



Reg. No. : .....

Name : .....

SECOND SEMESTER B.TECH. DEGREE EXAMINATION, MAY/JUNE 2016  
**EE100 BASICS OF ELECTRICAL ENGINEERING**

Max. Marks : 100

Duration : 3 Hours

## PART – A

Answer **all** questions, **each** question carries **4** marks :

1. State and explain Kirchhoff's laws.
2. What are constant voltage and constant current sources ? Voltage and current sources are mutually transferable. Explain. Derive the relationship between line and phase voltage in a star connected system.
3. Prove that in a purely inductive circuit the current lags behind the applied voltage by 90 degree and the power consumed is zero.
4. In the two wattmeter method of power measurement in a three phase circuit, the readings of the wattmeters are 4800W and – 400W. Find the total power and power factor of the load.
5. Draw and explain the typical electrical power transmission scheme.
6. Derive the e.m.f equation of a single phase transformer.
7. Explain the necessity of starter in a DC motor.
8. Compare the performance of incandescent, fluorescent, mercury vapour and metal halide lamps in terms of efficacy, colour rendering index and life.
9. Compare uniform tariff and differential tariff.
10. What are the different types of lamps available in the market ? Give the specifications of a typical lamp. What are the advantages of LED lamps ?

(10×4=40 Marks)



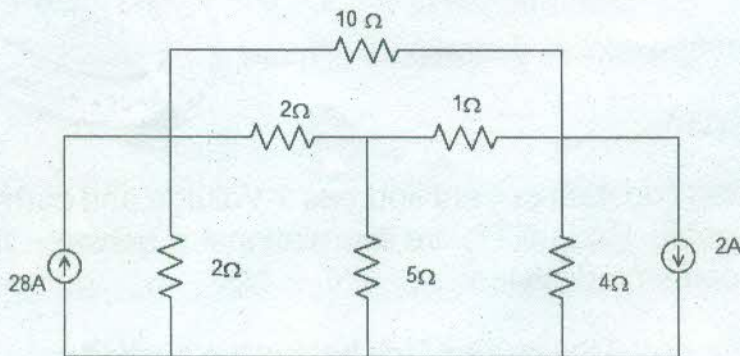
## PART – B

## MODULE (1 – 4)

Answer **any four** questions, **each** question carries **10** marks :

11. Use nodal analysis to form network equations and solve the nodal voltages using matrix method. Also calculate the current in different branches.

(10)



12. A steel ring of circular cross section of 1 cm in radius and having a mean circumference of 94.3 cm has an air gap of 1 mm long. It is uniformly wound with an exciting coil consisting of 600 turns and excited with a current of 2.5 A. Neglecting magnetic leakage

Calculate :

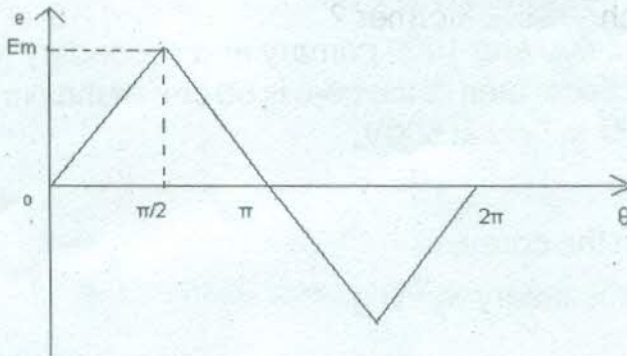
- i) m.m.f
- ii) Magnetic flux
- iii) Reluctance
- iv) Flux density
- v) Relative permeability of steel.

Assume that steel part takes about 40% of total ATs.

(10)



- 13. a) Define the rms value and average value of an alternating quantity. (4)
- b) Find the rms value and average value of the given waveform. (6)



14. A Series R-C circuit takes a power of 7000W when connected to 200V, 50Hz supply. The voltage across the resistor is 130 V.

Calculate :

- i) Resistance
  - ii) Current
  - iii) Power factor
  - iv) Capacitance
  - v) Impedance
  - vi) Equations for instantaneous values of voltage and current. (10)
15. Explain the measurement of power in a three phase system by using two wattmeter with relevant phasor diagrams. (10)
16. With the help of block diagram explain the working of a Thermal power plant. (10)  
(4×10=40 Marks)



## MODULE – 5

Answer **any one** full question :

17. a) What are the losses of single phase transformer ? (4)
- b) A single phase transformer has 400 and 1000 primary and secondary turns respectively. The net cross sectional area of the core is  $60 \text{ cm}^2$ . If the primary winding be connected to a 50Hz supply at 500V,
- Calculate :
- i) Peak value of flux density in the core and
- ii) The voltage induced in the secondary winding. (6)

OR

18. a) Explain the working principle of a three phase Induction motor. (5)
- b) Calculate the generated e.m.f. in the armature winding of a 4 pole lap wound dc machine having 728 conductors running at 1800 rpm. The flux per pole is 30 mWb. (5)

## MODULE – 6

Answer **any one** full question :

19. With a neat sketch explain pipe and plate earthing. (10)
- OR
20. a) With a neat sketch explain the working of a single phase ELCB. (5)
- b) Draw the schematic layout of a typical LT distribution board used in house wiring. (5)
-