

Scheme – G

Sample Question Paper

Course Name : Computer Engineering Group

Course Code : CO/CM/IF/CD/CW

Semester : Third

Subject Title : Electrical Technology

Marks : 100

17331

Time: 3 hrs

Instructions:

1. All questions are compulsory
2. Illustrate your answers with neat sketches wherever necessary
3. Figures to the right indicate full marks
4. Assume suitable data if necessary
5. Preferably, write the answers in sequential order

Q1 (A) Attempt any SIX of the following.

12 Marks

- a) State Kirchhoff's Current law.
- b) Give expression for the following:
 - i) Star to Delta conversion of resistances
 - ii) Delta to Star conversion of resistances
- c) Define the following for a.c.:
 - i) Form Factor
 - ii) Peak Factor
- d) State importance of Lenz's law.
- e) State the difference between EMF and Potential Difference.
- f) State two advantages of three phase circuits over single phase circuits.
- g) Give classification of Fuses.
- h) State two factors affecting severity of electric shock.

Q1 (B) Attempt any TWO of the following.

08 Marks

- a) Compare fuse and MCB on the basis of
 - i) Cost
 - ii) operation
 - iii) safety
 - iv) service
- b) State any one application of following single-phase motors:
 - i) Resistance split phase motor
 - ii) Capacitor start- induction run motor

- iii) Shaded pole motor
- iv) Universal motor
- c) Draw a labeled diagram showing constructional details of core type single phase transformer. State its working principle.

Q2. Attempt any FOUR of the following.

16 Marks

- a) "In parallel combination, the equivalent resistance is less than the least among the resistors". Justify the statement with an example.
- b) In Fig.2(b) 150 volts are applied to the terminal AB. Determine
 - i) the resistance between the terminal A and B
 - ii) the current I

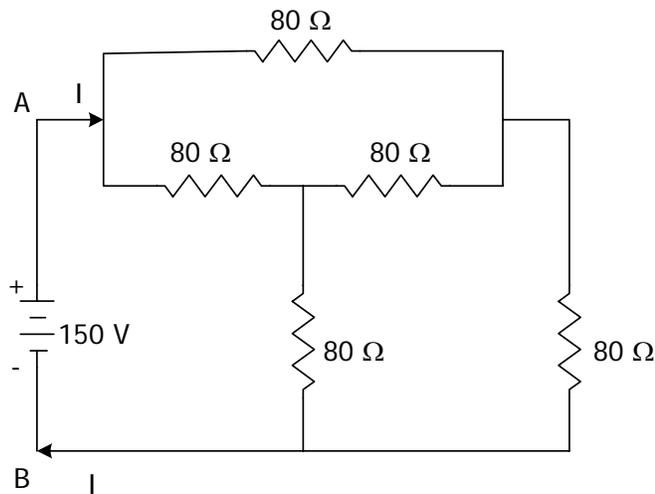


Fig.2 (b)

- c) Write voltage equations for Fig.2(c) using Kirchoff's voltage law.

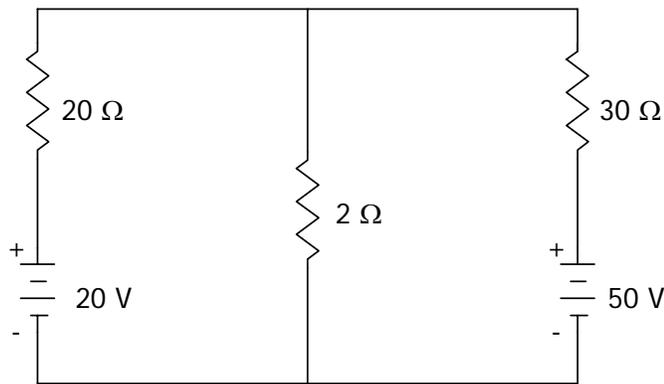


Fig.2(c)

- d) Define the following related to a.c.
- i) Frequency
 - ii) Cycle
 - iii) Time Period
 - iv) Amplitude
- e) Draw circuit diagram for measurement of single-phase power using dynamometer type wattmeter.
- f) Define the following terms and state their expression:
- i) Active Power
 - ii) Reactive Power

Q3. Attempt any FOUR of the following.

