



B.Tech II Semester Regular/Supplementary Examinations, October 2022

BASIC ELECTRICAL ENGINEERING
(Common to ECE, CSE, CSE(AI&ML), CSE(DS) & IT)

Maximum Marks: 70

Date: 18.10.2022 Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 Three resistances of 6Ω , 12Ω and 18Ω are connected in delta network. What is the maximum value of resistance in its equivalent star network.
- 2 What are the limitations of superposition theorem
- 3 A sinusoidal voltage waveform is having a time period of 20ms and peak value (amplitude) of 325.27V. What is the instantaneous value of the waveform at 2.5ms.
- 4 Write the formula for three-phase active power in terms of phase quantities.
- 5 Compare normal transformer with auto transformer
- 6 A single-phase transformer has a primary current of 10A and a secondary current of 20A. comment whether the transformer is step up or step down
- 7 What is the function of the yoke used in DC generator?
- 8 Enumerate the applications of induction motors.
- 9 What is earthing?
- 10 Outline the importance of battery back up.

Part-B

Answer All the following questions.

(5X10M=50Marks)

- 11 a) State and explain kirchhoff's laws with suitable examples (4M)
b) Determine the current flowing through 2Ω resistor using nodal analysis for the circuit shown in figure 1 (6M)

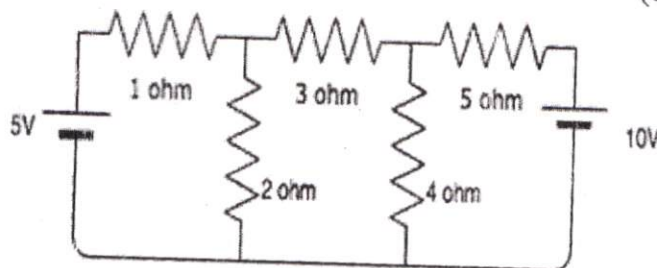


Figure 1

OR

- 12 a) State and explain reciprocity theorem.

(5M)

- b) Determine the current in 4Ω resistor using Norton's theorem for the circuit shown in fig.2 (5M)

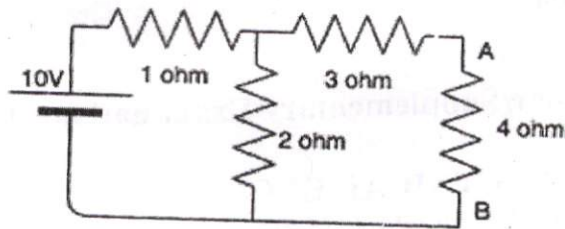


Figure 2

- 13 a) With a neat circuit diagram and phasor diagram explain series RC circuit? (5M)
 b) A series RLC circuit with $R=10\Omega$, $L=9\text{mH}$ and $C=40\mu\text{F}$ is excited by a single phase, 230V, 50Hz supply. Determine the impedance, power and power factor of the circuit. (5M)
 OR
- 14 a) Determine the formfactor and peak factor of Sinusoidal voltage waveform whose amplitude is V_m (5M)
 b) Derive the relationship between phase and line quantities of voltage and current in a 3-phase balanced star connected system. (5M)
- 15 a) Derive an expression for the induced emf of a transformer. (5M)
 b) Full load efficiency of a 1-phase transformer operating at 0.8 power factor(lag) is 96%. Determine its efficiency at half full load and unity power factor. (5M)
 OR
- 16 Explain open circuit test conducted on the transformer. (10M)
- 17 a) Derive an expression for torque produced by DC motor. (5M)
 b) A 4 pole lap connected dc generator having 60 slots on its armature with 6 conductors per slot, runs at 750 rpm and generates an open circuit voltage of 230V. Find its useful flux per pole. (5M)
 OR
- 18 a) Explain the working principle of a synchronous generator. (5M)
 b) A 4-pole, 50Hz induction motor has a slip speed of 90 rpm. Determine (i) Synchronous speed (ii) slip (iii) actual speed of the induction motor. (5M)
- 19 a) Explain Switch Fuse unit. (5M)
 b) Compare MCB and Fuse. (5M)
 OR
- 20 What is battery? How it is different from cell? Discuss the classification and characteristics of batteries. (10M)