

U.G. 3rd Semester Examination-2025**PHYSICS****Skill Enhancement Course (SEC)****Course Code : PHY-SEC-T-3****(Renewable Energy & Energy Harvesting)****[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: 1×5=5
 - a) Write two limitations of nuclear energy.
 - b) What are fossil fuels?
 - c) What are the main two types of crystalline used in PV solar cells?
 - d) Give an example of solar pond in India.
 - e) Mention two battery technologies that are used to store solar energy.
 - f) Write one application of Photovoltaic solar system.

[Turn over]

- g) What materials are used for Piezoelectricity?
- h) Mention one recent application of piezoelectric generators.

GROUP-B

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

- a) Give an idea about solar green houses and mention its advantages. Draw the V-I characteristic curve of a solar cell (qualitative plot) and mark Open circuit voltage (V_{oc}) and Short Circuit Current (I_{sc}) and Maximum Power point. $3+2$
- b) Write short notes on (any one): 5
- Non Convective solar pond
 - Solar cooker
- c) What are the advantages of vertical axis wind turbines? What are the environmental impacts of wind turbines? What are the basic components of a Wind energy conservation system? $2+1\frac{1}{2}+1\frac{1}{2}$
- d) Which places on earth are suitable for geothermal energy harvesting and why? Write two advantages and two disadvantages of Geothermal energy. $2+3$

GROUP-C

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

- a) Write the basic idea of Ocean Thermal Energy Conservation (OTEC). What are the main advantages and disadvantages of Ocean energy? $5+2\frac{1}{2}+2\frac{1}{2}$
- b) Explain the fundamental principle of Tidal energy generation. What are the main components of Tidal power plant? Write two limitations of Tidal power plant. What are the Hydrothermal resources? $3+3+2+2$
- c) Discuss about the sources of Geothermal energy and their potential in India. Briefly discuss about the three main types of Hydropower schemes (Run to river scheme, Storage Scheme, Pumped storage Scheme). $5+5$
- d) What fuel is used for nuclear fission reactors? What are the advantages of a nuclear power plant? Are nuclear power plants renewable sources, explain? Draw a block diagram with connections for a household solar energy harvesting unit using: Solar Cell, Charge Controller, Battery, and Inverter. $1+3+2+4$