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TEE–101

B. Tech. (First Semester)
Mid Semester EXAMINATION, 2016
(All Branches)
BASIC ELECTRICAL ENGG.

Time : Two Hours] [*Maximum Marks : 60*

Note : (i) This question paper contains *three* questions with alternative choice.

(ii) All questions are compulsory.

(iii) Each question carries four Parts (a), (b), (c) and (d). Attempt either Parts (a) and (b) or (c) and (d) of each question.

(iv) Each Part carries **ten** marks. Total marks assigned to each question are **twenty.**

(v) Assume suitable data wherever it is necessary.

1. (a) Obtain expressions for the equivalent star network resistances for a delta network.

(b) A network is arranged as shown in Fig. 1. Determine the value of the current in the 8 Ohm resistor, using mesh equations.

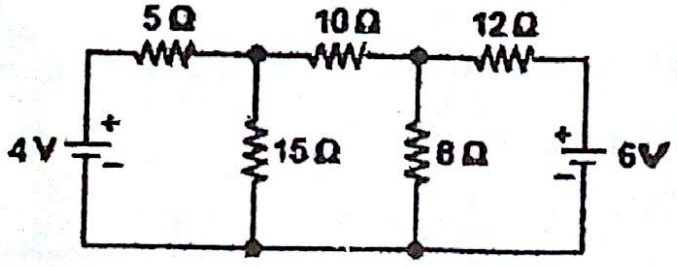

Fig.1

Or

(c) State Superposition theorem. Explain with a suitable example.

(d) For the given circuit find the value of R_L and determine the value of maximum power across that load resistance.

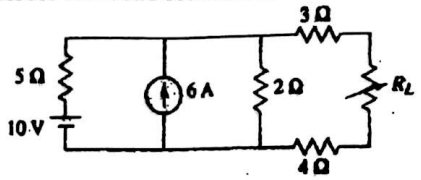

Fig. 2

2. (a) Define the following with example :

(i) Bilateral and Unilateral Elements

(ii) Active and Passive Elements

(b) An R-L-C series circuit with a resistance of 10 Ω, inductance of 0.2 H and a capacitance of 40 μF is supplied with a 100 V supply at variable frequency. Find the following w. r. t. series resonant circuit :

(i) the frequency at which resonance takes place

(ii) at resonance, find the current

(iii) power

(iv) power factor

(v) voltage across R-L-C at that time

(vi) quality factor

(vii) half-power points

(viii) resonance and phasor diagram

Or

(c) Discuss various characteristics of a series RLC resonant circuit. Derive mathematical expressions in support of your discussion.

(d) The following three sinusoidal currents flow into the junction :

$i_1 = 3\sqrt{2}\ \sin\ \omega t,\ i_2 = 5\sqrt{2}\sin(\omega t + 30°)$ and $i_3 = 6\sqrt{2}\sin(\omega t - 120°)$.

Find the expression for the resultant current which leaves the junction.

3. (a) What are the advantages of three phase system ? Derive relation between line voltage and phase voltage in Star connection.

(b) By using source transformation, source combination and resistance combination convert the circuit shown in Fig. into a single voltage source and single resistance.

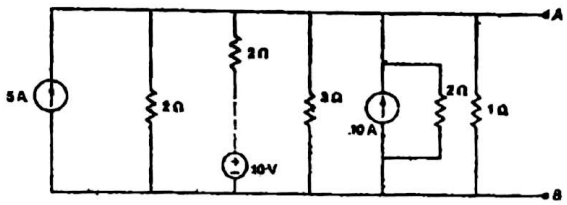

Fig. 3

Or

(c) State Norton theorem for dc circuit. Determine the Thevenin equivalent of given circuit shown in Fig.

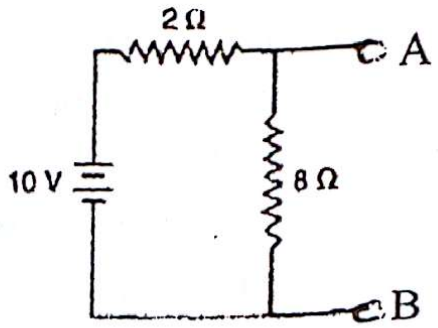

Fig. 4

(d) Find the voltages V in the circuit shown in Fig. Which makes the current in the 10 V resistor zero by using nodal analysis.

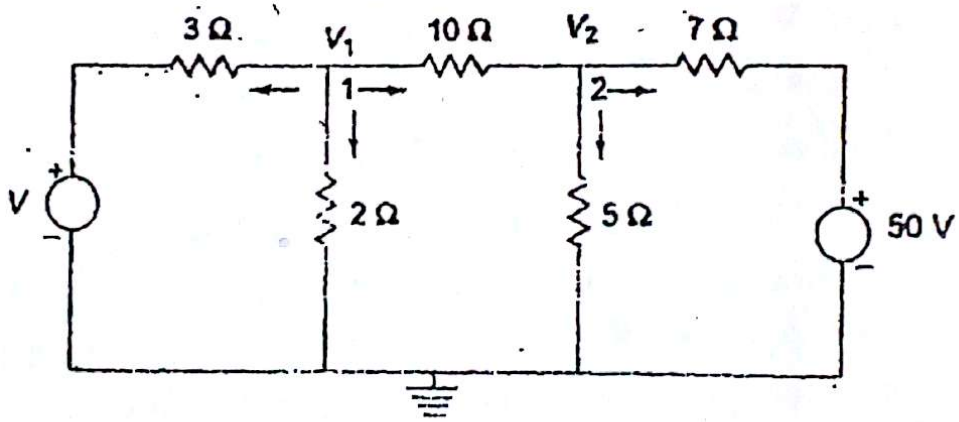

Fig. 5