

DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO

23-0009-AM TEST BOOKLET

GEOLOGY

(Time Allowed: 3 hours)

PAPER - I

(Maximum Marks: 300)

INSTRUCTIONS TO CANDIDATES

Read the instructions carefully before answering the questions: -

1. This Test Booklet consists of 12(twelve) pages and has 75 (seventy-five) items (questions).
2. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS BOOKLET *DOES NOT* HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.
3. Please note that it is the candidate's responsibility to fill in the Roll Number and other required details carefully and without any omission or discrepancy at the appropriate places in the OMR Answer Sheet and the Separate Answer Booklet. Any omission/discrepancy will render the OMR Answer Sheet and the Separate Answer Booklet liable for rejection.
4. Do not write anything else on the OMR Answer Sheet except the required information. Before you proceed to mark in the OMR Answer Sheet, please ensure that you have filled in the required particulars as per given instructions.
5. Use only **Black Ball Point Pen** to fill the OMR Answer Sheet.
6. This Test Booklet is divided into 4 (four) parts - Part - I, Part - II, Part - III and Part - IV.
7. All three parts are Compulsory.
8. Part-I consists of **Multiple Choice-based Questions**. The answers to these questions have to be marked in the OMR Answer Sheet provided to you.
9. Part-II, Part-III and Part-IV consist of **Conventional Essay-type Questions**. The answers to these questions have to be written in the separate Answer Booklet provided to you.
10. In Part-I, each item (question) comprises of 04 (four) responses (answers). You are required to select the response which you want to mark on the OMR Answer Sheet. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose **ONLY ONE** response for each item.
11. After you have completed filling in all your responses on the OMR Answer Sheet and the Answer Booklet(s) and the examination has concluded, you should hand over to the Invigilator *only the OMR Answer Sheet and the Answer Booklet(s)*. You are permitted to take the Test Booklet with you.
12. **Penalty for wrong answers in Multiple Choice-based Questions:**
THERE WILL BE PENALTY FOR WRONG ANSWERS MARKED BY A CANDIDATE.
 - (i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, one-third of the marks assigned to the question will be deducted as penalty.
 - (ii) If a candidate gives more than one answer, it will be treated as a wrong answer even if one of the given answers happens to be correct and there will be same penalty as above to the question.
 - (iii) If a question is left blank. i.e., no answer is given by the candidate, there will be no penalty for that question.

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PART - I (Multiple Choice-based Questions)

Instruction for Questions 1 to 50:

- Choose the correct answer for the following questions.
- Each question carries 3 marks.

[3x50=150]

1. Which of the following geochronologic units is correctly matched with the corresponding chronostratigraphic units?
 - (a) Period – Erathem
 - (b) Era-Stage
 - (c) Epoch-Series
 - (d) Age-Chronozon
2. Which of the following is passive-margin landform?
 - (a) Island arc
 - (b) Great escarpments
 - (c) Orogens
 - (d) Pull-apart basins
3. Which of the following is not a biostratigraphic unit?
 - (a) Range Zone
 - (b) Polarity Zone
 - (c) Assemblage Zone
 - (d) Abundance Zone
4. To which of the following ages is Muth quartzite dated to?
 - (a) Silurian
 - (b) Cambrian
 - (c) Ordovician
 - (d) Devonian
5. Which of the following is the largest felsic volcanic Province of India?
 - (a) Malani Suite
 - (b) Deccan Traps
 - (c) Rajmahal Traps
 - (d) Sylhet Traps
6. Match the following igneous activity in Group-A with the cratons where they occur in Group-B
 - (a) P-2, Q-1, R-3, S-4
 - (b) P-4, Q-1, R-2, S-3
 - (c) P-4, Q-2, R-3, S-1
 - (d) P-2, Q-1, R-4, S-3

Group-A

- P. Gingala Granite
- Q. Dalma Volcanic
- R. Closepet Granite
- S. Dongargarh Granite

