B.Sc. 3rd Semester (Honours) Examination, 2023 (CBCS)

Subject : Physics

Course : SEC-1

(Weather Forecasting)

Time: 2 Hours **Full Marks: 40**

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

1. Answer *any five* of the following questions: 2×5=10

(a) Why are rain clouds look grey?

(b) What causes a rainbow?

(c) Why is it hot in summer and cold in winter?

(d) Write down two conditions for development of air mass.

(e) Why tropical cyclones weaken over land after rainfall?

(f) What is ozone layer and why it is important?

(g) Explain Polar easterlies.

(h) What is the difference between condensation and precipitation?

2. Answer *any two* of the following questions: 5×2=10

(a) What is lightning? How does lightning occur? What causes thunder sound with lightning? 1+2+2

(b) What is hail? How does hail form? Why do the tropics have more precipitation than other locations? 1+2+2

(c) Why is the Troposphere considered to be the most significant layer of the atmosphere? 5

(d) What is the cause of wind? Show that the wind power is proportional to wind velocity. 2+3

3. Answer *any two* of the following questions: 10×2=20

(a) What do you understand by the phenomenon of the inversion of temperature? Write down the favourable conditions for temperature inversion. Explain how does it impact the atmosphere and the weather. 2+3+5

(b) What is fog? How does fog form? Differentiate fog, haze and mist. What is frontal system? Describe different fronts. 1+2+3+1+3

(c) What are short-range, medium-range and long-range weather forecasting? State the importance of weather forecasting. Discuss briefly any one method used for weather forecasting. What are the problems of weather forecasting? 3+2+4+1

(d) What is global warming? Write two natural and two man-made causes of global warming. What is a carbon footprint? How can one reduce his/her carbon footprint? 2+2+2+2+2

B.Sc. 3rd Semester (Honours) Examination, 2023 (CBCS)

Subject : Physics

Course : SEC-1 (OR)

(Renewable Energy)

Time: 2 Hours **Full Marks: 40**

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Group-A

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

(a) Why is it necessary to capture carbon from environment?

(b) What is solar greenhouse? Mention its uses.

(c) State the disadvantages of using atomic energy.

(d) What do you mean by ocean thermal energy conversion (OTEC)?

(e) What is tip speed ratio (TSR) of a wind turbine?

(f) What is tailrace in a hydro power plant?

(g) What are the causes that make interior of the earth hot?

(h) Define piezo electric effect. Name one material that exhibits piezo electric property.

Group-B

Answer *any two* questions. 5×2=10

2. (a) What is meant by wind power?

(b) On which factors does the power output of a wind turbine depend?

(c) What are the advantages of vertical axis wind turbine over horizontal axis turbines? 1+2+2

3. (a) Which energy of water is used to generate hydroelectricity?

(b) Name two turbines used in hydro power plant.

(c) Discuss the impact of hydro power plant on environment.

(d) State the function of sluice gate in a hydro power plant. 1+1+2+1

4. (a) Can we harvest energy from electromagnetic waves? Discuss.

(b) Write down the basic principles of electromagnetic energy harvestor.

(c) What are the applications of electromagnetic energy harvesting device? 2+2+1

5. (a) What is thermonuclear reaction?

(b) Briefly describe different parts of a nuclear reactor. 1+4

Group-C

Answer *any two* questions. 10×2=20

6. (a) Discuss the difference between conventional and non-conventional energy.
   (b) What is biomass? How can we get energy from biomass?
   (c) What is energy plantation?
   (d) What is landfill project? 3+(1+3)+1½+1½

7. (a) Discuss briefly the importance of solar energy.
   (b) What are the three types of solar power plant?
   (c) How electricity is generated from solar cell?
   (d) What is solar pond? Why is it called a non-convective pond? 2+2+3+(1+2)

8. (a) Define geothermal energy.
   (b) Is geothermal power a natural resource?
   (c) Classify geothermal resources.
   (d) Why heat extraction from geothermal sources is called heat mining?
   (e) With a schematic diagram describe a method of generating electricity from geothermal energy. 1+1+2+2+4

9. (a) What are the different technologies used to harvest ocean energy?
   (b) With a diagram, describe the principle of generating energy using Oscillating Water Column (OWC) device from ocean waves.
   (c) Define ocean biomass.
   (d) What are the advantages and disadvantages of ocean energy harvesting? 2+4+2+2
