VIT
Vellore Institute of Technology

Final Assessment Test – November 2018

Course: EEE1001 - Basic Electrical and Electronics Engineering

Class NBR(s): 0276 / 0296 / 0338 / 0359 / 0414 / 0445 / 0464 / 0521 / 5461 / 5462 / 5463 / 7127

Time: Three Hours

Max. Marks: 100

Answer any TEN Questions

(10 X 10 = 100 Marks)

1. Using nodal analysis, find V_1 and V_2 in the circuit shown in Fig.1

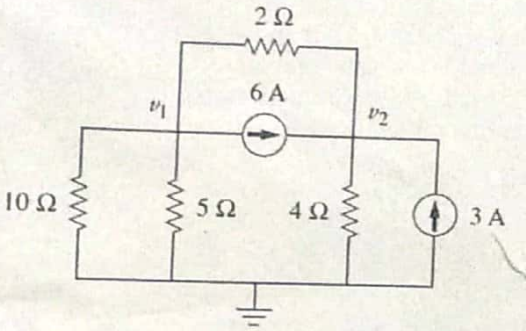

Fig.1

2. Find the P_{max} delivered to load R_L for the circuit shown in Fig.2

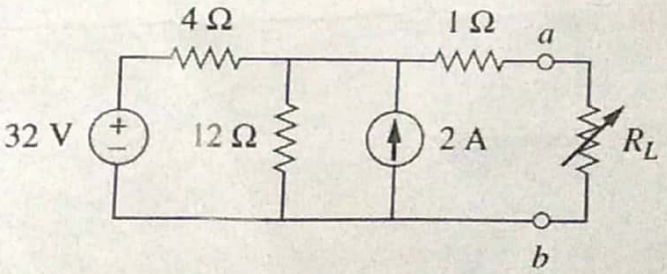

Fig.2

3. a) The *instantaneous* value of voltage in an AC circuit is given by [5]

$$V(t) = 100 \sin\ (50\pi t - 0.523)\ V.$$

Find (i) peak to peak voltage (ii) average voltage (iii) RMS voltage (iv) frequency and (v) phase angle

b) A series RLC circuit with $R=40\ \Omega$ and $L=50.07$ mH is connected across a 400 V, 50 Hz supply. The circuit draws a current of 10A. Find (i) capacitor value (ii) power factor of the circuit (iii) V_L and V_c [5]

4. a) The power taken by an inductive circuit when connected to a 120 V, 50 Hz supply is 400 W and the current is 8A. Calculate (i) resistance (ii) impedance (iii) reactance (iv) power factor and (v) phase angle between voltage and current. [5]

b) Deduce the condition for a RLC circuit to behave like a resistive circuit and mention the nature of following parameters at this condition. (i) Current (ii) Phase angle and (iii) power factor. [5]

5. Explain the construction and different types of DC generators in detail.

6. Explain the construction and principle of operation of Transformer in detail.

7. Design a circuit to add three bit numbers with two circuits adding two bit numbers.

8. Design a logic circuit which receives four bit binary number and gives out an output whenever the number is divisible by 4 or 5.

9. Explain the operation of BJT in common emitter configuration.

10. Design a Voltage regulator circuit to get 5 V DC output when the input is 20 V AC.

11. Find i_o using mesh current analysis for the circuit shown in Fig.3

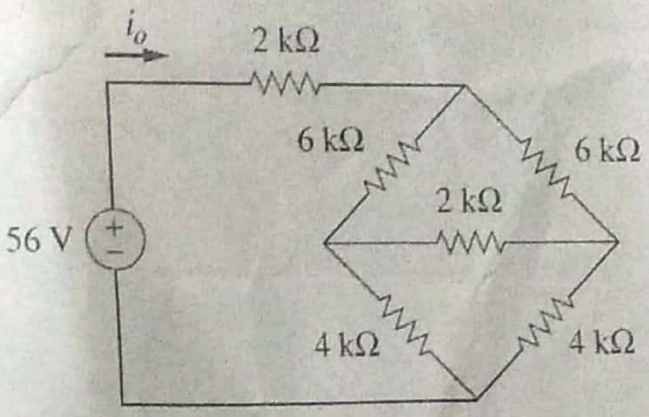

Fig.3

12. A coil of resistance 5 Ω and inductance 120 mH in series with a 100 μF capacitor is connected to a 300 V, 50 Hz supply. Calculate (i) current flowing (ii) phase angle between the supply voltage and current (iii) voltage across the coil and (iv) voltage across the capacitor.

⇔⇔⇔