

B. Sc. GEOLOGICAL SCIENCE EXAMINATION, 2023

(3rd Year, 1st Semester)

EARTH AND CLIMATE

PAPER – DSE/TH/01/A

Time : Two hours

Full Marks : 40

(Use a separate Answer script for each Part)

PART – I (20 Marks)

(Answer any four questions)

(4 X 5) =20

1. What are the sources of greenhouse gases? Discuss their effects on climate.
2. Discuss briefly the factors that determine the variability of Earth's climate.
3. Explain the factors responsible for the Deep-Water Circulation in oceans.
4. How do forcings and feedbacks determine the rate and magnitude of climate changes? Justify your answers.
5. Explain any one of the following :
 - a) Coriolis force
 - b) Younger Dryas

[Turn over

PART – II (20 Marks)

Answer any four (04) questions from the following:

(4×5 = 20)

1. What is a 'System' in terms of environmental aspect? What is meant by the steady state condition of a system? Briefly discuss the role of stock and flux to maintain the steady state of the Earth's environmental system.
2. What is hyetograph? How does it influence the hydrograph of the basin outlet? - Discuss with suitable graphical representations for the case of a) Normal precipitation; b) Cyclonic precipitation and c) Cloud bursting. (1+1+3)
3. Mention the sequential steps of meteorological processes to form precipitation. How do water droplets form in cloud and grow rapidly to finally precipitate in the form of rain? What is 'ventilation effect'? (1+1+2+1)
4. What are the major layers of atmosphere? Why do the atmospheric temperature rise with altitude in its outermost layer? Briefly discuss the contribution of atmosphere to the earth's energy budget and the surface temperature. (1+2+2)
5. Choose the correct answer from the following: (5×1 = 5)
 - i. In connection with resultant feedback of environmental process, the Global warming" is :
 - a. Negative feedback
 - b. Increasing feedback
 - c. Positive feedback
 - d. Decreasing feedback
 - ii. The most dominant greenhouse gas in the Earth's atmosphere is :
 - a. CO₂
 - b. H₂O
 - c. CH₄
 - d. CFC
 - iii. 'Atmospheric Window' centered on a wavelength of :
 - a. 80 – 110 μm
 - b. 8 – 12 μm
 - c. 12 – 110 μm
 - d. None of the above

[3]

iv. Radiation balance of the Earth is near to zero at :

- a. 40° latitude
- b. 60° latitude
- c. 30° latitude
- d. 50° latitude

v. Width of the Biosphere band of our planet is about

- a. 40 km
- b. 120 km
- c. 160 km
- d. 20 km