1756

Code : 15EE21T

Register Number | | | | | | | |

II Semester Diploma Examination, April/May-2018

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 closed circuit, open circuit, short circuit with neat circuit diagram. **5**

2. Define :
   (i) Bilateral circuit
   (ii) Unilateral circuit **5**

3. Define and mention SI units for the followings : **5**
   (i) Absolute permeability
   (ii) Relative permeability

4. List the difference between electric circuit and magnetic circuit. **5**

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

6. Define power and power factor in AC circuit. **5**

7. Define : 5

(a) RMS value of alternating current.

(b) Average – value of an alternating current and write their equations.

8. Derive an equation for power in pure resistive circuit. 5

9. List advantages of 3-phase system over 1 – ϕ system. 5

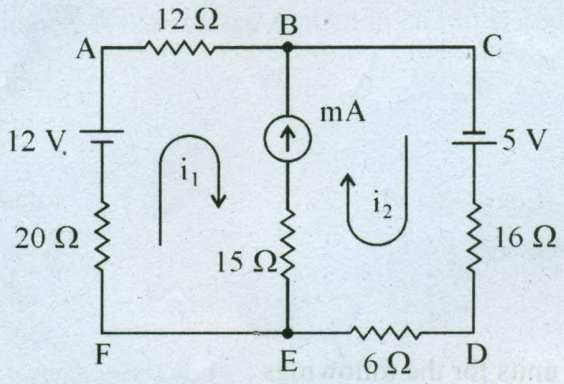
PART – B

10. (a) Define the followings : 4

(i) Linear circuit

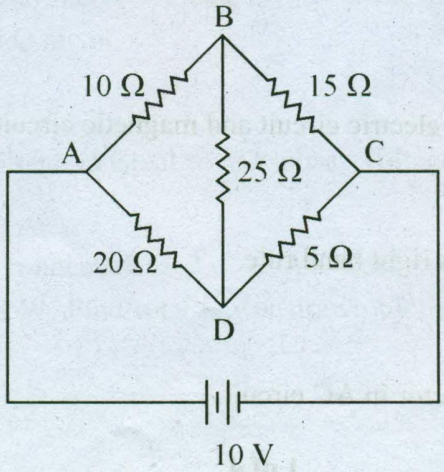
(ii) Non-linear circuit

(b) By applying Kirchhoff's law find the current through the milliammeter connected to the circuit below. 6



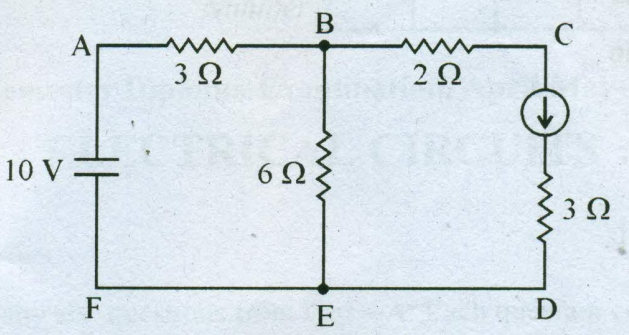
11. (a) Derive an expression for star – delta transformation. 5

(b) Using star-delta transformation find the total current for the circuit given below : 5



12. (a) State and explain maximum power transfer theorem. 5

(b) Prove Reciprocity theorem for the circuit given below : 5



13. (a) Define the following : 4

(i) Magnetic flux (ϕ)

(ii) Flux density (B)

(b) An air cored toroidal coil has 3000 turns and carries a current of 0.1 A. The cross sectional area of the coil is 4 cm^2 and length of magnetic circuit is 15 cm. Determine the magnetic field strength, flux density and total flux in the coil. 6

14. (a) State and explain : 6

(i) Fleming's right hand rule

(ii) Cork's screw rule

(b) Define self inductance and co-efficient of self inductance of a coil with units. 4

15. (a) Draw sinusoidal waveform and mark the following : 5

(i) Instantaneous value

(ii) Amplitude

(iii) Cycle

(iv) Frequency

(v) Time period

(b) A sinusoidal alternating current is represented by i = 30 sin 30 t. 5

Find :

(i) maximum value

(ii) current when t = 0.002 sec passing through zero in the direction

(iii) RMS value of current

16. (a) Derive an expression for instantaneous value of alternating voltage and current. **5**

(b) If $I_1 = 2 + i3$ **5**

$I_2 = 5 + i6$

Perform

(i) $I_1 + I_2$

(ii) $I_1 - I_2$

(iii) $I_1 \times I_2$

(iv) $\frac{I_1}{I_2}$

17. (a) With diagram explain pure resistive circuit. **5**

(b) An AC series circuit consisting of 10 Ω resistance, 0.05 h inductance and 100 μF capacitance. If the voltage applied to circuit is 200 V 60 Hz, find : **5**

(i) Impedance

(ii) Current

(iii) Power factor

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

(i) Inductive reactance (X_L)

(ii) Capacitive reactance (X_C)

(b) A series RLC circuit has R = 50 Ω, L = 50 μh and c = 1000 pf, find resonant frequency (fr) and Q factor. **5**

19. (a) Prove that line voltage is equal to $\sqrt{3}$ phase voltage in a 3 – ϕ star connected system. **5**

(b) Two wattmeters connected to 3 – ϕ AC line to measure power and reads 6717 W and 2538 W. Find total power drawn by the balanced load and power factor. **5**