Group-B

- 1. Singhbhum Craton
- 2. Aravalli Craton
- 3. Baster Craton
- 4. Dharwar Craton

7. K-T boundary signifies -
- (a) Extinction of Trilobite
 - (b) Extinction of Dinosaurs
 - (c) Extinction of Brachiopod
 - (d) Presence of Dinosaurs
8. Which of the following separates the Lesser Himalayas and the Sub Himalayas?
- (a) Main Central Thrust
 - (b) Main Boundary Thrust
 - (c) Indus-Tsangpo Suture Zone
 - (d) South Tibetan Detachment fault
9. According to Airy's hypothesis of Isostasy the blocks are of -
- (a) Uniform density with varying thickness
 - (b) Uniform depth with varying density
 - (c) Uniform depth with uniform density
 - (d) Uniform depth with uniform thickness
10. Who proposed the principle of Uniformitarianism?
- (a) James Hutton
 - (b) William White
 - (c) Charles Darwin
 - (d) Georges Cuvier
11. Which is a dominant factor in the evolution of landforms and is reflected in them?
- (a) Erosion agents
 - (b) Geomorphic processes
 - (c) Geologic structure
 - (d) Grain size
12. Which of the following stratigraphic units belongs to the Cretaceous?
- (a) Jaisalmer formation
 - (b) Lathi formation
 - (c) Pariwar formation
 - (d) Baisakhi formation
13. Pyroclastic rocks that have a fragmented cindery texture are called
- (a) Scoria
 - (b) Pumice
 - (c) Ignimbrites
 - (d) Tuff
14. What is the wavelength range of the visible spectrum in electromagnetic spectrum?
- (a) $0.4\mu\text{m} - 0.7\mu\text{m}$
 - (b) $1\mu\text{m} - 10\mu\text{m}$
 - (c) $0.1\mu\text{m} - 0.4\mu\text{m}$
 - (d) $10\mu\text{m} - 100\mu\text{m}$

15. Which of the following satellites is a Geostationary Satellite?

- (a) LANDSAT
- (b) IRS
- (c) INSAT
- (d) SPOT

16. Match the following stratigraphic units in Group-A with the economic deposits in Group-B:-

Group-A	Group-B
P. Nallamalai group	1. Manganese
Q. Bailadila group	2. Pb
R. Mansar formation	3. Iron ore
S. Bijawar Series	4. Diamonds

- (a) P-3, Q-1, R-2, S-4
- (b) P-2, Q-3, R-1, S-4
- (c) P-1, Q-3, R-2, S-4
- (d) P-2, Q-4, R-3, S-1

17. The ratio of compressive and longitudinal strain is called -

- (a) Bulk modulus
- (b) Poisson's ratio
- (c) Young's modulus
- (d) Rigidity

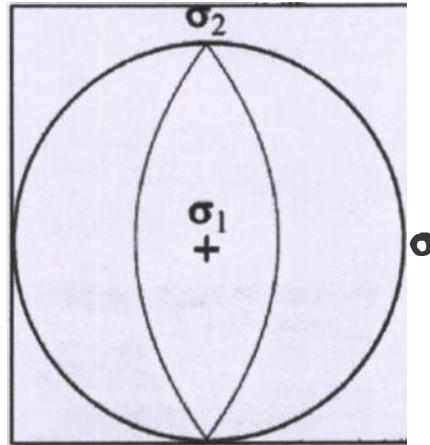
18. What is the spatial resolution of LISS-III?

- (a) 72.50 m.
- (b) 23.50 m.
- (c) 5.8 m.
- (d) 188.3 m.

