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2E3209

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2E3209

B.Tech. II-Sem. (Main/Back) Examination, May/June - 2025

2FY3-08 Basic Electrical Engineering

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of seven questions from Part B and Three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory. **(10×2=20)**

1. State Kirchoff's Current Law (KCL) and Kirchoff's Voltage Law (KVL)
2. What is the difference between Active and Passive circuit elements.
3. Define real power, reactive power, Apparent Power and Power factor.
4. What is voltage regulation in a transformer, Also define the efficiency of it.
5. What is the difference between an Induction motor and a synchronous motor.
6. What is a power converter. Also provide the purpose of an Inverter.
7. Differentiate MCB and MCCB.
8. A sinusoidal AC voltage has a peak value of 230 V calculate "Form Factor"
9. Two resistors of 8Ω *and* 12Ω are connected in parallel across 24V supply find current through each resistor.
10. What is the significance of Back EMF in a DC motor.

PART - B

(Analytical / Problem Solving Questions)

Attempt any Five questions. **(5×4=20)**

1. Derive and explain the maximum power transfer theorem. **(4)**

2. Derive the EMF equation of a transformer, Also discuss the equivalent circuit of it. (4)

3. Explain the construction and working three phase Induction motor. (4)

4. Explain the operation and Basic circuits of single phase rectifier with R Load. (4)

5. Explain the importance of proper earthing in electrical installations. Also Discuss the different methods of earthing. (4)

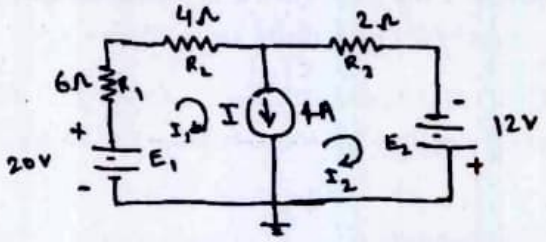
6. A 100 V, 50 Hz Ac supply is connected to a series combination of a 10Ω resistor, 0.2H Inductor and 50 μF capacitor find :

   a) Impedance of the circuit

   b) Current flowing in the circuit

   c) Voltage across each component. (4)

7. Using the mesh analysis determine the current of the network. (4)



PART-C

(Descriptive / Analytical / Problem Solving / Design Questions)

Attempt any Three questions. **(3×10=30)**

1. A factory operates at 250V, 50Hz drawing 50A with a power factor of 0.7 lagging. Calculate the capacitance required to improve the power factor to 0.9. (10)

2. a) Explain the speed control methods of Induction motor.

   b) Explain the construction and working of synchronous generator. (5+5)

3. a) Explain the working of DC-DC converter.

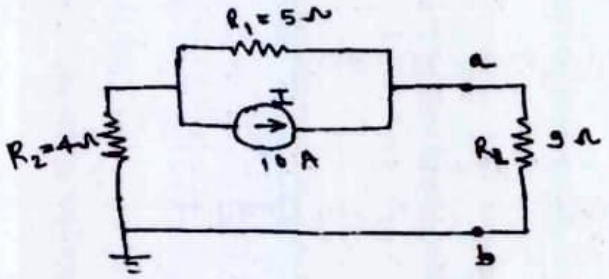
   b) Explain the characteristics and applications of SCR. (5+5)

4. Write short note on:

   a) Losses in transformer

   b) Elementary calculations for energy consumption. (5+5)

5. Find the Morton equivalent circuit for the network external to the 9Ω Register. As in given figure.



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