13/5/22

[This question paper contains 4 printed pages.]

Your Roll No.

Sr. No. of Question Paper : 1088

Unique Paper Code : 32223905

Name of the Paper : Renewable Energy and Energy Harvesting

Name of the Course : **B.Sc (Hons) Physics / B.Sc. Prog**

Scheme of Examination : CBCS Part-II

Semester : IV – SEC

Duration : 3 Hours Maximum Marks : 50

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Answer any **5** questions.
3. Question number **1** is compulsory.

1. Answer any **5** questions : (5×2=10)

   (i) Compare merits and demerits of horizontal and vertical axis wind mill.

P.T.O.

(ii) How temperature difference is maintained in shallow solar pond?

(iii) Explain how hydro and wind energies are the indirect sources of solar energy?

(iv) Define PV effect.

(v) How do you classify the solar energy devices? Explain.

(vi) Write 3 points of comparison between thermal energy and nuclear energy.

(vii) Define Ocean Thermal Energy.

2. Write a note on flat plate collectors. How it is different from concentration type collectors? State the advantages and disadvantages of solar concentrators. Describe different methods of sun tracking. (10)

3. What is biomass? Explain biomass conversion technologies. Explain in briefly about factors affecting biogas generation. (10)

4. Provide a brief explanation of the piezoelectric effect and the converse piezoelectric effect. Make a drawing to illustrate what causes the piezoelectric effect at the atomic level. List out three possible applications of piezoelectric materials in renewable energy harvesting and compare this with other renewable sources. (10)

5. What is the difference between pre-combustion and post-combustion carbon capture technologies, and how can they be used more in the future? What are the limitations to transporting the CO_2 and H_2 gas with current technologies? What are the long-term impacts and risks (such as leakage) to injecting carbon deep underground? (10)

6. What is the difference between a fuel cell and a battery? What are different arrangements of a storage battery? Describe principle and working of a lead acid battery and compare this with lithium-ion batteries. (10)

7. What do understand by electromagnetic energy harvesting? Explain the principle and working of an electromagnetic generator. What is Seebeck thermoelectric effect? How Seebeck coefficient vary with temperature? (10)