Combined First and Second Semester B.Tech. Degree
Examination, April 2014
(2013 Scheme)
13.108 : BASIC ELECTRICAL ENGINEERING (ABCHMNPSTU)

Time: 3 Hours
Max. Marks : 100

PART – A

Answer all questions. Each question carries 2 marks.

1. Explain the term statically induced emf.

2. An alternating voltage $V = (100 + j 80)$ volts is supplied to a circuit and the current flowing $I = (−5 + j 12)$ Ampere. Find the impedance of the circuit.

3. Explain the significance of leading and lagging power factor.

4. What do you mean by phase sequence in three phase system?

5. Name the different sources of Non-conventional energy.

6. What are the advantages of high voltage transmission?

7. What are the losses occurring in a transformer?

8. What do you mean by slip of an induction motor?

9. Give the schematic layout of an LT switch board.

10. Mention the parts of a sodium vapour lamp.

P.T.O.
PART – B

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

Module – I

11. a) Calculate the current through 10 \( \Omega \) resistor.  

\[ \begin{array}{ccc}
5 \Omega & 8 \Omega & 12 \Omega \\
4V & 15.2 & 10.52 \\
\end{array} \]

b) A mild steel ring of 15 cm mean circumference has a cross sectional area of 3 cm\(^2\) and has a winding of 250 turns on it. The ring is cut through at a point so as to provide an air gap of 1 mm in the magnetic circuit. It is found that a current of 4 A in the winding produces a flux density of 1 Tesla in the air gap find:
1) The relative permeability of mild steel
2) Inductance of the winding.  

OR

12. a) Calculate the RMS value of a half rectified sine wave.  

b) A capacitor of 8 \( \mu \text{F} \) takes a current of 1.0 A when ac voltage applied across it is 230 V. Calculate:
1) The frequency of applied voltage
2) The resistance to be connected in series with the capacitor to reduce the current in circuit to 0.5 A at same frequency.  

Module – II

13. a) Derive the expression for voltage, current power and power factor for a 3 phase balanced star connected system.  

b) Show that the power in 3 phase circuits can be measured using 2 Wattmeter. Draw the vector diagram.  

OR

14. a) With a neat block diagram explain the method of power generation in a thermal power plant.  

b) Explain the different equipments in a substation.
Module – III

15. a) Briefly explain the constructional details of a dc generator.  10
    
b) Explain the principle of operation of synchronous motors.  10
      
    OR

16. a) Briefly explain the constructional details of a three phase transformer.  10
    
b) Explain the different methods of starting of single phase induction motor.  10

Module – IV

17. a) With a neat sketch explain plate earthing.  10
    
b) Explain different types of tariffs.  10
      
    OR

18. a) With a neat diagram explain construction and working of Mercury vapour lamp.  10
    
b) What are the charging methods of lead acid battery?  10