(This Question paper contains 2 printed pages)

Roll No | | | | | | | | |

S. No. of Question Paper : **225**

Unique Paper Code : 2223012005
Name of the Paper : Physics of Earth
Name of the Course : B.Sc. Prog.–Physical Sciences with Physics_NEP: UGCF-2022
Semester : IV

Duration : **3 Hours** Maximum Marks: **90**

(Write your Roll No on the top immediately on receipt of this paper.)

Attempt **five** questions in all, including Question No. **1** which is compulsory.

All questions carry equal marks.

1. Answer any **six** of the following $\mathbf{6 \times 3 = 18}$

   (a) Outline the carbon cycle.

   (b) What is the difference between a depression contour and a normal contour on a topographic map?

   (c) What is the Coriolis effect?

   (d) What is the Richter scale? How are seismic waves detected using geophones?

   (e) What are mid-oceanic ridges and oceanic trenches?

   (f) What is the adiabatic lapse rate? Distinguish between dry and moist adiabatic lapse rates.

   (g) State the necessary conditions for cloud formation?

2. (a) How does Deforestation affect the balance of ecosystems? What are the key factors causing Deforestation in India and around the world? Give any two prominent examples of Deforestation. **7**

   (b) What is the chemical composition of seawater? What factors affect the salinity of ocean water? Why are oceans important to Earth's systems? **7**

   (c) How does the Nebular Theory explain the formation of the solar system? **4**

3. (a) Critically analyze the concept of "ecological restoration" in the context of industrial-era environmental damage. Evaluate the role of policy, technology, and community participation in achieving meaningful recovery. **7**

(b) Differentiate between cyclones and anticyclones in terms of their formation mechanisms, pressure systems, wind circulation patterns, and associated weather conditions. Evaluate their impacts on regional and global climate systems, with suitable examples. **7**

(c) Briefly explain the origin of the Universe as described by the Big Bang model. **4**

4. (a) Describe the vertical structure of the atmosphere, identifying its major layers. Explain how temperature varies with altitude, including the concept of the adiabatic lapse rate. **7**

(b) What is ocean circulation? What are the two main types of ocean circulation? What is the role of the Coriolis effect in ocean circulation? What are the primary factors driving surface ocean currents? **7**

(c) Explain how the tilt of Earth's axis and its orbit around the Sun contribute to the change in seasons. What role does Earth's spin play in this process? **4**

5. (a) Explain the mechanism of the Indian monsoon system. Include the role of land-sea breeze, pressure systems, and seasonal wind reversal. **7**

(b) Explain the geodynamical processes involved in the formation of island arcs. How are these arcs related to subduction zones, and what geological features accompany their formation? **7**

(c) What are the main differences between asteroids, comets, and dwarf planets in terms of composition and location in the solar system? Give examples. Compare the roles of the Asteroid Belt and the Kuiper Belt in shaping our understanding of planetary formation and the solar system's structure. **4**

6. (a) Explain the concept of topography and discuss the various techniques used to represent topographic data, including maps, contour lines, and digital elevation models (DEMs). **7**

(b) Describe the types of seismic waves generated during an earthquake. How do these waves help in understanding the Earth's internal structure? **7**

(c) Describe the evidence and methods used to study paleoclimate. **4**