16 Marks

- a) Draw a.c. wave forms showing the following:
- i) Phase difference
 - ii) In phase
 - iii) lagging
 - iv) leading
- b) Find the Form Factor and Peak Factor of the sinusoidal alternating current.
- c) Prove that average power consumption in pure inductor is zero when a.c. voltage is applied.
- d) State Faraday's laws of electromagnetic induction.
- e) Distinguish between statically induced EMF and dynamically induced EMF with example.
- f) Draw phasor diagram for R-C series circuit. Write voltage and current equation for it.

Q4. Attempt any FOUR of the following.

16 Marks

- a) Explain the behaviour of a.c. circuit containing capacitor only when alternating voltage is applied across it.
- b) In the circuit given in Fig 4(b) calculate current I by using series and parallel combination.

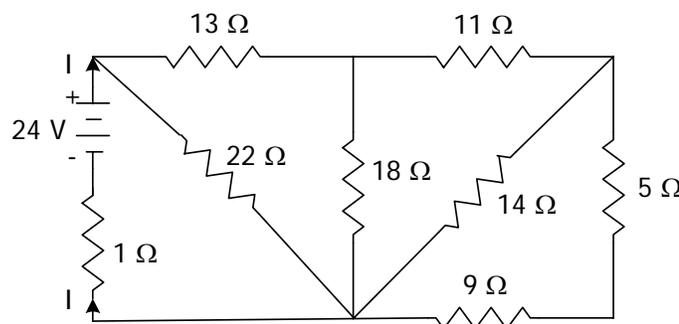


Fig 4(b)

- c) Explain the effect of power factor on power consumption.
- d) Distinguish between active and reactive power.
- e) Compare auto transformer with two winding transformer on the basis of:
 - i) cost ii) construction iii) efficiency iv) application
- f) Define voltage regulation and efficiency of single phase transformer.

Q5. Attempt any FOUR of the following.

16 Marks

- a) State relation between phase and line current and phase and line voltage of the following system:
 - i) Star connected balanced system
 - ii) Delta connected balanced system
- b) Draw three phase a.c. wave forms. Explain phase sequence for the three phase a.c.
- c) State advantages of balanced load in three phase system.
- d) For a balanced three phase, three wire system with star connected load for which line voltage is 230V and per phase resistance and reactance is 6 ohms and 8 ohms respectively. Calculate line current and power absorbed by each phase.
- e) An alternating current of frequency 50 Hz has a maximum value of 100 A. Calculate:
 - i) the instantaneous value after $1/360$ second and
 - ii) the time taken to reach 80 A for the first time
- f) Explain principle of operation of single phase induction motor.

Q6. Attempt any FOUR of the following.

16 Marks

- a) Voltage regulations of same capacity distribution transformers are 0.02 and 0.05 respectively. Which transformer will you choose? Justify your answer.
- b) Give classification of transformers on the basis of :
 - i) construction ii) supply system ii) power rating iv) applications
- c) A three-phase 400 V, 50Hz, a.c. supply is feeding a three phase delta connected load with each phase having a resistance of 25 ohms, an inductance of 0.15 H and a capacitance of 120 microfarads in series. Determine the line current and total three phase power absorbed.
- d) A coil takes a current of 6 A when connected to a 24 V d.c. supply. To obtain the same current with a 50 Hz a.c. supply, the voltage required was 30 V. Calculate:
 - i) the inductance of the coil and

- ii) the power factor of the coil
- e) A circuit draws a current of 10 A at a voltage of 200 V and its power factor is 0.8 lagging. Calculate:
- i) active power ii) reactive power iii) apparent power.
- Also draw power triangle.
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