B. Sc. GEOLOGICAL SCIENCE EXAMINATION, 2024

(3rd Year, 1st Semester)

EARTH AND CLIMATE

PAPER : DSE 01/A

Time : *Two Hours* *Full Marks* : 40

(*Use a separate Answer script for each Part*)

PART—I (20 Marks)

Answer *any ten* questions from the following : 2×10=20

1. Explain why television newscasts have weather segments but not climate segments.

2. What is the most important factor responsible for Earth's different seasons?

3. Explain the role of greenhouse effect in warming the atmosphere.

4. What is Coriolis force?

5. Identify the main climate groups of India in the Koeppen system.

6. Explain how cores taken from ocean deposits and ice sheets are used to infer past climate conditions.

7. List two other anthropogenic gases in addition to CO_2. What is the contribution of these gases to global warming?

8. Describe the 'ice-albedo feedback'. As 'positive feedback', does it necessarily lead to global warming?

9. How do changes in eccentricity, obliquity and precession influence Earth's climate? What time scales are applied for each?

10. What are climate proxies? Give examples.

11. Write a short note on 'Pleistocene glacial – interglacial cycles'.

12. Discuss briefly the impact of monsoons in India.

PART—II (20 Marks)

Answer *any four* questions from the following : 5×4=20

1. What is a dynamic system? How does an open dynamic system differ from a close dynamic system? Discuss with examples. What is meant by the 'steady state' of an environmental system? How is 'flux' crucial to maintain the 'steady state' of a system? 1+2+1+1

2. What is the most dominant greenhouse gas in our atmosphere? Why is it not the most effective one? Explain in brief. Why is 'global warming' considered as 'positive feedback'? 3+2

3. Draw a schematic diagram to show the variation of temperature at different structural layers of the Earth's atmosphere. Discuss the importance of 'atmospheric window'. 3+2

4. Write the basic conditions that are required for precipitation. What is 'ventilation effect'? Why, in general, is rain shadow zone a common occurrence adjacent to the area where precipitation takes place due to orographic cooling? 2+1+2

5. What is albedo effect? How does the intensity of incoming and outgoing solar radiation vary with latitude? Discuss in brief with graphical presentation. How is it possible to yield more outgoing radiation than incoming radiation in the Polar regions? 1+2+2

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