

# END TERM EXAMINATION

SECOND SEMESTER [B.TECH.] MAY-JUNE 2016

Paper Code: ETEE-106

Subject: Electrical Technology (Batch 2013)

Time: 3 Hours

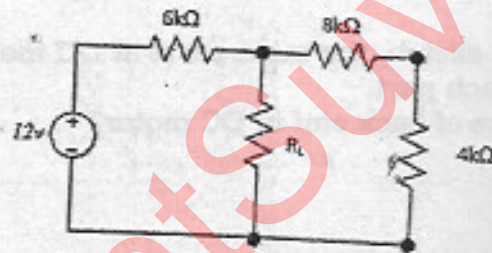
Maximum Marks: 75

Note: Attempt any five questions including Q no.1 which is compulsory. Select one question from each unit.

- Q1 (a) Define (i) active and passive elements (ii) unilateral and bilateral elements (iii) linear and non linear elements. (5)
- (b) An alternating voltage is represented by  $e = 150 \sin 100\pi t$ . Determine amplitude, time period and frequency, angular velocity, form factor and peak factor of voltage. (5)
- (c) (i) Why a series RLC circuit is also called accepter circuit?  
(ii) Give the relationship between phase and line voltages and currents in three phase star connected circuit. (5)
- (d) What are the essential torques of indicating instruments? Explain their necessity. (5)
- (e) Explain the basic principle of operation of single phase transformer and draw the phasor diagram of ideal transformer on no load? (5)

## UNIT-I

- Q2 (a) State and Explain Maximum Power Transfer Theorem. (6.5)
- (b) For the circuit shown below, what will be the value of  $R_L$  to get the maximum power? What is the maximum power delivered to load? (6)



- Q3 (a) Derive the relationship between resistances connected in star and equivalent delta system. (5)
- (b) Three resistances of  $20\Omega$ ,  $25\Omega$  and  $30\Omega$  are connected in delta. Calculate the corresponding resistances in an equivalent star connection. (2.5)
- (c) State and explain superposition theorem. (5)

## UNIT-II

- Q4 (a) Resistance of  $20\Omega$  and inductance of  $0.2H$  and a capacitance of  $150\mu F$  are connected in series across  $230V$ ,  $50\text{ Hz}$  mains. Determine  $X_L$ ,  $X_C$ ,  $Z$ , and  $Y$ , p.f., active power and reactive power. (6.5)
- (b) Three similar resistors are connected in star across  $400V$ , 3-phase line. The line current is  $10A$ . Calculate the value of each resistor. To what value should the line voltage be changed to obtain the same line current with the resistors delta connected? (6)

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- Q5 (a) Explain Series Resonance. Derive the condition of resonance in series RLC circuit. (6)  
(b) Determine the RMS value, average value and form factor of half wave rectified alternating current. (6.5)

UNIT-III

- Q6 (a) Discuss in detail principle, construction and working of PMMC instruments. (8.5)  
(b) A moving coil instrument has a resistance of  $10 \Omega$  and gives full scale deflection when carrying a current of  $50\text{mA}$ . Show how it can be adopted to measure voltage up to  $750\text{V}$  and current upto  $1000\text{A}$ . (4)
- Q7 (a) Explain the terms: Apparent power, Active power and Reactive power of an ac circuit. (3)  
(b) Explain the two wattmeter method used for measurement of power in three phase circuit. (6.5)  
(c) Why is eddy current damping not possible in moving iron instruments? (3)

UNIT-IV

- Q8 (a) Explain electric and magnetic circuits. Give analogy between them. (4)  
(b) A  $600\text{KVA}$ , 1-phase transformer has an efficiency of  $92\%$  both at full load and half load at unity power factor. Determine its efficiency at  $60\%$  of full load at  $0.8$  power factor lag. (8.5)
- Q9 (a) Describe with suitable sketch, the main parts of DC machine. Explain the main function of each part. (10)  
(b) What is the significance of back emf in DC motor? (2.5)

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