

[This question paper contains 2 printed pages.]

**Sr. No. of Question Paper : 2146**                      **GC-3**                      **Your Roll No.....**

**Unique Paper Code : 32223905**

**Name of the Paper : Renewable Energy and Energy Harvesting**

**Name of the Course : B.Sc. (Hons.) Physics (CBCS) – Skill Enhancement Course**

**Semester : III**

**Duration : 3 Hours**

**Maximum Marks : 50**

**Instructions for Candidates**

1. Write your Roll No. on the top immediately on the receipt of this question paper.
2. Question No. 1 is compulsory.
3. Attempt five questions in all.

1. Attempt any five questions :

- (a) Sun emits  $3.8 \times 10^{26}$  Joules of energy per second. The atmosphere absorbs 50% of incident energy. What is the amount of solar energy received by  $1 \text{ m}^2$  of earth surface at Mall Road if the sun rays hits ground at  $60^\circ$  ?
- (b) The oxidation of one gram of Petrol emits 48.3 kJ of energy. If a petrol electric generator of efficiency 40% consumes 1.8 kg of petrol in 30 minutes, find out the electrical power output of the generator.
- (c) Let a solar cell absorbs only blue light of wavelength 4500-4900 Å. What is the maximum output voltage ?
- (d) Suggest two methods to harvest piezoelectric energy.
- (e) What do you understand by carbon capture technology ?
- (f) Newspapers regularly carry two terms PM2.5 and PM10 in the context of environmental degradation. What do they stand for ?

*P.T.O.*

- (g) Burning of fossil fuel and biomass results in emission of greenhouse gases. What do you understand by greenhouse gases ? Name two of them.
2. What is the principle behind nuclear energy harvesting ? Give the associated nuclear reaction(s). What are the pros and cons of nuclear energy ?  
(3+2+5=10)
3. Discuss how a hydro power plant works. What are the environmental impacts of hydro power plants ?  
(6+4=10)
4. (a) What do you understand by clean energy source ? Describe one procedure to convert biomass into a clean energy source.
- (b) What is fossil fuel and how their use affects the environment ? (6+4=10)
5. Explain the importance of geothermal energy taking its present day scenario as point of reference. Brief the working of the different kinds of geothermal power plants.  
(5+5=10)
6. What according to you are the major challenges in adopting solar power as a household power source ? Explain the working of a solar cell. (5+5=10)
7. Write short notes on any **four** :
- (a) Ocean Biomass
- (b) Tidal Energy
- (c) Wind Turbine
- (d) Renewable Sources of Energy
- (e) Wave Energy Devices
- (f) Net Metering (4×2.5=10)

*Some Useful Constants*

Planck's Constant =  $6.63 \times 10^{-34}$  Js

1AU =  $1.49 \times 10^{11}$  m

e =  $1.6 \times 10^{-19}$  C