19. An instrument which is mostly useful in reconnaissance mapping is?

- (a) Stereoscope
- (b) Pedometer
- (c) Altimeter
- (d) Stereonet

20. The stereographic projection below shows the principle stress axes and fault planes. The projection represents a -



- (a) Normal fault
- (b) Reverse fault
- (c) Thrust fault
- (d) Dextral fault

21. Which of the following does not belong to siliceous micro fossils group?

- (a) Radiolaria
- (b) Diatoms
- (c) Foraminifera
- (d) Silicoflagellates

22. Shear strain is defined as -

- (a) $\gamma = \tan \psi$
- (b) $e = S/l_0$
- (c) $\Delta = S_v/V_0$
- (d) $\lambda = (1+e)^2$

23. The Hook shaped pattern in a fold is a result of which kind of fold interference pattern of Ramsay?

- (a) Type 0
- (b) Type 1
- (c) Type 2
- (d) Type 3

24. An unconformity in which the older sequence is made up of plutonic igneous rock while the younger sequence is made up of sedimentary rocks is called -

- (a) Disconformity
- (b) Non-Conformity
- (c) Angular Unconformity
- (d) Parallel Unconformity

25. Slickenside is an example of -

- (a) Penetrative foliation
- (b) Penetrative Lineation
- (c) Non penetrative foliation
- (d) Non-Penetrative Lineation

26. Fossils which range from ancient time up to the present day without any change in their primitive characters are known as -
- (a) Trace fossils
 - (b) Living fossils
 - (c) Body fossils
 - (d) Facies fossils
27. A specimen of a species from the same locality as its holotypes is
- (a) Topotype
 - (b) Lectotype
 - (c) Paratype
 - (d) Holotype
28. A stress acting along the plane is called -
- (a) Normal Stress
 - (b) Compressive Stress
 - (c) Tensile Stress
 - (d) Shear Stress
29. The horse Hyracotherium possessed -
- (a) Two functional toes
 - (b) Four Toes
 - (c) Three toes
 - (d) A single functional toe
30. Which of the following plant fossils is known as middle Gondwana flora?
- (a) Dicroidium
 - (b) Ptilophyllum
 - (c) Glossopteris
 - (d) Gangamopteris
31. Trilobites disappeared in the mass extinction by the end of -
- (a) Carboniferous
 - (b) Triassic
 - (c) Silurian
 - (d) Permian
32. Which of following hominid were reported from Middle Siwalik?
- (a) Sivapithecus
 - (b) Ramapithecus
 - (c) Sugrivapithecus
 - (d) Gigantopithesus
33. Which of the following is not a terrestrial planet?
- (a) Mercury
 - (b) Mars
 - (c) Jupiter
 - (d) Venus

34. Stony meteorites consist of -
(a) Iron and nickel
(b) Silicate minerals
(c) Nickel and Cobalt
(d) None of the above
35. The San Andreas fault is a kind of-
(a) Reverse fault
(b) Thrust fault
(c) Sinistral strike slip
(d) Dextral-Strike slip
36. The shape and age of the earth are
(a) Spheroid and 4.6 Ga
(b) Oblate spheroid and 4.6 Ga
(c) Ellipsoid and 4.0 Ga
(d) Prolate ellipsoid and 4.0 Ga
37. The velocity of P-Wave is highest-
(a) In upper crust
(b) In upper mantle
(c) In lower mantle
(d) in the core
38. Which of the following is not an element of plate tectonics?
(a) Convergent
(b) Divergent
(c) Translational
(d) Transform
39. The sequence of magnetic polarity with respect to their age (Ma) from Pliocene to Pleistocene is-
(a) Brunhes, Matuyama, Gauss and Gilbert
(b) Brunhes, Gauss, Matuyama and Gilbert
(c) Gilbert, Matuyama, Gauss and Brunhes
(d) Gilbert, Gauss, Matuyama and Brunhes
40. An imaginary surface which coincides with hydrostatic pressure level of the natural water in the confined aquifer is called
(a) Ground Surface
(b) Phreatic Surface
(c) Piezometric Surface
(d) Free Surface
41. What is the unit of transmissibility?
(a) m^2/day
(b) m^3/day
(c) m/second
(d) cm/second

