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Code No: 151AG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year I Semester Examinations, July - 2021

BASIC ELECTRICAL ENGINEERING

(Common to EEE, CSE, IT, CSIT, ITE, CE(SE), CSE(CS), CSE(DS), CSE(Networks))

Time: 3 hours

Max. Marks: 75

Answer any five questions

All questions carry equal marks

1.a) State and explain the Kirchhoff's laws.

b) By applying Kirchhoff's laws, determine the current through all the elements in the circuit as shown in the figure. [6+9]

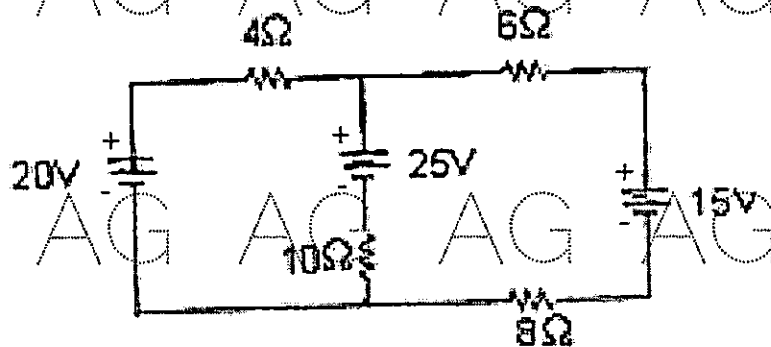


Figure: 1

2.a) State and explain Thevenin's theorem.

b) Using superposition theorem, determine the current through 3 ohm resistor shown in following figure 2 (All resistance are in ohms). [7+8]

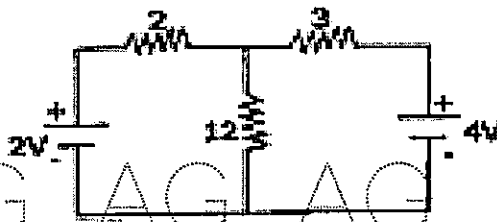


Figure: 2

3.a) Define the following terms:

i) Cycle

ii) Amplitude

iii) R.M.S value and

iv) Average value of an alternating quantity.

b) A coil having a resistance of 10 ohms and an inductance of 0.2H is connected in series with a 100×10^{-6} F capacitor across a 230V, 50Hz, determine

i) The active and reactive components of the current and power.

ii) The voltage across the coil, Draw the phasor diagram. [6+9]

4.a) What are the advantages of polyphase system?

b) Determine the line and phase current of the load, when a delta connected balanced load with an impedance of $(25+j15)$ ohms is connected to 230V, three phase balanced supply in positive sequence. [6+9]

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- 5.a) Develop the equivalent circuit of a single phase transformer.
b) A 220/440 V single phase transformer has 1000 turns on primary. The maximum flux density in the core is 1.2 Wb/m^2 . Calculate the number of turns on secondary, area of cross section and maximum flux in the core. [6+9]

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- 6.a) Explain the different 3-phase transformers connections with neat diagram.
b) The core of a 100 kVA, 11000/550V, 50 Hz, single phase core type transformer has a cross section of $20\text{cm} \times 20 \text{ cm}$. Determine i) the number of H.V. and L.V turns per phase and ii) the e.m.f. per turn, if the maximum core density is 1.3 tesla. [8+7]

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- 7.a) Explain the speed control of 3-phase induction motor.
b) A 6-pole, 100 HP, 3-phase, 440-V, 50Hz induction motor has a slip of 5% on full load. Calculate the speed of the motor? [9+6]

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- 8.a) Describe the miniature circuit breaker with neat diagrams.
b) Explain different types of wires used in electrical wiring. [7+8]

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