

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 : $1 \times 5 = 5$
- 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 half-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?

[Turn over]

- 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:

