

1167**Code : 15EE21T**Register
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II Semester Diploma Examination, April/May-2017**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 questions carries **10** marks.

PART – A**6 × 5 = 30**(Answer any **six** questions from this section.)

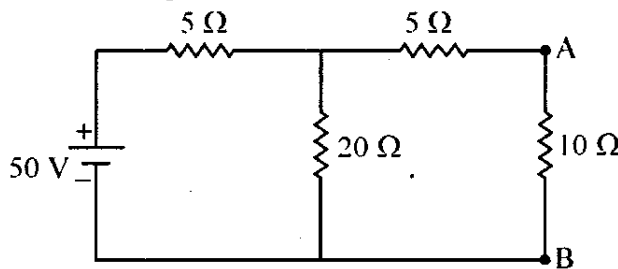
1. What do you mean by an (i) active circuit and (ii) passive circuit ? **5**
2. Define (i) linear circuit & (ii) non-linear circuit. **5**
3. Define (i) Magnetic circuit & (ii) Magneto-motive-force. Mention their units. **5**
4. Compare magnetic circuit with an electric circuit. **5**
5. State and explain Maxwell's Cork Screw rule. **5**
6. Define : (i) cycle and (ii) frequency of an alternating quantity. Mention their units. **5**
7. Draw a sinusoidal waveform & mark the following :
(i) Maximum value
(ii) Instantaneous value
(iii) Time period &
(iv) Frequency. **5**
8. Define (i) Inductive reactance and (ii) Capacitive reactance. Mention their units. **5**
9. Write the advantages of 3-phase system over single phase system. **5**

PART – B

 $7 \times 10 = 70$

(Answer any seven questions from this section.)

10. Explain the star-delta-transformation with diagram. 10
11. State and explain Reciprocity theorem. 10
12. Find the current through $10\ \Omega$ Resistor, by applying Thevenin's theorem to the circuit given in the following circuit. 10



13. (a) State the law of reluctance. 3
- (b) A coil of 2000 turns placed on an iron ring of mean circumference 0.3 m, takes a current of 0.5 A. If the area of cross section of the iron ring is 5 cm^2 , find (i) field intensity (ii) flux density and (iii) total flux in the iron ring. Take μ_r for iron = 3000. 7
14. (a) State and explain self induced e.m.f. 5
- (b) State and explain mutually induced e.m.f. 5
15. (a) Define average value of an alternating current. 5
- (b) Explain mid-ordinate method or graphical method of calculating the average value. 5
16. (a) A sinusoidal alternating current is represented by $i = 30 \sin 30 t$. Find
- (i) Maximum value
- (ii) current when $t = 0.002$ seconds passing through zero in the positive direction.
- (iii) R.M.S. value of current. 5
- (b) Two impedances $z_1 = (4 + j6)$ and $z_2 = (6 + j4)$ are connected in series. Find the effective impedance and p.f. of the circuit. 5

17. (a) Define (i) True power & (ii) Reactive power. Mention their units. 5
(b) Define (i) Series resonance & (ii) Q-factor. Write their equations. 5
18. (a) Derive the equation for power in a pure resistive circuit. 5
(b) A series circuit consists of a resistance of $20\ \Omega$ an inductance of $0.5\ \text{H}$ and a capacitance of $50\ \mu\text{F}$. If this is connected to a $250\ \text{V}$, $50\ \text{Hz}$ supply. Find
(i) Inductive reactance
(ii) Capacitive reactance 5
19. (a) Prove that the line current is equal to the phase current in a 3-phase star connected system. 5
(b) Three similar coils of $20\ \Omega$ resistance and $10\ \Omega$ inductive reactance are connected in delta. If a $400\ \text{V}$, $50\ \text{Hz}$ supply is given to it, find
(i) Phase current
(ii) Line current
(iii) Power taken and
(iv) P.F. of the circuit. 5
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