Combined Geo - Scientist Exam, 2017

भू-विज्ञान परीक्षा

GEOLOGIST EXAM-2017

ZLX-U-GLY

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 under **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.

Symbols, abbreviations and notations have their usual standard meanings.

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 Booklet must be clearly struck off.

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

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

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

SECTION A
(Compulsory Section)

Q1. Answer and/or describe the following in brief with diagrams wherever necessary : *5×10=50*

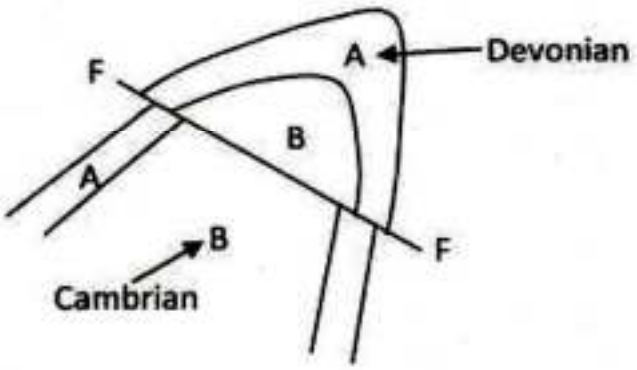
(a) Differentiate between raster and vector data. Discuss their utility in Geology. *5*

(b) Discuss the formation of four different types of sand dunes with relation to sand supply, vegetation and wind. *5*

(c) Differentiate between glacial deposits and fluvial deposits. Discuss three examples each of glacial depositional landforms and fluvial depositional landforms. *5*

(d) In a toposheet 45 D-11 (1 : 50,000 scale) the distance between two places is 10 cm. What is the actual distance on ground ? What are the other toposheets that occur to N, S, E, W of the above number toposheet ? Show in a diagram. *5*

(e) In a horizontal topography, two beds A and B are involved in deformation. Describe the details about the structure and sequence of their development. *5*



(f) Discuss the seismic character of convergent plate boundaries with suitable example. *5*

(g) Karewa Group *5*

(h) Geological Time Scale *5*

(i) Biocoenose and thanatocoenose fossil assemblages *5*

(j) Ecology of diatoms *5*

SECTION B

(Attempt any one question)

Q2. (a) Define 'resolution'. Discuss the different types of resolutions in satellite remote sensing. Can we have all the resolutions very high/fine in a particular satellite data ? What is resolution trade-off ? Discuss the spatial and temporal resolutions suitable/optimum for geological study, climatic study and geological hazard study. *15*

(b) Write short notes on the following : *15*

(i) Shutter Ridges

(ii) Fault-line Scarp

(iii) Horst and Graben

(iv) Triangular Facet

(v) Pull-apart Basin

Q3. (a) Discuss the image elements and geotechnical elements for visual classification of satellite images. *10*

(b) Discuss the difference among multispectral, hyperspectral and thermal images and their advantages. Give one example each of these three types of satellite images. *10*

(c) What is a glacier and where does it form ? Discuss how glaciers move. Describe four pre-glacial landforms and four post-glacial landforms. *10*

SECTION C

(Attempt any one question)

Q4. (a) Write about the buckling mechanism of folding. How does it explain the association of folds of different wavelength and amplitude ? *15*

(b) Draw 3D diagrams for normal, thrust and strike slip faults and show the orientation of σ_1, σ_2 and σ_3 responsible for generation of faults. *15*

Q5. (a) In a progressive deformation, write the significance of slaty cleavage, crenulation cleavage, boudinaged fold and folded boudin. *10*

(b) Write about the different forms of salt diapirs and the structures associated with these. *10*

(c) In a stereoplot, the poles of axial plane schistosity of F_1 folds lie on a girdle. When the F_1 fold axes are plotted in the same diagram, they lie very close to the pole of the girdle. Show the plot and interpret the structure. *10*

SECTION D

(Attempt any one question)

Q6. (a) Write short notes on the following : *15*

(i) Accretionary Prism

(ii) Back-arc Basin

(iii) Blueschist Facies Rocks

(b) Define a rift zone. Distinguish between active and passive rifts. Describe the structure and typical rock associations of a continental rift zone. *15*

Q7. (a) What is a collisional orogeny ? Discuss the structural and lithological characters of a collisional orogenic belt. *10*

(b) Discuss the structure of a 'divergent plate boundary'. What are the main geochemical signatures of basalts associated with mid-oceanic ridges ? *10*

(c) Compare and contrast the following : *10*

(i) Lithosphere and Asthenosphere

(ii) Subduction and Obduction

SECTION E

(Attempt any one question)

Q8. (a) Outline the palaeogeography of India near the Precambrian/Cambrian boundary. *15*

(b) Discuss the salient events of the fragmentation of the Gondwanaland during the Permian-Cretaceous interval. *15*

Q9. Write brief notes on the following :

(a) India-Asia collision and the rise of the Himalayas *10*

(b) Maximum Flooding Surface (MFS) in sequence stratigraphy *10*

(c) Radiometric dating of rocks *10*

SECTION F

(Attempt any one question)

Q10. (a) Describe the bathymetric distribution of organisms. *15*

(b) Throw light in brief on the evolution of vertebrate life through the ages. *15*

Q11. (a) Describe oculo-genital rings of echinoids. *10*

(b) Differentiate between the Pelecypoda and Brachiopoda. *10*

(c) Explain macroevolution with examples. *10*