

B.E (Model Curriculum) (Common for all Branches) Sem-I & II
ESC101 - Basic Electrical Engineering

P. Pages : 3

Time : Three Hours



GUG/W/22/13167

Max. Marks : 80

- Notes :
1. All questions carry equal marks.
 2. Answer **five** questions as per internal choice.
 3. Due credit will be given to neatness and adequate dimensions.
 4. Assume suitable data wherever necessary.
 5. Illustrate your answers wherever necessary with the help of neat sketches.
 6. Use of non-programmable calculator is permitted.

1. a) Find voltage drop across 4Ω resistor as shown in fig. 1 (a).

8

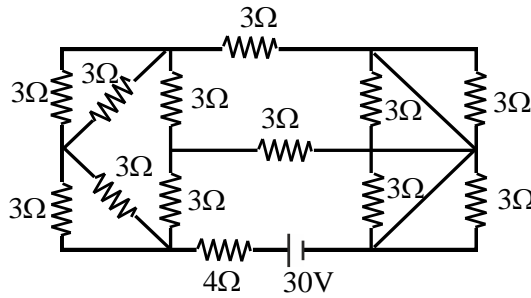
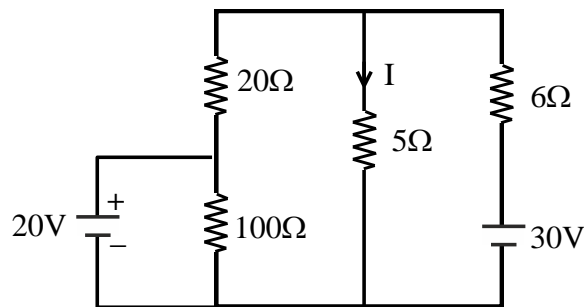


Fig. 1 (a)

- b) Use superposition theorem to find current I in the circuit shown below in fig. 1 (b).

8



OR

2. a) State and Explain Thevenin's theorem with an example.

5

- b) Determine Norton's equivalent circuit for the circuit shown in fig. 2 (b).

5

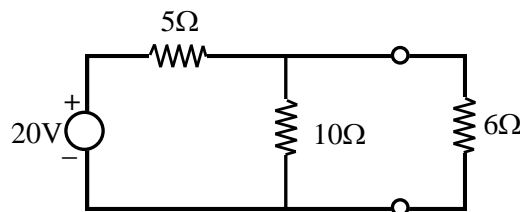


Fig. 2 (b)

- c) For the circuit shown in fig. 2.(c), Find the voltage across the 10Ω resistor and the current passing through it. 6

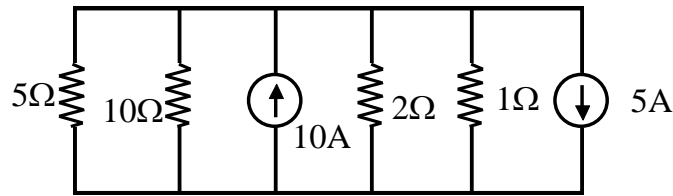


Fig. 2 (c)

3. a) Determine the average and rms value of the waveform shown in fig. 3 (a). 8

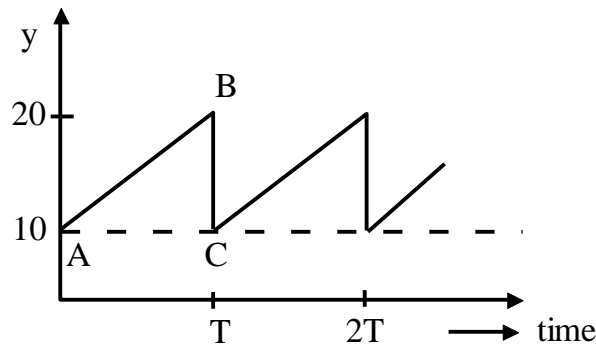


Fig. 3 (a)

- b) Draw the phasor diagram of the following combinations: 8
- R-L series circuit.
 - R-C parallel circuit
 - R-L-C series circuit such that $X_L > X_C$
R & L in series combination in parallel with C when ac source connected to it.

OR

4. a) Derive the relationship between phase and line quantities (voltage & current) for a 3-phase balanced star connected system. 8
- b) A balanced star-connected load is supplied from a symmetrical three phase, 400V (Line to Line) supply. The current in each phase is 50A and lags 30° behind the phase voltage. Find. 8
- Phase Impedance.
 - Active & reactive power drawn load. Draw phasor diagram showing phase and Line voltage.
 - Draw phasor diagram showing phase and Line voltage and Line current.
5. a) Derive an Emf equation of single phase transformer under no load & loaded condition. 8
- b) Define and explain the following terms with appropriate Diagram. 8
- Magnetic fringing.
 - Magnetic Leakage
 - Leakage coefficient.
 - Coercive forces.

OR

6. a) Define efficiency & voltage regulation. Also state condition for maximum voltage regulation & zero voltage Regulation of single phase transformer. **8**
- b) A single phase transfer has 100 turns on primary winding and 400 turns on secondary winding. The net cross-sectional area of the core is 250cm^2 . If the primary winding is connected to 50Hz, 230V supply, Calculate, (a) Emf induced secondary winding and (b) Maximum value of flux density in the core. **8**
7. a) Explain the working principal of single phase Induction motor. **4**
- b) Draw torque speed characteristics of single phase Induction-motor and state its significance. **4**
- c) Explain various exact torque equations of three phase Induction motor. **8**

OR

8. a) State the speed control methods of separately excited DC motor. **8**
- b) Explain the working principal of synchronous generator. **8**
9. a) Explain the working of PN-Junction diode in forward and reverse bias. **8**
- b) Write short note **any two**. **8**
- i) MCB ii) ELCB iii) MCCB

OR

10. a) Explain the plate earthing. State the factor Influencing the earth resistance. **8**
- b) Describe the Important characteristics for batteries and what is their meaning. **8**
