



## AUTUMN END SEMESTER EXAMINATION-2016

1<sup>st</sup> Semester B.Tech & B.Tech Dual Degree

### BASIC ELECTRICAL ENGINEERING

EE-1003

(Regular-2016 & Back-2015 Admitted Batch)

**Time: 3 Hours**

**Full Marks: 60**

*Answer any Six questions including question No.1 which is compulsory.*

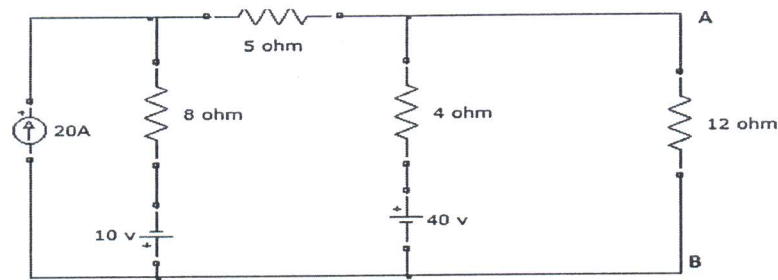
*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words as far as practicable and all parts of a question should be answered at one place only.*

1. a) Define active and passive networks with examples.. [2 × 10
- b) Name four different measuring instruments used in laboratory and write their functions.
- c) Find the average value, and RMS value of sinusoidal current.
- d) Write two advantages of star & delta connections in 3-phase circuit.
- e) What is eddy current loss and how is it being minimized?
- f) List some uses of D.C. series and shunt motors.
- g) Draw the single line diagram of typical A.C. supply scheme.
- h) State and explain Norton's theorem.
- i) Define the time constant for a series RL circuit and explain its significance.
- j) Distinguish between renewable & non-renewable sources of energy.

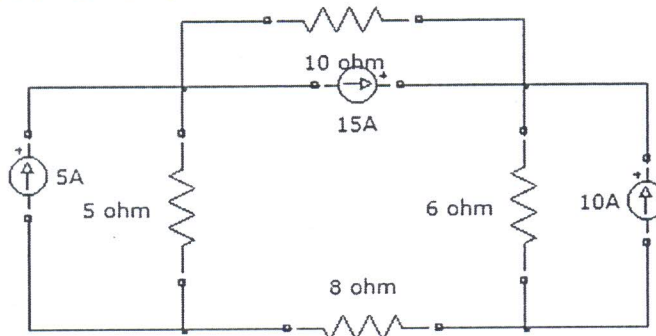
(1)

2. a) Find the current through the  $12\Omega$  resistor using Nodal analysis method. [4]

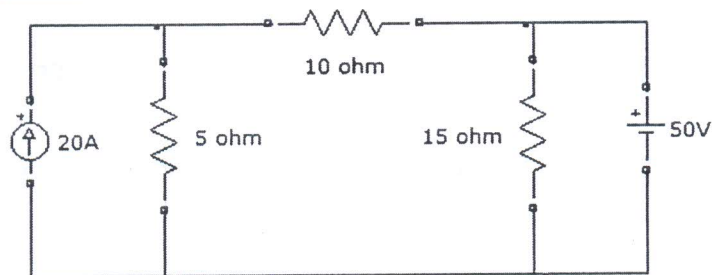


- b) What are the different types of energy sources available? Compare conventional and non-conventional energy sources. [4]

3. a) Find the current in  $8\Omega$  resistor for the circuit shown by applying superposition theorem. [4]



- b) Find the current in the  $10\Omega$  resistor by using Thevenin's theorem. [4]



(2)

4. a) An alternating current of frequency 50 Hz has a maximum value of 100 A. Calculate (a) its value (1/600) second after the instant the current is zero and its value decreasing there afterwards, (b) how many second after the current is zero (increasing there after wards) will the current attain the value of 86.6 A. [4]
- b) Explain with the help of a diagram how alternating current is generated. Show that the active power consumed in a purely inductive circuit and purely capacitive circuit is zero when sinusoidal voltage is applied across it. [4]
5. a) Explain with neat diagram the construction, working, advantages & disadvantages of dynamometer type instrument. [4]
- b) Describe the different methods of house wiring and also explain the need of earthing in an electrical installation system. [4]
6. a) An iron ring of cross-sectional area  $4 \text{ cm}^2$  is wound with a wire of 80 turns & has a airgap of 2 mm. Calculate the magnetizing current required to produce a magnetic flux of 0.01 mWb if mean length of the magnetic path is 30 cm and relative permeability of iron is 420. [4]
- b) Explain the principle of operation of induction motor. Write the different parts of induction motor. [4]
7. a) A 400 V, 3- $\Phi$  supply is connected to a balanced network of three impedances each consisting of a  $20 \Omega$  resistance and a  $15 \Omega$  inductive reactance. Determine, (i) the line current (ii) power factor (iii) total power in kW, when the three impedances are [4]
- (a) star-connected, (b) delta-connected.

(3)

- b) Derive the relationship between phase voltage and line voltage in a balanced star connection. [4]

8. Write short notes on any two. [4 × 2]

- a) Working of moving coil instrument
- b) Magnetic hysteresis loop.
- c) Comparison of hydro, steam & nuclear power plant
- d) Draw a typical torque-slip characteristic curve of a 3-phase induction motor.

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