

24007

B. Tech. 2nd Semester Examination,

May-2013

ELECTRICAL TECHNOLOGY

Paper-EE-101-F

*Time allowed : 3 hours]*

*[Maximum marks : 100*

*Note : (i) Question No. 1 is compulsory from Section-A.*

*(ii) Attempt four questions from remaining four sections selecting one question from each section.*

*(iii) Use of non programmable calculator is allowed.*

**Section-A**

1. (i) Distinguish between Linear and Non linear Network. 4
- (ii) Explain the effect of variation in load on the magnitude of flux in the core of single phase transformer. 4
- (iii) Derive the e.m.f. equation for DC Generator. 4
- (iv) Write short note on controlling torque in measuring instruments. 4

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[P.T.O.]

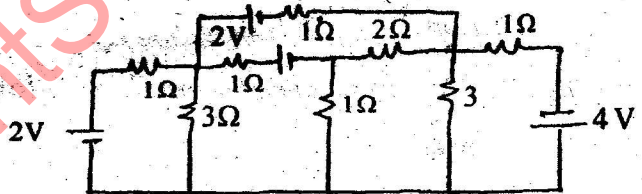
(2)

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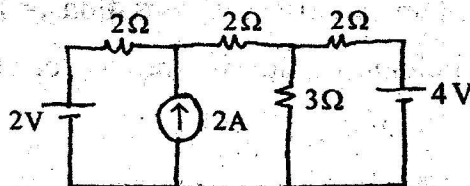
- (v) Explain the physical significance of power factor in AC system. 4

**Section-B**

2. (a) Explain the Kirchhoff's voltage law and Kirchhoff's current law with some suitable example. 10
- (b) Find the value of current flowing through 2 ohm resistance in the given circuit by using Nodal Analysis. 10



3. (a) Find the value of current flowing through 3 ohm resistance in the given circuit by using Norton's theorem. 10



- (b) State and explain Millman's Theorem with some suitable example. 10

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**Section-C**

4. (a) Define and explain the terms given below with the help of derivation :
- (i) RMS values and
  - (ii) Average values of an AC sinusoidal signal. 10
- (b) An inductive ckt of resistance  $3\ \Omega$ , and inductance  $0.02\text{ H}$  is connected to a  $230\text{ V}$ ,  $50\text{ Hz}$  supply. What value of capacitance be placed in parallel with the inductive ckt will produce resonance ? Also find current taken from supply at resonance. 10
5. A coil which has  $6\text{ ohm}$  and  $25.5\text{ mH}$  inductance is energized from a  $220\text{ V}$ ,  $50\text{ Hz}$  supply :
- (i) Calculate the current
  - (ii) A capacitor is then connected in parallel with the coil so that the overall power factor is raised to unity. Calculate the capacitance of the capacitor. 20

**Section-D**

6. (a) Explain two wattmeter method of power measurement in 3-phase AC system at balanced load. 10

- (b) Derive the relation between Line voltage and Phase voltage, Line current and Phase current for delta connection in 3-phase system. 10
7. Draw and explain the circuit diagram and Phasor diagram of single phase Practical transformer diagram at resistive load. 20

#### Section-E

8. (a) Explain how the 3-phase supply is generated in 3-phase Synchronous Generator.
- (b) Prove that 1-phase induction motor is not self starting. Explain the starting methods. 10
9. (a) Explain the construction and working of
- (i) Electrodynamicometer wattmeter.
  - (ii) A 220 V single phase energy meter has a constant load current of 8 A at unity power factor. If the meter disc makes 1145 revolution during 1.5 hours, calculate the meter constant. If the power factor were 0.9, what would be the number of revolutions made by the disc in that time ? 10