2E3209

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B.Tech. II Sem (Main) Examination, July - 2022
2FY3-08 Basic Electrical Engineering

Time : 3 Hours   Maximum Marks : 70

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. How is the Norton's theorem similar to Thevenin's theorem? In what respect do they differ?   (2)

2. What is function of commutator and brushes?   (2)

3. Find the relationship between phase and line voltage and currents for delta and star connected system.   (2)

4. What is significance of the form factor and peak factor?   (2)

5. Give the comparision between squirrel cage induction motor and slip ring induction motor.   (2)

6. Why the stator windings of alternator are generally star-connected? (2)

7. Why three - phase synchronous motor will always run at synchronous speed? (2)

8. What are the values of the power - factor for following circuits- (2)
    a) Pure inductive circuit and
    b) Pure resistive circuit?

9. Why transistor is called current controlled device? What is need of biasing the transistor?   (2)

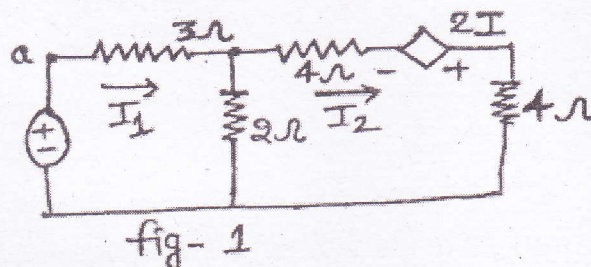10. Give the comparision between different voltage source and between different types of current source.   (2).

PART - B

(Analytical/Problem solving questions)

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

1. Find the current in branches of fig-1 using node voltage method.   (4)

fig- 1

2. Determine the resonant frequency in an series R-L-C circuit. Determine current, power factor at resonance condition.   (4)

3. A 3-phase induction motor is wound for 4-poles and is supplied from a 50Hg system. Find

    a)   Actual speed of the motor when running at 4% slip and

    b)   Frequency of emf induced in rotor.   (4)

4. Find R to have maximum power transfer in circuit of Fig. 2. Also find maximum power transferred.   (4)

fig-2
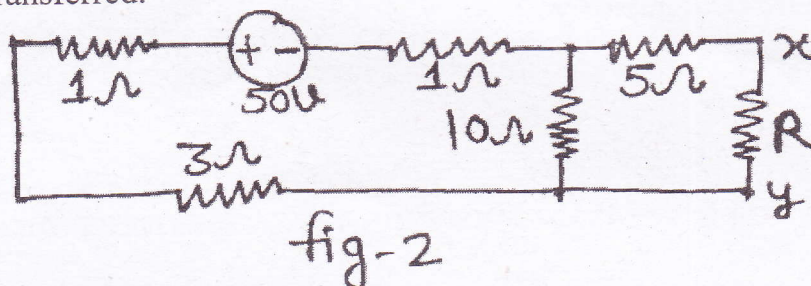
5. Derive the emf. equation of a single phase transformer Draw phasor diagram of ideal transformer under.   (4)

    a)   Unity power factor

    b)   Lagging and

    c)   Leading power factor.

6. Draw the V-I characteristics of SCR. And mark all important points on characteristics and define them.   (4)

7. Classify different types of 1-phase rectifier with R-Load. Draw equivalent circuit diagram of each type. Also sketch input, output voltage waveform and current waveform with proper labeling.   (4)

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PART - C
(Descriptive/Analytical/Problem Solving/Design question)

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

1. Give the comparision between switch fuse unit, MCB, ELCB, MCCB. Discuss need of earthing. Explain different types of earthing with suitable circuit diagram. **(10)**

2. Sketch a layout of squirrel cage induction motor and label all the parts. Explain working principle of 3-phase induction motor and draw equivalent circuit diagram. **(10)**

3. Explain working principle of transformer. Classify different types of losses occur in transformer. Deduce relationship between losses for maximum efficiency. **(10)**

4. Prove that is a D.C. current of I amp is super imposed on an AC current of peak value I amp, the rms value of the resultant current is $\sqrt{3/2}$ I. **(10)**

5. Find the current through 3Ω resistance of circuit shown in fig. 3 using Norton's Theorem, verify the result using Thenenin's theorem. **(10)**

fig-3

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