

B.Tech. DEGREE EXAMINATION, MAY 2016
Second Semester

15EE101 – BASIC ELECTRICAL ENGINEERING
(For the candidates admitted during the academic year 2015 – 2016)

- Note:**
- (i) **Part - A** should be answered in OMR sheet within first 45 minutes and OMR sheet should be handed over to hall invigilator at the end of 45th minute.
 - (ii) **Part - B** and **Part - C** should be answered in answer booklet.

Time: Three Hours

Max. Marks: 100

PART – A (20 × 1 = 20 Marks)
Answer **ALL** Questions

1. When a fourth resistor is connected in series with three resistor, the total resistance
(A) Increase by one-fourth (B) Increases
(C) Decreases (D) Remains the same

2. A circuit consists of three resistors in parallel, when one resistor is removed the circuit current,
(A) Decreases (B) Increases by one third
(C) Decreases by one-third (D) Decrease by the amount of current through the removed resistor.

3. An algebraic sum of all the element voltages in a mesh is equal to
(A) The total of the voltage drops (B) The source voltage
(C) Zero (D) The total of the source voltage and the voltage drops.

4. A 24V DC supply is applied across a voltage divider consisting of two 68kΩ resistors. The unknown output voltage is
(A) 12V (B) 24V
(C) 0V (D) 6V

5. The voltage across a coil when $\frac{di}{dt} = 20mA / s$ and $L=8H$ is
(A) 16mV (B) 160mV
(C) 1.6mV (D) 2.5mV

6. If the cross-sectional area of a magnetic field increases, but the flux remains the same, the flux density
(A) Increases (B) Decreases
(C) Remains the same (D) Doubles

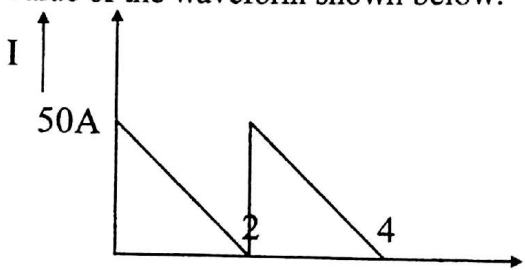
7. When the speed at which a conductor is moved through a magnetic field is increased, the induced voltage
(A) increases (B) decreases
(C) Remains constant (D) Reaches zero

8. There is 900 mA of current through a coil with 40 turns. What is the reluctance of the coil if the flux is 400 Wb?
 (A) 1100m AT/Wb (B) 1100 AT/Wb
 (C) 9000 AT/Wb (D) 90 m AT/Wb
9. In a series RC circuit, 12V (rms) is measured across the resistor and 15V(rms) is measured across the capacitor. The rms source voltage is
 (A) 3V (B) 27V
 (C) 19.2V (D) 1.9V
10. In the complex plane, the number $14-j5$ is located in the
 (A) 1st quadrant (B) 2nd quadrant
 (C) 3rd quadrant (D) 4th quadrant
11. A 47Ω resistor and a capacitor with a capacitive reactance of 120.135Ω are in series across an AC source. What is the circuit impedance, Z ?
 (A) 1.29Ω (B) 129Ω
 (C) 167Ω (D) 73Ω
12. In RLC series A.C circuits, the inductive reactance is equal to capacitive reactance. The phase angle between applied voltage and circuit current is
 (A) 90° (B) -90°
 (C) 0° (D) 45°
13. In a certain three wire Y-connected generator, the phase voltages are 2kV. The magnitude of line voltage is
 (A) 1732.05V (B) 1154.70 V
 (C) 2309.4 V (D) 3464.10 V
14. Fleming's right hand rule regarding direction of induced emf, correlates
 (A) Magnetic flux, direction of current flow and resultant force (B) Magnetic flux, direction of motion and the direction of emf induced.
 (C) Magnetic field strength, induced voltage and current (D) Magnetic flux, direction of force and direction of motion of conductor
15. A D.C generator works on the principle of
 (A) Lenz's law (B) Ohm's law
 (C) Faraday's law of electromagnetic induction (D) Fleming left hand rule
16. Torque developed by a single phase induction motor at starting is
 (A) Pulsating (B) Uniform
 (C) Half of full load torque (D) zero
17. In India, the transmission of power is done by
 (A) 3-phase 3-wire system (B) 3-phase 4 -wire system
 (C) Single phase system (D) 2-phase 2-wire system
18. Galvanized steel or iron metal is not used in one of the following earthing system
 (A) Pipe earthing (B) Plate earthing
 (C) strip earthing (D) Rod earthing

