

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-I & II(NEW) EXAMINATION – SUMMER 2023****Subject Code:3110005****Date:08-08-2023****Subject Name:Basic Electrical Engineering****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

	MARKS
Q.1 (a) Determine the number of branches and nodes in the circuit shown in fig 1. Identify which elements are in series and which are in parallel.	03
(b) Find the average and rms value for the waveform shown in fig 2.	04
(c) Explain working of a single-phase transformer and derive the e.m.f. equation. Why the rating of transformer is in KVA?	07
Q.2 (a) Can we apply KVL in a loop containing a current source? Give answer with reason.	03
(b) Explain ideal Voltage and current source	04
(c) Determine the current in the branches of the network in Fig.3 using nodal analysis.	07
OR	
(c) A 120 V, 500 W lamp is used with a series choke on a 230 V, 60 Hz line, what is the inductance of the required choke if the choke has a Q of 2 ?	07
Q.3 (a) Distinguish between a mesh and a loop of a circuit.	03
(b) What is the use of form factor and peak factor; also differentiate between EMF and potential difference.	04
(c) Determine the current through 2 ohm resistor connected between A and B in the circuit shown in fig.4 using Thevenin theorem	07
OR	
Q.3 (a) What is the need for power factor improvement in electrical circuits?	03
(b) Summarize the advantages of 3 phase circuits over single-phase circuits.	04
(c) A 400 v, 50 Hz 3-phase supply has 1 00 ohm between R and Y, j 1 00 ohm between Y and B and - j 100 ohm between B and R. Find (a) line currents for phase sequence RYB(b) star connected balanced resistors for the same power	07
Q.4 (a) Draw and explain briefly BH curve.	03
(b) Write advantages of the sinusoidal waveform for electrical power applications.	04
(c) With the help of phasor diagram explain two wattmeter methods for the measurement of three-phase power.	07
OR	
Q.4 (a) What is the significance of back E.M.F. in a DC Motor?	03
(b) State advantages and disadvantages of autotransformer.	04
(c) What is the time constant of an RC circuit? Show that its units are the same as that of time. How this quantity signify about capacitor voltage during charging?	07
Q.5 (a) Why single-phase induction motor is not self-starting?	03
(b) Analyze on how can the direction of rotation of a DC shunt motor be reversed	04
(c) Define the term battery capacity. On which factors it depends. Also list out the parts of lead acid battery	07
OR	
Q.5 (a) list out some safety measures against electric shocks	03
(b) What is the difference between wire & cable?	04

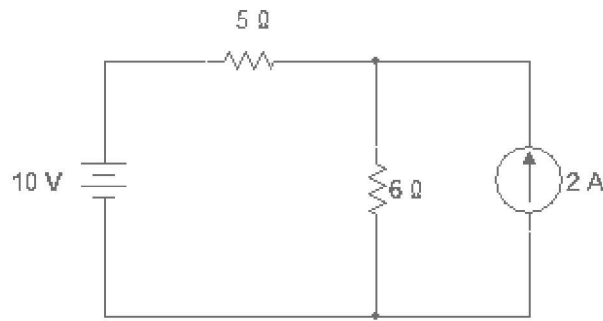


Fig1

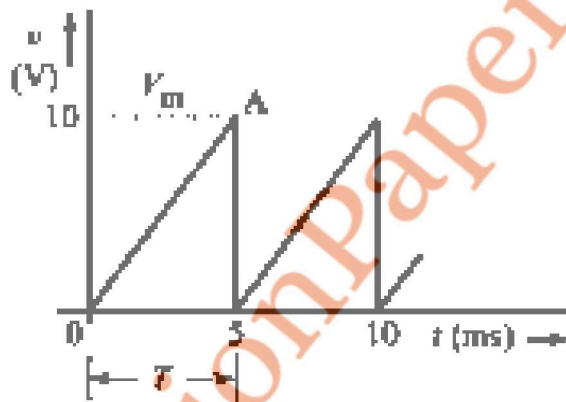


Fig2

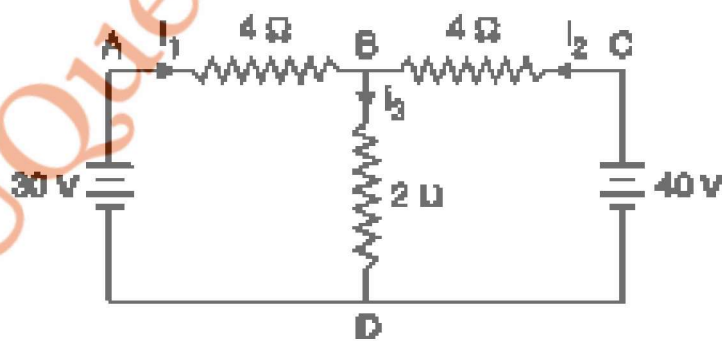


Fig.3

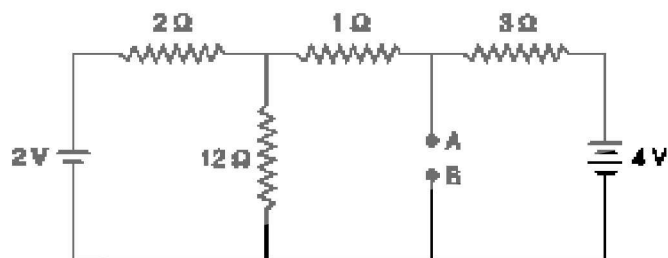


Fig.4