



Reg. No.

--	--	--	--	--	--	--	--	--

PHE 455

II Semester M.Sc. Degree Examination, Sept./Oct. 2022

PHYSICS

Energy Studies (Open Elective)

Time : 3 Hours

Max. Marks : 70

Note : Answer **any three** questions choosing **one each** from Part – I to Part – III and **four** questions from Part – IV.

PART – I

1. a) How do you estimate the amount of solar energy reaching the upper atmosphere of the earth ? Explain. 8
b) Discuss any two forms of renewable energy resources. 5
c) Write a note on design aspects of solar passive systems. 5
2. a) Explain the characteristics of a basic photovoltaic conversion system with the help of a block diagram. 8
b) Explain any one application of a photovoltaic conversion system with an example. 5
c) Discuss solar active and passive systems. 5

PART – II

3. a) What do you mean by wind energy ? Discuss the basic principle of conversion of wind to energy, its origin and classification. 6
b) Explain advantages of hybrid wind energy system compared to routine wind energy system. 6
c) Explain various parameters of wind which affects the extraction of maximum power. 6
4. a) Explain the Aerodynamics of a Windmill and how it influences the efficiency. 10
b) Differentiate between horizontal axis and vertical axis windmills and their performance. 8

P.T.O.

**PART – III**

- | | |
|--|----------|
| 5. a) Explain the properties of a biogas as a fuel. | 6 |
| b) What is bio-digestion ? What are the factors affecting it ? | 6 |
| c) What is Biomass ? How it is converted into energy ? | 6 |
| 6. a) What is Gasification ? Explain its types. | 8 |
| b) Explain ethanol as a biofuel. | 5 |
| c) What are aerobic and anaerobic bioconversion processes ? Explain. | 5 |

PART – IV**(4×4=16)**

- | | |
|---|--|
| 7. a) What is entropy ? What is its role in explaining the second law of thermodynamics ? | |
| b) Explain spectral distribution of extraterrestrial radiations. | |
| c) Basic principle of solar photovoltaic conversion. | |
| d) Enumerate limitations of wind energy conversions. | |
| e) Discuss any two types of biogas plants. | |
| f) Explain any two ways of converting solar energy into other forms. | |
-