GEOLOGY
Paper – I

General Instructions
This Question-Cum-Answer (QCA) Booklet contains 80+7 pages. Immediately on receipt of the Booklet, please check that this QCA Booklet does not have any misprint or torn or missing pages or items, etc. If so, get it replaced by a fresh QCA Booklet.

Candidates must read the instructions on this page and the following pages carefully before attempting the paper. Candidates should attempt all questions strictly in accordance with the specified instructions and in the space prescribed under each question in the Booklet. Any answer written outside the space allotted may not be given credit.

Question Paper in detachable form is available at the end of the QCA Booklet and can be removed and taken by the candidates after conclusion of the exam.

निर्धारित समय : तीन घंटे
Time Allowed : Three Hours

अधिकतम अंक : 200
Maximum Marks : 200
Important Instructions

Candidates should read the undermentioned instructions carefully. Violation of any of the instructions may lead to penalty.

DON'TS:

1. Do not write your Name or Roll number or Serial No. of Question-Cum-Answer-Booklet anywhere inside this Booklet. Do not sign the “Letter Writing” questions, if set in any paper by name, nor append your roll number to it.

2. Do not write anything other than the actual answers to the questions anywhere inside your Question-Cum-Answer-Booklet.

3. Do not tear off any leaves from your Question-Cum-Answer-Booklet. If you find any page missing, do not fail to notify the Supervisor/Invigilator.

4. Do not write anything on the Question Paper available in detachable form or admission certificate. Write answers at the specified space only.

5. Do not leave behind your Question-Cum-Answer-Booklet on your table unattended. It should be handed over to the Invigilator after conclusion of the exam.
DO'S:
1. Read the instructions on the cover page and the specific instructions to this Question Paper mentioned on the next page of this Booklet carefully and strictly follow them.
2. Write your Roll number and other particulars, in the space provided on the cover page of the Question-Cum-Answer-Booklet.
3. Write legibly and neatly in ink. Pencil may be used for drawing diagrams, sketches, etc.
4. For rough work, blank pages provided at the end of this booklet should be used. The rough work should be crossed through afterwards.
5. If you wish to cancel any work, draw your pen through it or write “Cancelled” across it, otherwise it may be valued.
6. Hand over your Question-Cum-Answer-Booklet personally to the invigilator before leaving the examination hall.

(केवल परीक्षकों द्वारा भरा जाए/To be filled by Examiners only)

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सकल योग/Grand Total

ZXL-U-GLY

SPECIMEN
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:  \[ 5 \times 10 = 50 \]

Q1(a) Differentiate between raster and vector data. Discuss their utility in Geology.

SPECIMEN
Q1(b) Discuss the formation of four different types of sand dunes with relation to sand supply, vegetation and wind.
Q1(c) Differentiate between glacial deposits and fluvial deposits. Discuss three examples each of glacial depositional landforms and fluvial depositional landforms.
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.
Q1(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.
Q1(f) Discuss the seismic character of convergent plate boundaries with suitable example.
Q1(h) Geological Time Scale

SPECIMEN
Biocoenose and thanatocoenose fossil assemblages
Q1(j) Ecology of diatoms
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.
Q2(b) Write short notes on the following:

(i) Shutter Ridges

(ii) Fault-line Scarp
(iii) Horst and Graben

(iv) Triangular Facet
(v) Pull-apart Basin
Q. 1 (a) Discuss the image elements and geotechnical elements for visual classification of satellite images.
Discuss the difference among multispectral, hyperspectral and thermal images and their advantages. Give one example each of these three types of satellite images.
What is a glacier and where does it form? Discuss how glaciers move. Describe four pre-glacial landforms and four post-glacial landforms.
Q4. (a) Write about the buckling mechanism of folding. How does it explain the association of folds of different wavelength and amplitude?
Q4(b) Draw 3D diagrams for normal, thrust and strike slip faults and show the orientation of $\sigma_1$, $\sigma_2$ and $\sigma_3$ responsible for generation of faults.
In a progressive deformation, write the significance of slaty cleavage, crenulation cleavage, boudinaged fold and folded boudin.
Q5(b) Write about the different forms of salt diapirs and the structures associated with these.
In a stereoplot, the poles of axial plane schistosity of F₁ folds lie on a girdle. When the F₁ 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.
SECTION D
(Attempt any one question)
Q6. (a) Write short notes on the following:
   (i) Accretionary Prism
Q6(a)  (ii) Back-arc Basin
(iii) Blueschist Facies Rocks
Q6(b) Define a rift zone. Distinguish between active and passive rifts. Describe the structure and typical rock associations of a continental rift zone.
What is a collisional orogeny? Discuss the structural and lithological characters of a collisional orogenic belt.
Q7(b) Discuss the structure of a ‘divergent plate boundary’. What are the main geochemical signatures of basalts associated with mid-oceanic ridges?
Compare and contrast the following:
(i) Lithosphere and Asthenosphere

SPECMEN
Q7(c) (ii) Subduction and Obduction
SECTION E
(Attempt any one question)

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

SPECIMEN
Q8(b) Discuss the salient events of the fragmentation of the Gondwanaland during the Permian-Cretaceous interval.
SPECIMEN
Write brief notes on the following:

Q9(a) India-Asia collision and the rise of the Himalayas
Q9(b) Maximum Flooding Surface (MFS) in sequence stratigraphy
Radiometric dating of rocks
SECTION F
(Attempt any one question)
Q10.(a) Describe the bathymetric distribution of organisms.
Q10(b) Throw light in brief on the evolution of vertebrate life through the ages.
(a) Describe oculo-genital rings of echinoids.
Differentiate between the Pelecypoda and Brachiopoda.
Q11(c) Explain macroevolution with examples.