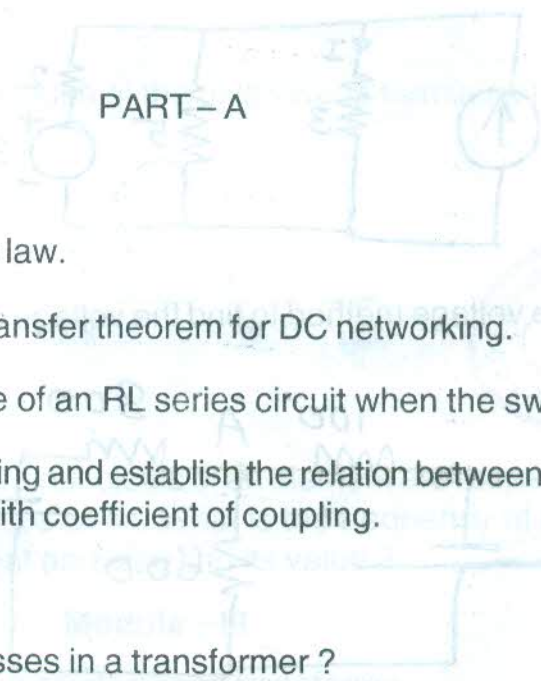
Name :

**Combined First and Second Semester B.Tech. Degree Examination,
May 2015
(2013 Scheme)**

13.108 : BASIC ELECTRICAL AND ELECTRONICS ENGINEERING (FR)

Time : 3 Hours

Max. Marks : 100



PART - A



Answer **all** questions.

1. State and Explain Ohm's law.
2. State maximum power transfer theorem for DC networking.
3. Obtain the step response of an RL series circuit when the switch is closed.
4. Define coefficient of coupling and establish the relation between self inductance and mutual inductance with coefficient of coupling.
5. Define power factor.
6. What are the different losses in a transformer ?
7. Prove that power developed by a DC motor is maximum when its back emf (E_b) is equal to half of its applied voltage.
8. Define ripple factor.
9. What is the most commonly used transistor configuration ? Why ?
10. Define pinchoff voltage of an FET. **(10x2=20 Marks)**



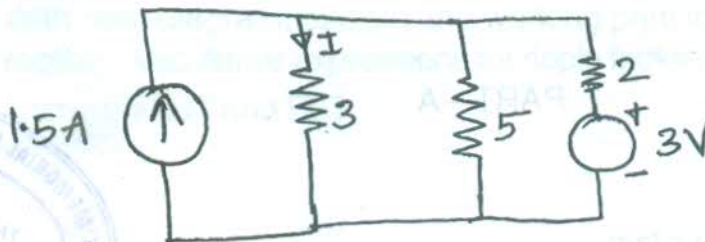
PART - B

Answer **any one full** question from **each** Module. **All** questions carry **20** marks.

Module - I

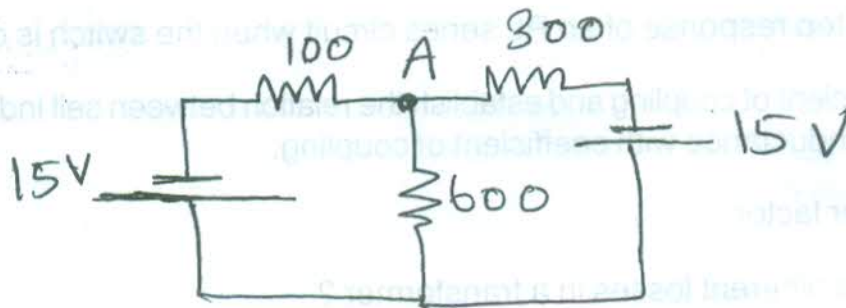
11. a) Find the current I in the circuit shown by i) Super position theorem
ii) Norton's theorem.

12



- b) Use node voltage method to find the voltage of node A

8



OR

12. a) A coil having an inductance of 48 mH and resistance of 9.8Ω is connected in series with a $25 \mu\text{F}$ capacitor across 230 V, 50 Hz supply. Calculate the resonant frequency, current flowing at resonance and θ factor of the circuit.

12

- b) Define resonance. What are the characteristics of a series RLC circuit at resonance ?

8

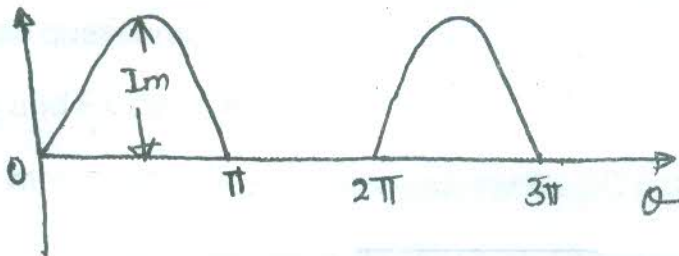


Module – II

13. a) Three coils each of resistance 4Ω and inductive reactance 3Ω are connected in delta across a 400 V, 50 Hz supply. Find the current in each coil line current, active power and reactive power. 15
- b) Explain the meaning and significance of the term 'phase sequence' of a 3ϕ system. 5

OR

14. a) Find rms and average values of the given wave form also find form factor. 12



- b) The voltage and current sinusoids of an element are respectively $i(t) = 10 \sin 314 t$ and $V(t) = 10 \cos 314 t$. What is the frequency of sinusoids and which is the element and also find its value ? 8

Module – III

15. a) Derive emf equation of a single phase transformer. 7
- b) The primary winding of a transformer is connected to a 240 V, 50 Hz supply. The Secondary winding has 1500 turns. The maximum value of core flux is 0.00207 Wb, determine.
- i) secondary induced emf
 - ii) no. of turns in the 1°
 - iii) cross sectional area of the core if maximum flux density of core is 0.465 tesla. 13

OR

16. a) Explain the necessity of earthing. Describe with neat sketch 'pipe earthing'. 10
- b) Describe the working of ELCB. 5
- c) Derive emf equation of a DC generator. 5



Module – IV

17. Write a short notes on the following

- | | |
|---------------|---------------|
| a) LED | b) LCD |
| c) DIAC | d) TRIAC |
| e) Photodiode | f) Solar cell |

20

OR

18. a) With neat diagram, explain the working principle of a full wave bridge rectifier. Also derive expressions for ripple factor and rectification efficiency.
- b) Compare BJT and FET.

13

7

