Combined Geo-Scientist (Main)
Examination, 2024

SGSE-P-GLG

GEOLOGY

Paper – I

*Time Allowed : **Three** Hours*

*Maximum Marks : **200***

Question Paper Specific Instructions

Please read each of the following instructions carefully before attempting questions :

*There are **ELEVEN** questions divided in **SIX** sections.*

*Candidate has to attempt **SIX** questions in all.*

*The **ONLY** question in Section **A** is **compulsory**.*

*Out of the remaining **TEN** questions, the candidate has to attempt **FIVE,** choosing **ONE** from each of the other Sections **B, C, D, E** and **F**.*

The number of marks carried by a question/part is indicated against it.

Unless otherwise mentioned, symbols, abbreviations and notations have their usual standard meanings.

Neat sketches are to be drawn to illustrate answers, wherever required. They shall be drawn in the space provided for answering the question itself.

Wherever required, graphs/tables are to be drawn on the Question-cum-Answer (QCA) Booklet itself.

Attempts of questions shall be counted in sequential order. Unless struck off, attempt of a question shall be counted even if attempted partly.

Any page or portion of the page left blank in the Question-cum-Answer (QCA) Booklet must be clearly struck off.

*Answers must be written in **ENGLISH** only.*

SECTION A

(Compulsory Section)

Q1. Describe the following in brief with illustrations, wherever necessary :

(a) Pratt's theory of Isostasy 5

(b) Infrared Remote Sensing 5

(c) Saline Series of Salt Range 5

(d) Duplexes 5

(e) Limitations of Lithostratigraphic Correlation 5

(f) Shear Sense Indicators 5

(g) Hummocky Cross-stratification 5

(h) Unaltered preservation of fossils 5

(i) Species concept in Paleontology 5

(j) Stromatolites and their geological significance 5

SECTION B

*Attempt any **one** question.*

Q2. (a) Describe the role of groundwater in Limestone topography. Also, discuss the various erosional landforms developed due to the action of groundwater, with a suitable diagram. *15*

(b) Discuss the Digital Image Processing and comment on the image enhancement techniques. *15*

Q3. (a) With a neat diagram, describe the various compositional and mechanical layerings of the Earth. Also, discuss the role of seismic waves in inferring the interior of the Earth. *10*

(b) Describe the various types of volcanoes. Also discuss the causes of volcanism, with a diagram and comment on the global distribution pattern of volcanoes. *10*

(c) Discuss the spectral reflectance curve of the Earth's surface covered by soil, water bodies, rocks and vegetation, with suitable sketches. *10*

SECTION C

*Attempt any **one** question.*

Q4. (a) What is dip isogon pattern ? How are they helpful in classification of folds ? *15*

(b) Discuss different types of linear structures and discuss their tectonic significance. *15*

Q5. (a) Discuss the mechanism and significance of Mylonites and Cataclastic deformation. *10*

(b) What is rock cleavage ? Give the significance of cleavage in deciphering the structure of a folded area. *10*

(c) With the help of a block diagram for normal fault, thrust and strike-slip fault, show the orientation of σ_1, σ_2 and σ_3 for generation of these faults. *10*

SECTION D

*Attempt any **one** question.*

Q6. (a) What is a facies model ? Describe the sedimentation pattern and facies in a tidal flat environment. *15*

(b) How is depositional fabric in rudites useful in determining the depositional environment ? *15*

Q7. (a) Describe the controlling factors of sandstone composition. *10*

(b) Discuss the diagenesis and diagenetic reactions that occur in carbonate sediments. *10*

(c) Giving the genesis, describe any four sedimentary structures which are useful in paleocurrent analysis. *10*

SECTION E

*Attempt any **one** question.*

Q8. (a) Describe the shell morphology of trilobites with neat and labelled sketches. Add a note on their biostratigraphic significance during Paleozoic. *15*

(b) Comment on the ichnofacies concept and their role in the interpretation of shallow marine environments. Discuss the advantages and limitations of ichnofossils. *15*

Q9. (a) Describe the various stages in hominids evolution with suitable examples and sketches. *10*

(b) Comment on the Gondwana plant fossils and their paleoclimatic and paleogeographic implications. *10*

(c) Discuss the hypotheses for the cause of Permian-Triassic mass extinction. *10*

SECTION F

*Attempt any **one** question.*

Q10. (a) Describe the tectonic evolution of Cuddapah Supergroup. Also discuss the lithostratigraphic classification and associated depositional environment. *15*

(b) Discuss the distribution of marine Paleozoic formation of India. Describe the stratigraphic succession of Kashmir Paleozoic formations and also mention the characteristic fossils from different Paleozoic successions. *15*

Q11. (a) Discuss the nature and tectonic evolution of Central Indian Tectonic Zone (CITZ). *10*

(b) Describe the depositional environment of Paleogene succession of the Himalayas. *10*

(c) Discuss the tectonic evolution of Kutch Basin. Explain the Mesozoic stratigraphy of Kutch Basin and their depositional environment. *10*