U.G. 1st Semester Examination - 2025

PHYSICS

[Skill Enhancement Course (SEC)]

Course Code : PHY-SEC-T-01

(Electrical Circuit and Network Skill)

[NEP-2020]

Full Marks : 35 Time : $1\frac{1}{2}$ Hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP-A

1. Answer any **five** questions : $1\times5=5$

   a) Draw circuit symbols of a PN diode and an electrolytic capacitor.

   b) What is the phase relation of current and voltage across a capacitor connected in an AC circuit'?

   c) Draw the waveforms of a have-wave rectifier and a full-wave rectifier.

   d) What is an extension board? What is its use?

   e) What is the role of a filter capacitor in a rectifier circuit?

   f) What are the full names of MCB and RCCB?

g) The number of turns in the secondary side in a step up transformer is higher or lower than primary?

h) What is the relation between RMS value and Peak value of AC voltage?

GROUP-B

2. Answer any **two** questions: $5 \times 2 = 10$

a) Write two advantages and two disadvantages of single phase AC motors.

b) Describe the working principle of MCB. What is the 'rating' of a fuse?

c) Briefly describe L, C and LC filter topology (with connection diagrams).

d) What are some usual components needed for wiring in a house? What is residual current?

e) Using a Multimeter, briefly explain the steps to measure a 2.2K Resistor and a 12V battery. The multimeter has ranges for resistor: 200Ω, 20K, 200K, and for DC voltages: 200mV, 20V, 200V.

GROUP-C

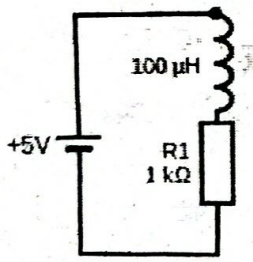
3. Answer any **two** questions: $10 \times 2 = 20$

a) Write down the principle (with simple diagram) of a DC generator and label its various parts. What is a commutator in a dc generator? What is a slip ring in an AC generator?

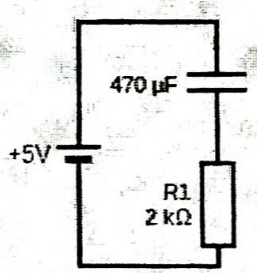
b) What is conduit wiring and what are its advantages / disadvantages? What is Distribution Box (DB) and Junction Box (JB)? What is 'earthing' and why is it important in wiring?

c) Write down the principle (with simple diagram) of 3 phase AC generators. What is STAR and Delta Connection in a 3-phase system?

d) Find the steady state current through the Resistor R1 for each of the circuits:



(i)



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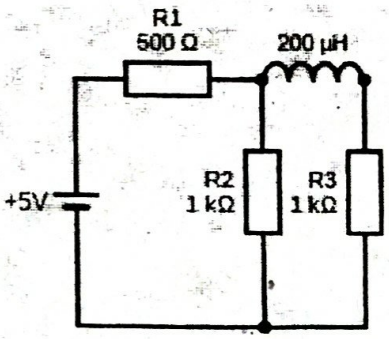

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