Code No: 152AC **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year II Semester Examinations, June - 2022
BASIC ELECTRICAL ENGINEERING
(Common to ECE, EIE, ECM, CSBS, CSE(AI&ML), CSE(IOT))

Time: 3 Hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
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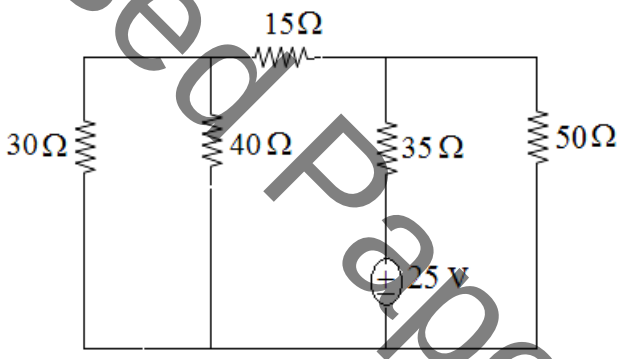
1.a) Two resistances when they are in series have an equivalent resistance of 9 ohms and when connected in parallel have an equivalent resistance of 2 ohms. Find the two resistances?
b) State and explain Kirchhoff's laws using an example. [7+8]

2.a) State and explain Thevenin's theorem.
b) Find the current 'i' in the circuit below shown in figure using Nortan's theorem. [7+8]



3.a) Explain about Series Resonance in a series RLC circuit and derive an expression for resonance frequency and quality factor.
b) Each phase of a balanced three phase delta connected load has an impedance of (4-j3) Ω. If a 3-phase voltage of 220 V supply is applied to this load, find the line and phase currents in the delta-connected load and the power delivered to the load. [7+8]

4.a) Define RMS value, Average value. Find Average value and RMS value of sinusoidal wave.
b) A Resistor of 100Ω in series with a capacitance of 50μF is connected to a supply of 200V, 50Hz. Find: (i) impedance (ii) current (iii) phase angle (iv) voltage across resistance and capacitance. [7+8]

5.a) What is voltage regulation of a transformer and develop an expression for calculating the voltage regulation in the transformer.
b) Calculate efficiency at half and full load of a 100 kVA transformer for power factor of (i) unity (ii) 0.8. The copper loss is 1000 W at full load and the iron loss is 1000 W. [8+7]

6.a) With neat constructional details, explain principle and operation of a synchronous generators.
b) A 3-phase delta connected 440 V, 3-phase 50 Hz, 4-pole induction motor has a rotor standstill e.m.f per phase of 150 V. If the motor is running at 1450 rpm, determine for this speed (i) the slip (ii) the frequency of rotor induced e.m.f (iii) the rotor induced e.m.f per phase. [8+7]

7.a) Briefly describe the construction and principal of operation of single-phase induction motor.

b) Describe briefly torque-slip characteristics of induction motor. Based on characteristics what are its applications? [8+7]

8.a) With the help of schematic diagram, explain the working principle of ELCB (Earth-Leakage Circuit Breaker). Discuss applications of ELCB.

b) Write short note on Switch Fuse Unit (SFU). [10+5]

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