VIT
Vellore Institute of Technology

Final Assessment Test – November/December 2023

Course: **EEE1024 - Fundamentals of Electrical and Electronics Engineering**

Time: **Three Hours** Max. Marks: 10

KEEPING MOBILE PHONE/SMART WATCH, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTI

Answer any TEN Questions

(10 X 10 = 100 Marks)

1. Apply mesh analysis to find the loop currents for the circuit shown in Fig.1.

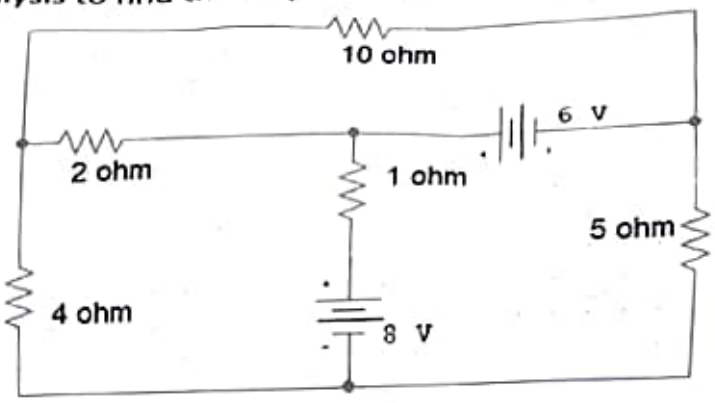

Fig. 1

2. Use Thevenin's theorem to find the current through the 5 Ω resistor in Fig. 2.

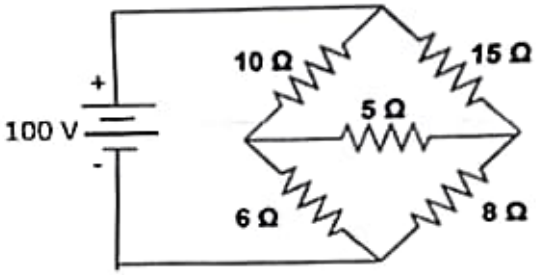

Fig.2

3. i) Determine the frequency, time period, peak value, peak-to peak value, rms value and average values of $v(t) = 10 \sin (150 t + 30^{\circ})$. **[5]**

   ii) With a neat phasor diagram, analyze the single phase ac circuit with *R*, *RL* and *RC* loads. **[5]**

4. A coil resistance of 10 Ω and inductance of 0.1H is connected in series with a 150 μF capacitor across a 200-V, 50 Hz supply.

   Calculate: (i). Impedance (ii). Current (iii). Power factor (iv). Voltage across the coil and capacitor (v). Real power, reactive power and apparent power.

5. a) Convert the following number to a decimal number: $(4057.06)_8$ **[2]**

   b) Convert the following number to a decimal number: $(A0F9.0EB)_{16}$ **[2]**

   c) Convert the following number to a binary number: $(27.625)_{10}$ **[2]**

   d) Convert the following number to a hexadecimal number: $(41209.05737)_{10}$ **[2]**

   e) Convert the following number to a hexadecimal number: $(01011111011.011111)_2$ **[2]**

6. a) Simplify the following Boolean expression: [5]

$$F(A,B,C) = \bar{A}\bar{B}\bar{C} + \bar{A}\bar{B}C + \bar{A}BC + A\bar{B}\bar{C} + A\bar{B}C + ABC$$

b) Design a full adder logic circuit to perform 3-bit addition. [5]

7. Draw and explain the V-I characteristics of PN Junction diode and list out its applications.

8. With the help of neat sketch, explain the types of rectifiers and list out its advantages and disadvantages.

9. Explain the architecture of 8051 microcontroller and list out its applications.

10. Explain the construction and working principle of PMMC with a neat diagram. Also, mention various types of torques in PMMC instrument.

11. a) Define a transducer and mention the various types of transducers [5]

b) Explain the resistive transducer with potentiometer. [5]

12. What is the purpose of modulation in communication? Explain different types of modulation.

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