**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY, BHOPAL**

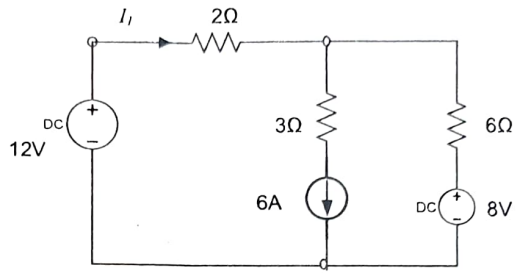
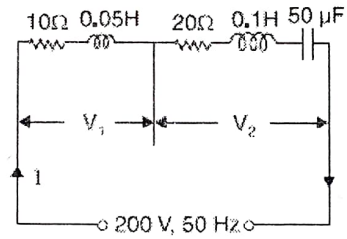
**END TERM EXAMINATION, June 2023**

**B.Tech. II Semester**

**Subject: Basic Electrical & Electronics Engg.** **Subject code : EE-108**

**Time : 3 Hours** **Max. Marks : 50**

Note: *(i) Assume the necessary data suitably, if any missing.*
*(ii) All questions carry equal marks.*

| Q.No. | Questions | Marks |
|---|---|---|
| Q.1. | a) Derive the condition of maximum power transfer in any D.C. circuit and find the efficiency when the source is transferring maximum power to the load. | 5 |
| | (b) Determine the current $I_1$ in the circuit of given figure using Superposition theorem.   | 5 |
| Q. 2. | (a) In the given circuit , find the values of : (i) the current I (ii) V1 and V2 and (iii) Power factor. Draw the phasor diagram.   | 5 |
| | (b) Describe the phenomenon of resonance in parallel circuit and explain its Q factor. Why parallel resonance circuit is often regarded as rejector circuit? | 5 |
| Q.3. | (a) In a 50 kVA, 1100/220 V transformer, the iron and copper losses at full load are 350 W and 425 W, respectively. Calculate the efficiency at<br>i. half load with unity power factor<br>ii. full load with 0.8 power factor lagging and<br>iii. Maximum Efficiency and the load at which maximum efficiency occurs assuming the load to be resistive. | 5 |
| | (b) Draw the equivalent circuit diagram of the transformer referred to secondary side. Draw the phasor diagram for this circuit and determine voltage regulation expression for lagging p.f. load. | 5 |

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|---|---|---|
| Q.4. | (a) What are the main parts of D C Machine ? Write the function of each part and state the material of which each part is made? | 5 |
| | (b) Develop an expression for the speed of a d c motor in terms of back emf and flux per pole. | 5 |
| Q.5. | a) Draw and explain V-I characteristic of P-N Junction diode when it is (i) forward biased (ii) reverse biased. | 5 |
| | b) Drive the expression of output voltage and efficiency of full wave rectifier. | 5 |