24007

B. Tech. 1st Semester F-Scheme Examination,

December–2014

ELECTRICAL TECHNOLOGY

Paper–EE–101 F

Time allowed : 3 hours] *[Maximum marks : 100*

Note : *(1) Attempt a total of **five** questions.*

*(2) **Question No. 1 is compulsory. One** question to be attempted from each unit.*

(3) The sub parts of questions should be attempted together only.

1. (a) Importance of power factor and how it is calculated. 4×5

(b) Explain KCL with diagram.

(c) How OC test of transformer is conducted ?

(d) Difference between Star and Delta 3 phase configuration.

(e) Difference between DC motor and Generator.

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Unit–I

2. (a) Using mesh current method, determine current I_1, I_2, I_3 in the given circuit shown in diagram 2.1. 10

(b) Using star/delta transformation find out current supplied by the battery in the circuit as shown in diagram 2.2 $(R = 1\,\Omega)$ 10

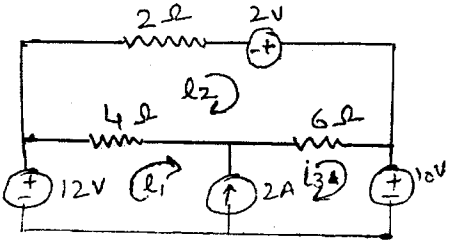

Fig. 2.1

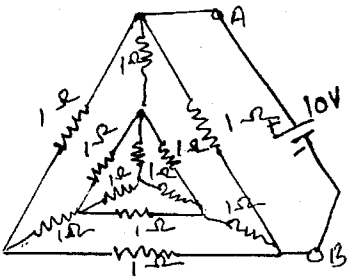

Fig. 2.2

3. (a) State and prove the maximum power transform theorem 10

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(b) For the NW shown in the figure 3.2 derive Thevenin's equivalent circuit and find voltage through 2Ω resistance. 10

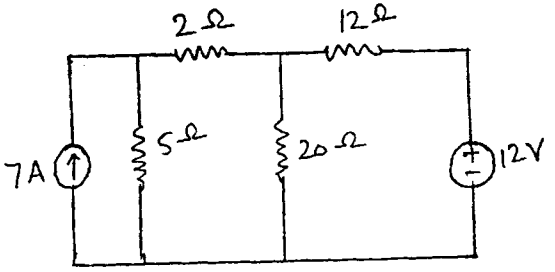

Fig. 3.2

Unit–II

4. (a) An AC of frequency of 50 Hz has maximum value of 100 A. Calculate

(i) its value 1/600 seconds after the instant the current is zero

(ii) In how many seconds after the zero value the current attains the value of 86.6 A. 10

(b) Two coils A and B are connected in series across a 240 V, 50 Hz supply. The resistance of A is 5 Ω and the inductance of B is 0.015 H. If the input from the supply is 3 kW and 2 kVAR, find the inductance of A and resistance of B. Also calculate the voltage across each coil. 10

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5. Two impedance $Z_1 = (6–j\ 8)\ \Omega$ and $Z_2 = (8–j\ 6)\ \Omega$ are in parallel across 100 V supply. Determine

   (i) current and power factor of each branch

   (ii) overall current and power factor

   (iii) power consumed by each branch and total power consumed. 7+7+6

Unit–III

6. Explain voltage regulation for a transformer and also determine conditions for zero regulation. Also derive EMF equation for the transformer. 14+6

7. (a) Derive the expression for measurement of power using two watt meter method. 10

   (b) Establish relation between the Line and phase voltage of both 3 phase star connected circuit. 10

Unit–IV

8. Explain construction, principle, working, EMF equation and losses of induction motor. Also draw a suitable diagram. 20

9. Write short notes on : 10×2

   (a) Energy meter.

   (b) Moving coil type ammeter.

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