



Reg. No. :

Name :

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

13.108 : BASIC ELECTRICAL ENGINEERING (ABCHMNPSTU)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **two** marks.

1. Define the term flux, reluctance and m.m.f.
2. Differentiate between constant voltage and current sources.
3. What do you understand by phase and line voltage in a 3 phase system ?
4. Explain the terms balanced and unbalanced loads.
5. What do you mean by an ideal transformer ?
6. Explain the working principle of a DC motor.
7. Why a synchronous motor not self starting ?
8. What do you mean by earthing ?
9. How consumer's are classified according to voltage level ?
10. What do you mean by trickle charging ?



PART – B

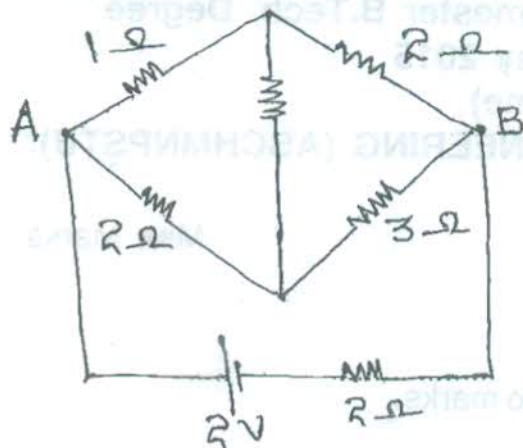
Answer **any one** full question from **each** Module. **Each** question carries **20** marks.

Module – I

11. a) State and explain Kirchhoff's law. 5
- b) Explain Faraday's laws of electromagnetic induction. 5



- c) Determine all the branch current in the bridge circuit shown below. Find also the voltage across AB. 10



OR

12. a) Compare between magnetic and electric circuits. 5
 b) Explain Self and Mutual inductance of coil. 5
 c) A ring of mean diameter 21 cm and cross section 10 cm^2 is made up of semi circular sections of cast steel and cast iron. If each joint has reluctance equal to an airgap of 0.2 mm, find the AT required to produce a flux of 0.5 mWb in the magnetic circuit. Take μ_r for steel and iron as 825 and 165 respectively. Neglect leakage and fringing effect. 10

Module – II

13. a) Obtain the relationship between line and phase voltage in a star connected system. 5
 b) Explain the working of a single phase energy meter with a neat diagram. 5
 c) Three impedances of $20 + j 15 \text{ ohm}$ each are connected in star across a 400 V, 3 phase supply. Calculate : 10
 i) The line current
 ii) Power factor
 iii) Active, reactive and apparent power of the system.

OR



14. a) Derive an expression for the total power in a 3 phase star connected system. 5
b) Explain the principle of operation of a dynamometer type wattmeter. 5
c) Power delivered to a 3 phase induction motor was measured by two wattmeter method. The readings obtained were +12.5 kW and – 4.8 kW on two wattmeters and the line voltage was 440 V. Find :
i) power factor
ii) line current
iii) true power drawn by the motor. 10

Module – III

15. a) Explain the working of a single phase transformer. 5
b) Obtain the expression for e.m.f. equation of a DC generator. 5
c) A 4 pole dc shunt generator with a shunt field resistance of $100\ \Omega$ and an armature resistance of $1\ \Omega$ has 378 wave connected conductors in the armature. The flux per pole is 0.02 Wb. If a load resistance of $10\ \Omega$ is connected across the armature terminals and the generator is driven at 1000 r.p.m. Calculate the power absorbed by the load. 10

OR

16. a) Explain the working principle of a 3 phase induction motor. 5
b) Derive the e.m.f. equation of an Alternator. 5
c) Calculate the e.m.f. of a 4 pole, 3 phase star connected alternator running at 1500 r.p.m. having total 192 conductors with 48 slots and coil span of 150° . The flux per pole is 0.1 Wb. 10

Module – IV

17. a) With neat sketch explain the working of a single phase earth leakage circuit breaker. 10
b) Draw the schematic lay out of a single phase domestic installation and explain the different components. 10

OR

18. a) What is the purpose of earthing and explain different method of earthing. 10
b) With a neat sketch explain pipe earthing indicating the required dimensions. 10
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