9/12/20

401/1

Sr. No 321309

B. Sc. (Physics)

December 2023

B.Sc.- III SEMESTER

Electrical Circuits & Network Skills (SECP-02)

Time: 3 Hours **Max. Marks:75**

Instructions:

1. *It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.*
2. *Answer any four questions from Part -B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART -A

Q1 (a) State Ohm's law in reference to dc circuits. (1.5)

(b) How much heat is produced by 2 kW electric heater when it is operated for 30 minutes? (1.5)

(c) Distinguish between AC and DC electricity. (1.5)

(d) A coil or resistance 1000 Ω and inductive reactance 200 Ω is connected across supply voltage of 230 V. Find the supply current. (1.5)

(e) What is the phase relationship between the supply voltage and current flowing through a purely inductive circuit? (1.5)

(f) What is meant by a fuse? On what principle does it operate? (1.5)

(g) What is meant by conductivity and how is it related with resistivity? (1.5)

(h) Write e.m.f equation of a dc motor. (1.5)

(i) What is meant by power factor? How can it be improved? (1.5)

(j) What is the difference between a wire and a cable? (1.5)

PART -B

Q2 (a) Obtain the expression of rise and decay of current through a R-L circuit. (10)

(b) Define resistance. How does increase in temperature affect the resistance of (i) conductors and (ii) insulators? (5)

Q3 (a) Explain how alternating quantities may be represented by complex numbers? (7)

(b) Add the following vectors given in rectangular form and illustrate graphically too. (8)

$A = 16 + j\,12, \quad B = -6 + j\,10.4$

Q4 What is a transformer? Describe its construction, principle and working with the help of neat diagrams. Also, describe the losses involved. (15)

Q5 (a) Differentiate between voltmeter and ammeter. (7)

(b) What are three phase series circuits? Explain its two types of star and delta connections. (8)

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Q6 (a) Give a detailed explanation of principles of measurement of voltage, current and resistance with a multimeter. (10)

(b) The total capacitance of two capacitors is 0.03μF when joined in series and 0.16 μF when connected in parallel. Find the capacitance of each capacitor. (5)

Q7 Write short notes on the following: (15)

(a) Relays

(b) Kirchoff's laws

(c) Preparation of extension board

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