1227

Code : 15EE21T

Register Number

II Semester Diploma Examination, Nov./Dec. 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** full questions from Part – B. Each question carries **10** marks.

PART – A

1. Define the following :

   (i)   Bilateral circuit

   (ii)   Unilateral circuit

2. Compare magnetic circuit and electric circuit (write any 5 comparisons).

3. Define flux density, write SI unit and the equation for flux density.

4. Define Leakage co-efficient and permeance.

5. State Faraday's laws of Electromagnetic Induction.

6. Define the following :

   (i)   RMS value

   (ii)   Average value

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7. Write a sinusoidal waveform and mark the following :

   (i)   Instantaneous value

   (ii) Maximum value

   (iii) Cycle

   (iv) Time period

8. Explain the following :

   (i)   Power factor

   (ii) Leading power factor

   (iii) Lagging power factor

   (iv) Unity power factor

   (v)   Zero power factor

9. Define the following in 3 phase system :

   (i)   Phase voltage and phase current

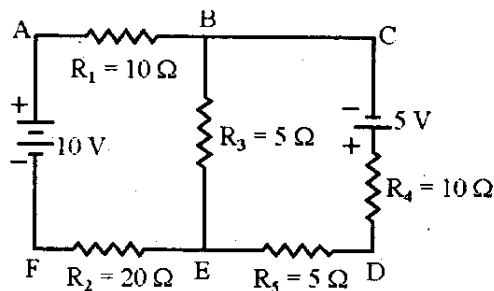   (ii) Line voltage and line current

PART – B

10. (a) Explain with diagram passive network and active network.

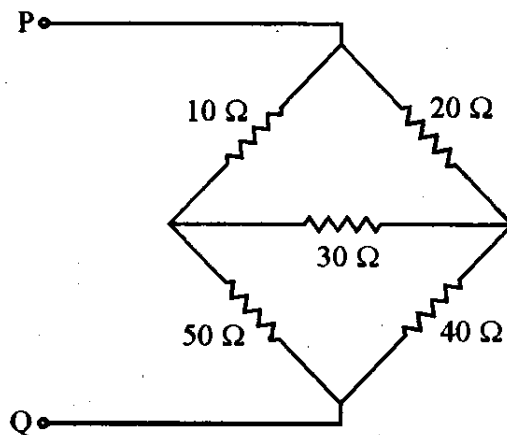   (b) With a neat circuit diagram, explain :

       (i)   Open circuit

       (ii) Short circuit

       (iii) Closed circuit, conditions

11. (a) In the given circuit, calculate the current through resistor R_3 using Kirchoff's laws :

    (b) State and explain reciprocity theorem.

12. (a) Using Delta-Star transformation, calculate the value of the equivalent resistance between P and Q of the circuit shown below :

(b) State Superposition theorem.

13. (a) Define the following and write their units :

(i) Flux

(ii) mmf

(iii) Magnetising force

(iv) Reluctance

(v) Absolute permeability

(b) State the law of reluctance and show the relation between mmf reluctance and flux.

14. (a) Define the following and give one example for each :

(i) Dynamically induced emf.

(ii) Statically induced emf.

(b) State and explain Fleming's right hand rule.

15. (a) Explain Analytical method of calculating the average value of alternating current.

(b) Explain the generation of single phase alternating voltage.

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16. (a) An AC voltage is represented by e = 100 sin 314t. Calculate the
    (i) maximum value
    (ii) frequency
    (iii) RMS value
    (iv) Instantaneous voltage at t = 0.001 seconds

    (b) Convert the following into polar forms if A = (10 + j 6), B = (30 + j 52).
    Perform the following :
    (i) A × B
    (ii) A/B

17. (a) Define the following and write their units :
    (i) Inductive reactance
    (ii) Capacitive reactance
    (iii) Impedance

    (b) Define and write the equations for the following :
    (i) Resonant frequency of an RLC series circuit
    (ii) Q factor of RLC series circuit

18. (a) Derive the equation for power in a pure resistive circuit.

    (b) A circuit has a resistance of 5 Ω, inductance of 0.1 henry and capacitance of 0.5 μF. Calculate the power factor.

19. (a) Show that line voltage = $\sqrt{3}$ phase voltage in 3 phase star connected system.

    (b) Explain Delta connected 3 phase system.

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