

**Code No: 6AC41**

**Date: 10-Aug-2022 (T.N)**

**B.Tech II-Year II- Semester External Examination, July/August-2022 (Supplementary)**  
**ELEMENTS OF ELECTRICAL ENGINEERING (CSE and IT)**

**Time: 3 Hours**

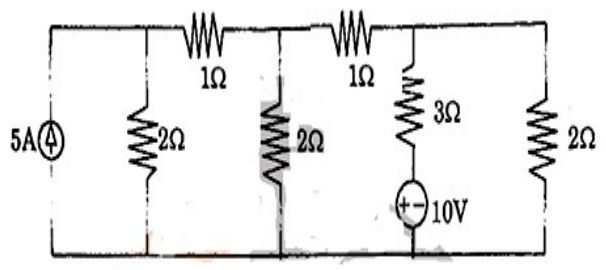
**Max.Marks:75**

**Note:** a) No additional answer sheets will be provided.  
b) All sub-parts of a question must be answered at one place only, otherwise it will not be valued.  
c) Missing data can be assumed suitably.

**ANSWER ANY 5 OUT OF 8 QUESTIONS. EACH QUESTION CARRIES 15 MARKS.**

**Bloom's Cognitive Levels of Learning (BCLL)**

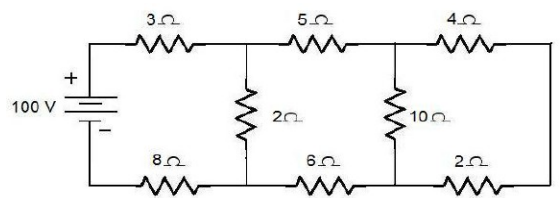
Remember	L1	Apply	L3	Evaluate	L5
Understand	L2	Analyze	L4	Create	L6

- |   | BC<br>LL | CO(s) | Marks |
|---|----------|-------|-------|
| 1. a) State and Explain the superposition theorem.  | L1       | CO1   | [8M]  |
| b) Calculate the current flowing through $3\Omega$ resistor in the below circuit diagram.   | L5       | CO1   | [7M]  |
|    |          |       |       |
| 2. a) Describe sinusoidal response of series RL circuit with circuit diagram, phasor diagram and waveforms along with mathematical expressions.   | L1       | CO2   | [8M]  |
| b) A resistance of $200\Omega$ , an inductance of $0.2H$ and a capacitance of $100\mu F$ are connected in series across a $220V$ $50Hz$ AC single phase supply. Calculate the total impedance and current of the circuit. | L5       | CO2   | [7M]  |
| 3. a) Derive emf equation of D.C. generator from the first principles.  | L2       | CO3   | [8M]  |
| b) A 4-pole wave wound DC generator is having 50 slots with 20 conductors per slot and rotating at $1500rpm$ . The flux per pole is $0.018wb$ , calculate the emf generated.  | L5       | CO3   | [7M]  |
| 4. a) Illustrate the operation of Transformer on NO-LOAD and hence deduce the equivalent circuit diagram with the help of Phasor diagram.   | L4       | CO4   | [8M]  |
| b) A single phase $15KVA$ transformer has iron losses of $200W$ and full-load copper losses $300W$ . Determine the efficiency of a transformer at<br>i) full-load, UPF                      ii) half – load, $0.8 PF$ .   | L5       | CO4   | [7M]  |

5. a) Explain the operation of induction motor. Discuss the applications of induction motor. L4 CO5 [8M]  
 b) The stator of a 3- $\phi$ , 4-pole induction motor is connected to a 50Hz supply. The rotor runs at 1455 rev/min at full load. CO5 [7M]  
 Determine: i) the synchronous speed and ii) the slip at full load. L5

6. a) State and explain the basic requirements of any measuring instrument. L2 CO6 [8M]  
 b) Describe the construction and working of PMMC instrument. Also derive the equation for deflecting torque. L2 CO6 [7M]

7. a) Estimate the current supplied by the source using network reduction technique. L5 CO1 [5M]



- b) Two coils connected in series have an equivalent inductance of 0.8H when connected in aiding, and an equivalent inductance of 0.5H when the connection is opposing. Calculate the mutual inductance of the coils. L5 CO2 [5M]  
 c) Derive the torque equation of a DC motor. L5 CO3 [5M]
8. a) Explain various Losses in a Single Phase Transformer. Derive the condition for Maximum efficiency. L2 CO4 [5M]  
 b) Derive the expression for line and phase voltages and currents in a balanced star connection system. L4 CO5 [5M]  
 c) How are measuring instruments classified? L2 CO6 [5M]

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