

Total No. of Printed Pages—8

3 SEM TDC GEGL (CBCS) GE 3 (A/B/C)

2023

(Nov/Dec)

GEOLOGY

(Generic Elective)

Paper : GE-3

Full Marks : 53

Pass Marks : 21

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

Paper : GE-3 (A)

(**Structural Geology and Tectonics**)

UNIT—I

(**Structural Geology**)

(Marks : 27)

1. What do you mean by the term 'stress ellipse'? What are different types of stresses? Write briefly about homogeneous and heterogeneous strain in rocks. 1+2+2=5

(2)

2. Write short notes on any *three* of the following : 3×3=9

- (a) Structural maps
- (b) Planar and linear structures
- (c) Fractures and faults
- (d) Strain ellipse

3. Write about the effects of topography on structural features. Define topographic contours. 4+2=6

Or

Describe the geometrical elements on a folded surface. What are antiforms and synforms? 4+2=6

4. Fill in the blanks : 1×2=2

- (a) The true dip direction is _____ to the strike of a bedding plane.
- (b) In case of a strike-slip fault, the fault plane is _____.

5. What is a fault? Describe briefly about different types of faults. 1+4=5

Or

Discuss briefly how the structural features control the accumulation of oil and natural gas. 5

UNIT—II

(Tectonics)

(Marks : 26)

6. Define plate tectonics. Describe briefly about different plate boundaries. 2+4=6

Or

Describe the important features associated with a convergent plate boundary. 6

7. Write short notes on any *three* of the following : 3×3=9

- (a) Continental and oceanic crust
- (b) Divergent plate boundary
- (c) Lithosphere and mantle
- (d) Continental drifting

8. Discuss briefly about the role of tectonic activities in the development of structural features. 6

Or

Describe the phenomenon of seafloor spreading. What are mid-oceanic ridges? 4+2=6

9. Write briefly about the transform plate boundary. 3

10. Fill in the blanks : 1×2=2

- (a) Island arcs are associated with a _____ plate boundary.
- (b) The average thickness of a lithospheric plate is _____ km.

(4)

Paper : GE-3 (B)

(**Fossils and Their Applications**)

UNIT—I

(**Introduction to Fossils**)

(Marks : 8)

1. Fill in the blanks : 1×2=2

(a) Many objects of inorganic origin closely resemble the forms of organic origin, and are found in the sedimentary rocks, they are called _____.

(b) Palynology deals with the study of _____.

2. Write short notes on any *two* of the following : 3×2=6

(a) Role of fossils in development of geological time scale

(b) Trace fossils

(c) Fossils sampling techniques

UNIT—II

(**Species Concept**)

(Marks : 12)

3. Write short notes on any *three* of the following : 3×3=9

(a) Taxonomy of organisms

- (b) Typomorphic classification
- (c) Binomial system of nomenclature
- (d) Rules for naming of a species

4. Answer any *three* of the following questions :

1×3=3

- (a) What is phylogenetic classification of fossils?
- (b) Define species.
- (c) Define holotype.
- (d) What do you understand by 'code of systematic nomenclature'?

UNIT—III

(Introduction to Various Fossil Groups)

(Marks : 10)

5. Write short notes on the following : 2×2=4

- (a) Microfossils
- (b) Use of palynology

6. Write briefly on 'important age-diagnostic fossiliferous horizons of India'.

6

(6)

UNIT—IV

(Applications of Fossils)

(Marks : 13)

7. What is index fossil? 2
8. What is paleoecology? 2
9. Write short notes on any *three* of the following : 3×3=9
- (a) Applications of fossils in the study of paleoecology
 - (b) Applications of fossils in paleoclimatic interpretation
 - (c) Principles and methods of paleoecology
 - (d) Fossils used in understanding the paleobiogeography

UNIT—V

(Societal Importance of Fossils)

(Marks : 10)

10. Discuss the implications of larger benthic fossils assemblages in hydrocarbon exploration. 5

Or

Give an explanatory note on how fossils are indicators of pollution.

11. Write briefly on 'use of spores and pollens to measure the thermal maturity of hydrocarbon reservoirs'. 5

(7)

Paper : GE-3 (C)

(**Martian Geology**)

UNIT—I

(Marks : 10)

1. Write short notes on any *two* of the following : 5×2=10
- (a) Mariner 4
 - (b) Mariner 7
 - (c) Mariner 9
 - (d) Mangalyaan

UNIT—II

(Marks : 10)

2. Discuss any *two* of the following : 5×2=10
- (a) Mars interior revealed by NASA's InSight Spacecraft
 - (b) Martian atmosphere and its characteristics
 - (c) NASA's missions to study Martian atmosphere

UNIT—III

(Marks : 13)

3. Name the three physiographic provinces of Mars and briefly discuss the tectonic origin of these provinces. 1+5=6

4. Write note on any *one* of the following : 7
- (a) Layered deposits on Martian surface and their origin
 - (b) Fretted terrains on Mars and their origin

UNIT—IV

(Marks : 10)

5. Write short notes on any *five* of the following : 2×5=10
- (a) Shergottites
 - (b) Nakhrites
 - (c) Chassignites
 - (d) Noachian
 - (e) Hesperian
 - (f) Amazonian

UNIT—V

(Marks : 10)

6. Answer/Write on any *two* of the following : 5×2=10
- (a) Briefly discuss the evidence of life on Mars.
 - (b) Terraforming of Mars and its challenges
 - (c) Challenges in human colonization of Mars

3 SEM TDC GEGL (CBCS)

GE 3 (A/B/C)