

**Earth, Atmospheric, Ocean and Planetary Sciences
Paper III**

Time Allowed : 2½ Hours]

[Max. Marks : 200

Instructions : This paper has **four (4)** Sections. Each Section has its own separate instruction regarding the length of the answer, the choice of questions, and the marks assigned to each question to be answered. There are totally **19** questions to be answered. Maximum marks are **200**.

SECTION I

Note : Questions **1** and **2** carry **20** marks each and should be answered in maximum **500** words each.

1. Discuss the distribution of dykes/dyke swarms in the Deccan province and comment on their role as feeder or post Deccan hypabyssal intrusives.

Or

Give the stratigraphic succession of Gondwana S. Group and describe the Gondwana sequence of Maharashtra.

2. Contrast vertical and lateral stream erosion processes. Describe the associated landforms.

Or

What are REE ? Give their geochemical characters and explain their applications in Igneous petrogenesis ?

SECTION II

Note : Choose any *one* specialisation/elective of your choice and answer questions **3** to **5** (no internal choice).

Questions **3** to **5** are of **15** marks each and answers should be maximum **300** words each.

Elective I

(Geology Specialization)

3. What are Meteorites ? Give their classification schemes and use in REE interpretation.
4. What are skarn deposits ? Give the classification and its evolution in space and time.
5. Compare magmatism at Mid-Oceanic ridges and in subduction zone.

Elective II

(Physical Geography Specialization)

3. What happens to stream discharge when the stream width or depth increases ? Why ?
4. How can climate affect the development of soil ? What is meant by soil ?
5. Explain the detrimental effect of soil erosion other than loss of top soil from agricultural fields.

Elective III

(Geophysics Specialization)

3. What are the travel-time curves ? Write down their significance in Seismology ?
4. Write down the basic principles of seismic reflection survey with an emphasis upon time correction.
5. What is Rheology ? Describe Newtonian *versus* Non-Newtonian viscous deformation.

Elective IV
(Oceanography)

3. Discuss in detail the types of deep water masses in oceans.
4. Explain with a neat diagram the hypsometric curve of the ocean bottom.
5. Describe the various ocean currents and the conveyor belt system.

Elective V
(Meteorology Specialization)

3. Discuss the necessary conditions for formation of clouds. Describe the types and characteristics of Cloud Condensation Nuclei (CCN) in warm clouds. Also discuss the 'Curvature Effect' and 'Solution Effect' in the process of growth of cloud droplets in warm clouds.
4. Discuss in brief, the components of and semi-permanent system during the South-West monsoon season over India.
5. Define and explain geostrophic wind. Derive the equation of Geostrophic wind and explain the wind flow patterns associated with Geostrophic wind in northern hemisphere.

3. _____

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5.

SECTION III

Note : Questions 6 to 14 are of 10 marks each and answer should not exceed 50 words.

6. Differentiate between modified Mercalli and Ritcher scales.

7. Give the geological considerations for the selection of dam site.

8. What are basemetal sulphide deposits ? Describe any *one* of them with suitable example.

11. Draw schematic section of an Island arc and label it.

12. Define a thrust and name major thrusts in Himalayan orogen.

13. Define wave refraction and explain the role it plays in shoreline processes.

14. Define the meteorological seasons in India. Discuss the major weather systems affecting India during winter season.

SECTION IV

Note : Questions **15** to **19** are of **5** marks each and answer should not exceed **30** words.

Answer the following questions by understanding the following map.

15. Describe the geological formation with number 8.

16. Delineate the Central Indian Suture Zone on the map and comment on its evolution.

17. Name the different granitic batholiths and comment on their economic importance.

18. Encircle the Rajmahal traps on the map, give its age and identify the lithologies associated with it.

19. The CIS divides which two protocontinents ? Explain in brief the Southern Protocontinent.

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ROUGH WORK

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