19. The instrument used to measure the earth resistance and cable resistance is
 (A) Analog multimeter (B) Energy meter
 (C) Megger (D) Ohm meter
20. When alternating current passes through a conductor
 (A) Remains uniformly distributed throughout the section of conductor
 (B) Portion of conductor near the surface carries more current as compared to the core
 (C) Portion of conductor near the surface carries less current
 (D) Entire current passes through the core of the conductor

PART – B (5 × 4 = 20 Marks)
 Answer ANY FIVE Questions

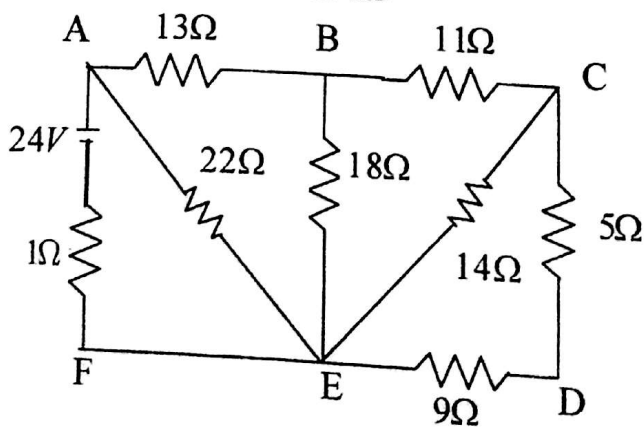
21. A 50Ω resistance is in parallel with 100Ω resistor. The current in 50Ω resistor is $7.2A$. what is the value of third resistor to be added in parallel to make the line current as $12.1A$?
22. Compare magnetic circuit and electric circuits.
23. Write short notes on fringing effect and leakage flux.
24. Find the average and RMS value of the waveform shown below.



25. Write short notes on the classification of measuring instruments.
26. Explain the relationship between the line and phase voltages and currents in 3 phase supply system.
27. Draw and explain the staircase wiring.

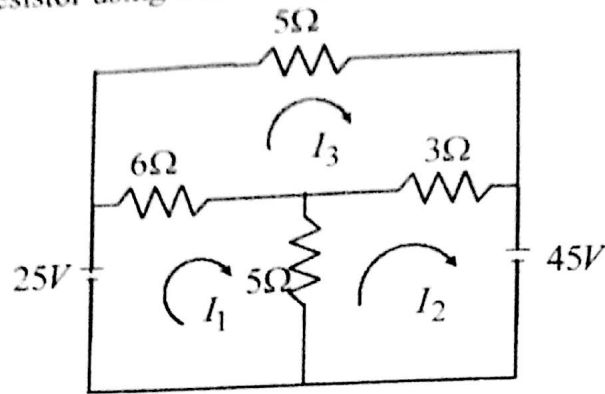
PART – C (5 × 12 = 60 Marks)
 Answer ALL Questions

28. a. An electrical network is arranged as shown below. Find
 (i) Current in branch AF
 (ii) Power absorbed in branch BE
 (iii) Potential difference across the branch CD



(OR)

- b. Find the current in 5Ω resistor using Mesh analysis in the circuit shown below.



29. a. A iron ring has mean diameter of 15cm, a cross section of 1.7cm^2 and has a radial gap of 0.5mm cut in it. It is uniformly wound with 1500 turns of insulated wire and a current of 1 A produces a flux of 0.1mWb across the gap. Calculate the relative permeability of iron on the assumption that there is no magnetic leakage.
- (OR)**
- b. The number of turns in a coil is 250. When a current of 2A flows in this coil, the flux in this coil is 0.3mWb. When the current is reduced to zero in 2m sec, the voltage induced in another coil is 63.75V. If the coefficient of coupling between two coils is 0.75. Find the self inductances of two coils, mutual inductances and the number of turns in the secondary coil.
30. a. A coil of resistance 10Ω and inductance 0.1H is connected in series with a $150\mu\text{F}$ capacitor across 200V, 50Hz supply. Calculate
- (i) Inductive reactance, capacitive reactance, impedance, current and power factor
 - (ii) Voltage across the coil and capacitor
- (OR)**
- b. Derive the average and RMS value of the full wave rectified sine wave voltage.
31. a. Explain the working principle and construction of DC machine with neat diagrams.
- (OR)**
- b. With neat sketches, explain the working principle of single phase capacitor start and run induction motor.
32. a. Describe briefly the layout of generation transmission and distribution system.
- (OR)**
- b. Explain the different types of earthing with suitable diagrams.

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