1278 **Code : 15EE-21T**

Register Number | | | | | | | |

II Semester Diploma Examination, Nov./Dec. 2016

ELECTRICAL CIRCUITS

Time : 3 Hours] **[Max. Marks : 100**

Note : (i) Answer any **six** questions from Part – **A**. Each question carries **5** marks.

(ii) Answer any **seven** questions from Part – **B**. Each question carries **10** marks.

PART – A

1. Explain : **5**
   (i) Closed Circuit
   (ii) Open Circuit
   With neat circuit diagrams

2. State Kirchoff's voltage law. With a neat circuit diagram, write the equation for Kirchoff's voltage law. **5**

3. Define the followings with SI units : **5**
   (i) Magnetic flux
   (ii) Flux density
   (iii) Absolute permeability
   (iv) Relative permeability
   (v) Reluctance

4. State and explain Fleming's right hand thumb rule. **5**

5. Write a sinusoidal wave form and mark **5**
   (i) Maximum value
   (ii) Time period
   (iii) Cycle
   (iv) Instantaneous value

6. Compute an equation for RMS value of an alternating current. **5**

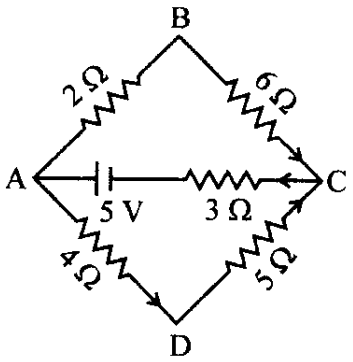
7. Explain with a neat circuit diagram, a pure resistive circuit and write its
   (i) Waveform
   (ii) Vector diagram
   (iii) Power consumption **5**

8. Define resonance and explain condition for series resonance. **5**

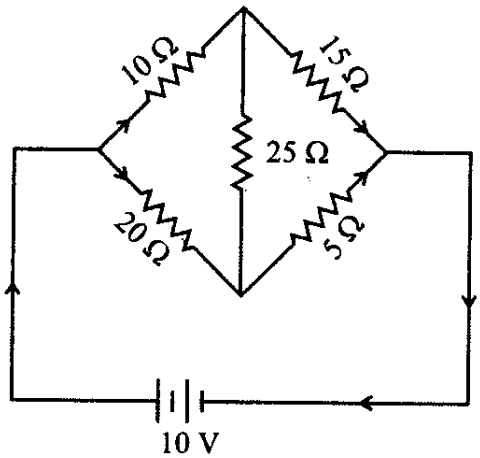
9. Show that line voltage = $\sqrt{3}$ phase voltage in 3-ϕ star connected system. **5**

PART – B

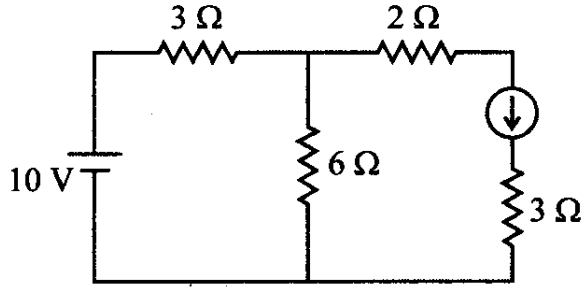
10. (a) Define : **4**
   (i) Active circuit
   (ii) Passive circuit
   (b) Calculate magnitude and show the direction of current through the battery for the given circuit by applying Kirchoff's laws **6**



11. (a) State and explain super position theorem. **4**
   (b) Calculate the total resistance and current for the circuit given below using star-delta transformation **6**



12. (a) Apply reciprocity theorem for the circuit given below : **6**



(b) Define : **4**

(i) Linear circuit

(ii) Unilateral circuit

13. (a) Compare magnetic circuit with electric circuit. **5**

(b) An air-cored coil has 3000 turns and carries a current of 0.12 amps. The cross sectional area of the coil is 5 cm^2 and length of magnetic circuit is 18 cm, find the

(i) Magnetic field strength

(ii) Flux density

(iii) Total flux in the coil **5**

14. (a) Compute an expression for energy stored in a magnetic field. **5**

(b) A coil of 70 cm length and 2.5 sq cm area of cross section has 1000 turns on it. Calculate inductance of the coil when

(i) The core is air core

(ii) The core is iron core of $\mu_r = 1000$ **5**

15. (a) Define : **5**

(i) Self Inductance

(ii) Faraday's laws of electromagnetic induction

(b) Define the followings : **5**

(i) RMS value

(ii) Average value

[Turn over

16. (a) Compute an equation for instantaneous value of an voltage and current. **4**

(b) A sinusoidal alternating current is represented by i = 120 sin 377 t.

Calculate :

(i) Maximum value

(ii) Current when t = 0.002 sec passing through zero in +ve direction.

(iii) RMS value of current **6**

17. (a) Two vectors are given in rectangular form $I_1 = 2 + i3$ and $I_2 = 5 + i6$. Calculate : **5**

(i) $I_1 + I_2$

(ii) $I_1 \times I_2$

(b) Explain with diagram R-L series circuit and compute an equation for power consumption. **5**

18. (a) Define the following : **5**

(i) Impedance (Z)

(ii) Capacitive reactance (X_C)

(iii) Inductive reactance (X_L)

(b) A circuit consists of resistance 20 Ω and an inductance of 0.3 h **5**

Calculate :

(i) Inductive reactance (X_L)

(ii) Impedance of circuit (Z) at 50 Hz frequency

19. (a) A resistance of 10 Ω, an inductive reactance of 30 Ω and capacitive reactance of 60 Ω are connected in series across 200 V, 50 Hz supply. Calculate : **5**

(i) Impedance

(ii) Current taken

(iii) Voltage a/c each element

(iv) P.f. of the circuit

(b) Explain with diagram two watt meter method of measurement of 3-ϕ power. **5**