42. An impermeable formation that neither contains nor transmits water is called -
- Aquifer
 - Aquiclude
 - Aquifuge
 - Aquitard
43. Sodium content of water is usually expressed in terms of percent sodium and defined by which formula?
- $\%Na = (Ca+Mg)100/Na+K+Ca+Mg$
 - $\%Na = (Na+K)100/Ca+Mg+Na+K$
 - $\%Na = (Ca+Na)100/Ca+Mg+Na+K$
 - $\%Na = (Mg+K)100/Ca+Mg+Na+k$
44. The production capacity of a well is rated by its -
- Well loss
 - Specific capacity
 - Thickness of a aquifer
 - Permeability of the aquifer
45. Which property of rock is determined by Triaxial Test?
- Shear Strength
 - Compressive Strength
 - Tensile Strength
 - None of these
46. An imperceptible slow movement of soil and rocks in down slope is known as -
- Rock fall
 - Creep
 - Slide
 - All of these
47. Most favorable geological environment for tunnel that would minimize the effect of vertical pressure -
- Inclined strata dipping away from valley slopes
 - Inclined strata dipping towards the valley slopes
 - Along an antiformal structure
 - Along a synformal structure
48. Which of the following has the correct stratigraphic sequence from older to the younger?
- Gorur Gneiss – Sargur Group – Bababudan Group – Chitradurga Group
 - Sargur Group – Gorur Gneiss – Bababudan Group – Chitradurga Group
 - Sargur Group – Bababudan Group – Chitradurga Group – Gorur Gneiss
 - Gorur Gneiss – Bababudan Group – Chitradurga Group – Sargur Group
49. A term that is used for a steeply plunging inclined fold is-
- Recumbent fold
 - Reclined fold
 - Plunging upright
 - Inclined Horizontal fold

50. Which of the following is not a component of GIS?

- (a) Computer
- (b) Software
- (c) Spatial data
- (d) Space segment

PART-II (Short Answer-type Questions)

Instructions for Questions 51 to 63:

- *Write the answers in short for any 10 (TEN) out of the thirteen questions.*
- *Each question carries 5 marks. [5x10=50]*

51. Explain trellis drainage pattern.

52. What are dip isogons and how are they drawn?

53. What is relief displacement? What is its formula?

54. Define drift and crab.

55. Describe the features of Moeritherium.

56. Write briefly about the adductor muscle impressions in Lamellibranches.

57. Explain Flexure slip and Flexure shear with the help of brief sketches.

58. Define ediacara fossils and cite its importance.

59. Bring out the difference between parallel and similar folds with rough sketches.

60. Explain the concept of gravity anomaly of mid oceanic ridges.

61. Define connate and juvenile water.

62. Give an overview of the vadose zone.

63. What are MBT and MCT? Explain.

PART-III (Long Answer-type Questions)

Instructions for Questions 64 to 71:

- *Answer any 5 (FIVE) out of the eight questions.*
- *Each question carries 10 marks.*

[10x5=50]

64. Explain the difference between regular and irregular Echinoids with atleast three examples of each type.
65. Discuss the characteristics of buckle folds.
66. Explain the difference between elastic strain and viscous strain.
67. What are the advantages of photo geology over conventional geological survey?
68. What is rule of V's? What is its significance in geological contacts? Explain with sketches.
69. Elaborate the different types of unconformities.
70. Explain different types of suture Lines in Cephalopods.
71. Discuss discontinuities in Earth's interior as revealed by seismic waves.

PART-IV (Essay-type Questions)

Instructions for Questions 72 to 75:

- *Answer any 2 (TWO) out of the four questions.*
- *Each question carries 25 marks.*

[25x2= 50]

72. What are mid oceanic ridges? What are their characteristic features and significance? Also discuss the concept of sea floor spreading.
 73. What are aerial photographs? Discuss their merits and limitations. Also describe application of remote sensing in geology with special emphasis on mineral exploration.
 74. What are mantle plumes? Discuss their origin and significance.
 75. Describe evolution history of elephant in detail with suitable sketches.
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