

**DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY**

**LONERE – RAIGAD – 402103**

**Summer Semester Examination, May – 2018**

**Branch: B. Tech**

**Semester: I**

**Subject: Basic Electrical Engineering [EE104]**

**Marks: 60**

**Date: 11 / 05 / 2018**

**Time: 3 Hrs**

**Instructions to the students:**

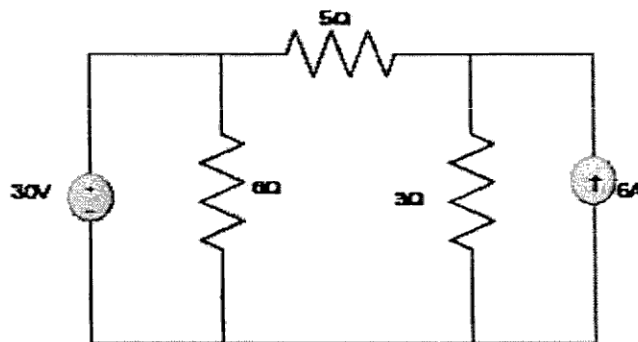
1. Each question carries 12 marks.
2. Attempt any 5 question of the following.
3. Illustrate your answers with neat sketches, diagrams etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

**Q.1.**

- a) A conductor has cross sectional areas of  $10\text{cm}^2$  & specific resistance of  $7.5\mu\Omega\text{ cm}$  at  $0^\circ\text{C}$ . **6M**  
What will be its resistance in  $\Omega/\text{km}$  when the temperature is  $40^\circ\text{C}$ . Take the temperature coefficient of the material =  $0.005 / ^\circ\text{C}$ .
- b) Explain the terms i) Electrical Work ii) Concept of Power. And write the necessary **6M**  
equations for the same.

**Q.2.**

- a) With the help of Thevenins theorem, find the magnitude and direction of the current **6M**  
flowing through  $5\Omega$  resistor shown in figure below.



- b) Prove that, “The Star resistance to be connected to a given terminals is equal to the product of the two delta resistances connected to the same terminal divided by the sum of the delta resistances” **6M**

**OR**

- b) State and Prove Maximum power transfer theorem. **6M**

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Q.3.

- a) Define 6M  
i) Active Power                      ii) Reactive Power                      iii) Apparent Power
- b) A sinusoidal alternating current of frequency 25Hz has a maximum value of 100A. How long it will take for the current to attain value 20A & 50A. 6M
- OR**
- b) Find the resultant of the following signals given 6M  
E1 = 25 sin  $\omega t$   
E2 = 10 sin ( $\omega t + \pi/6$ )  
E3 = 30 cos  $\omega t$   
E4 = 20 sin ( $\omega t - \pi/4$ ). Draw all phasors.

Q.4.

- a) Explain Resonance in series RLC circuit. 6M
- b) Three identical resistances are connected in delta to a 3-Phase supply of 400V. The line current is 34.65A and the total power taken from the supply is 14.4kW. Calculate the resistance and reactance values of each impedance. 6M

Q.5.

- a) Discuss similarities & dissimilarities in Electrical & Magnetic circuits. 6M
- b) A coil of 450 turns is uniformly wound around a ring of an iron alloy of mean circumference of 100cm & cross-sectional area 1.025cm<sup>2</sup>. When a current of 0.5A is linearly reduced to zero in 0.01sec, the emf induced in coil is 2V. Find Relative permeability of the iron alloy & the inductance of coil. 6M

Q.6.

- a) Derive the EMF equation of Transformer. 6M
- b) Calculate the capacitance and energy stored in a parallel plate capacitor which consists of two metal plates, each 60cm<sup>2</sup> separated by a dielectric of 1.5mm thickness and of  $\epsilon_r = 3.5$  if a potential difference of 1000V is applied across it. 6M

Given:  $\epsilon_0 = 8.854 \times 10^{-12}$  F/m.

—————**END OF PAPER**—————

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