Geologists' Exam, 2013

A–HFP–M–FDNA

GEOLOGY

Paper—I

Time Allowed : Three Hours | *Maximum Marks : 200*

INSTRUCTIONS

*Candidates should attempt **SIX** questions in **ALL** including Question No. **1**, which is compulsory, from Part—I and attempt **ONE** question each from Sections A, B, C, D and E from Part—II.*

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

All parts and sub-parts of a question are to be attempted together in the answer book.

Attempts of a part / question shall be counted in chronological order. Unless struck off, attempt of a part / question shall be counted even if attempted partly. Any page or portion of the page left blank in the answer book must be clearly struck off.

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

Symbols and abbreviations are as usual.

Neat sketches are to be drawn to illustrate answers, wherever required.

PART—I

1. Describe the following in **5** to **6** sentences each, with suitable sketches, wherever necessary. 5×10=50

   (a) Nunatak; 5

   (b) Badland; 5

   (c) Photogrammetry; 5

   (d) Back-arc Basin; 5

   (e) Map-reading; 5

   (f) Petrofabric Analysis; 5

   (g) Formation; 5

   (h) Susnai Breccia; 5

   (i) Periostracum; 5

   (j) Cyrtoconic Cephalopods. 5

PART—II

SECTION—A

2. (a) Explain the application of geomorphological studies in the construction of a dam. 15

   (b) Give an account of the Indian Space Mission and its usefulness in Geological studies. 15

3. Write notes on each of the following (in **250** words each) : 6×5=30

(a) Morphometric analysis of drainage basins; 6

(b) Pediplanation and Peniplanation; 6

(c) Horton's method of stream numbering; 6

(d) Terrain Evaluation; 6

(e) Infra-red imagery. 6

SECTION—B

4. (a) Discuss effect of stress on brittle and ductile Earth crust. 15

(b) Discuss in detail, projection diagram and its utility in Structural Geology. 15

5. Write notes on each of the following : 10×3=30

(a) Strain basics and their impact on Sedimentary Strata 10

(b) Geometry of faults 10

(c) Unconformities. 10

SECTION—C

6. (a) Analyse main features of Plate Tectonics. Is there any evidence of it in the Himalayan region ? If so, give salient features of the same. 15

(b) What are island arcs ? Discuss the evolution of primary active arcs. 15

7. Write notes on each of the following (in **250** words each) : 6×5=30

(a) Compare the geological and tectonic features of Peninsular and extra-peninsular India 6

(b) Characteristics of continental and oceanic crust 6

(c) Types of plate boundaries 6

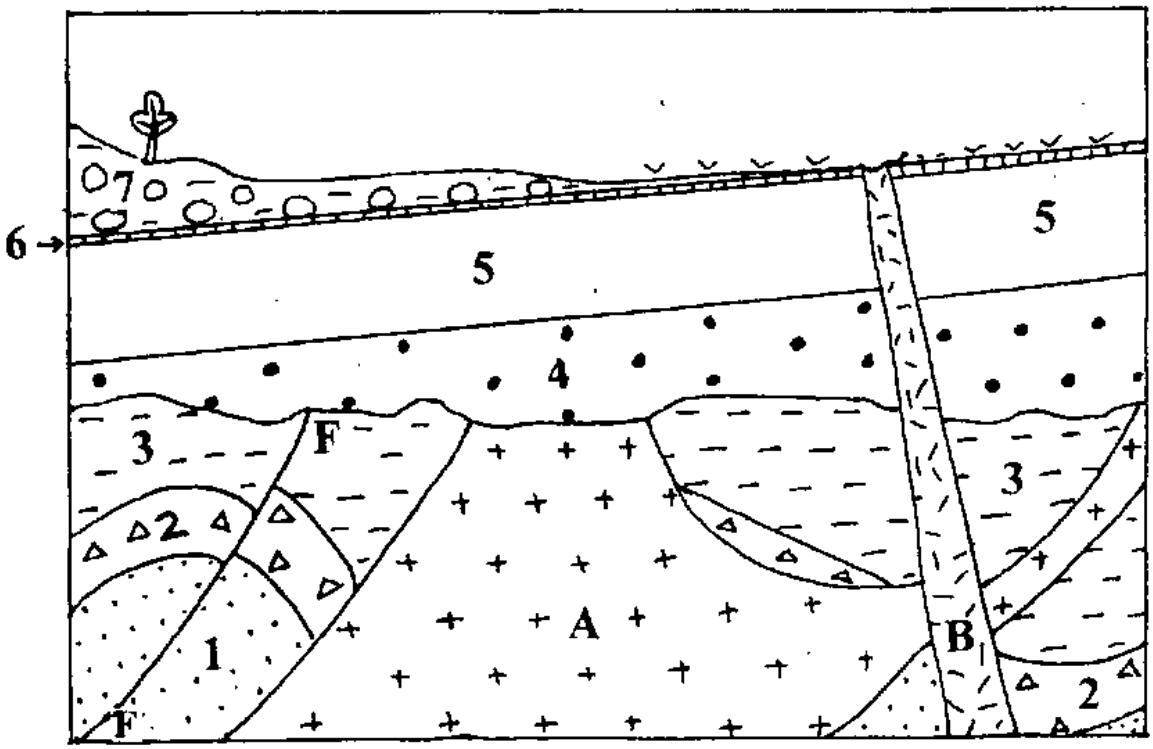
(d) Deep sea trenches 6

(e) Sea floor spreading. 6

SECTION—D

8. (a) In the section given below, bed nos. 1—7 are of sedimentary origin, while **A** and **B** are igneous

rocks. What sequence of events must have occurred in this region ? 15



(b) Explain briefly the "Two-fold" and "Three-fold" classifications of the Gondwana supergroup rocks. Discuss their merits and demerits (in about 500 words). 15

9. Write notes on each of the following (in about **200** words each) : 5×6=30

(a) Western Khondalite Zone; 5

(b) Bijawar Group in its type-locality; 5

(c) Sylhet Traps; 5

(Contd.)

(d) Blaini Boulder Beds; 5

(e) Po Formation of Himachal Pradesh; 5

(f) Karewa Formation. 5

SECTION—E

10. (a) Enumerate the vertebrate fossil record through time (in about 500 words). 15

(b) Discuss the evolutionary changes in bivalvian dentition, with examples (in about 500 words). 15

11. Discuss each of the following (in about **200** words each) : 5×6=30

(a) Distinction between *Globigerina* and *Globotruncana*; 5

(b) Types of fascioles in echinoids, with examples; 5

(c) *Conophyton*, its occurrence in India, and its stratigraphic significance—if any; 5

(d) Which cnidarians are found on either side of the Permian-Triassic boundary. Give examples; 5

(e) The habit and habitat of the pedicle-less brachiopods, with examples; 5

(f) A field geologist encounters seven consecutive beds in a cliff-section namely : **A** (blue limestone), **B** (black shale), **C** (blue limestone), **D** (siltstone), **E** (Calcareous shale), **F** (sandstone), **G** (Diamictite) from bottom to top. He collected the following fossils from these beds :

A — *Calceola sandalina*

B — *Monograptus* sp.

C — *C. sandalina*

D — *Phillipsia* sp.

E — *Meekoceras haydeni*

F — *Hipparion* sp.

G — No fossils

Discuss the geology briefly, and suggest broad ages of these beds. 5