

23-0009-AM TEST BOOKLET
GEOLOGY
PAPER - II

Time Allowed: 3 hours

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.

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

PART – I (Multiple Choice-based Questions)

Instructions for Questions 1 to 50:

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

[3x50= 150]

1. Quartz belongs to which silicate group of minerals -
 - (a) Neosilicate
 - (b) Cyclosilicate
 - (c) Tektosilicate
 - (d) None of the above
2. Which of the following is the gem variety of beryl?
 - (a) Turquoise
 - (b) Emerald
 - (c) Sapphire
 - (d) Peridot
3. Si:O ratio in double chain silicates is -
 - (a) 1:4
 - (b) 1:3
 - (c) 1:2
 - (d) 4:11
4. To which group does Jadeite belong?
 - (a) Clinopyroxene
 - (b) Orthopyroxene
 - (c) Orthoamphibole
 - (d) Mica
5. The chemical formula of Sylvite is -
 - (a) NH_4Cl
 - (b) KCl
 - (c) NaCl
 - (d) AgCl
6. Which crystal system is characterized by 3 mutually perpendicular axes of different lengths (a, b, c) -
 - (a) Cubic
 - (b) Monoclinic
 - (c) Orthorhombic
 - (d) Triclinic
7. Mineral crystallizing in which crystal system are not uniaxial?
 - (a) Monoclinic
 - (b) Tetragonal
 - (c) Trigonal
 - (d) Hexagonal

8. Positive uniaxial minerals are characterized by -
- (a) $n_e = n_o$
 - (b) $n_e < n_o$
 - (c) $n_e > n_o$
 - (d) $n_e \leq n_o$
9. Six membered ring silicate structure is a character of -
- (a) Bentonite
 - (b) Tourmaline
 - (c) Beryl
 - (d) Axinite
10. Stony iron meteorites are also known as -
- (a) Siderolites
 - (b) Aerolites
 - (c) Siderites
 - (d) Chondrites
11. Siderophile elements have affinity with -
- (a) Silica
 - (b) Iron
 - (c) Sulfur
 - (d) Oxygen
12. Which of the following is an ore of aluminum?
- (a) Enargite
 - (b) Chrysocolla
 - (c) Kieserite
 - (d) Diaspore
13. The chemical formula of bornite is -
- (a) CuFeS_2
 - (b) Cu_2S
 - (c) Cu_5FeS_4
 - (d) CuS
14. Regional metamorphism induced by increase in both pressure and temperature is known as
- (a) Burial metamorphism
 - (b) Dynamothermal metamorphism
 - (c) Contact metamorphism
 - (d) Ocean Floor metamorphism
15. Ag is a/an _____ element.
- (a) Siderophile
 - (b) Lithophile
 - (c) Chalcophile
 - (d) Atmophile

16. Which of the following is not a manganese mineral?
(a) Pyrolusite
(b) Psilomelane
(c) Hansmarite
(d) Wolframite
17. Which of the following is a Li bearing Mica?
(a) Lepidolite
(b) Biotite
(c) Phlogopite
(d) Muscovite
18. Cinnabar is an ore of which of the following elements?
(a) Ag
(b) Au
(c) Cu
(d) Hg
19. Which form of gypsum is selenite?
(a) massive
(b) fibrous silky
(c) transparent crystal
(d) granular
20. An igneous texture in which most of the crystals are anhedral :-
(a) allotriomorphic
(b) hypidiomorphic
(c) panidiomorphic
(d) poikilidic
21. Soda rich basalt in which albite or albite-oligoclase is the predominating feldspar is called
(a) Mugearite
(b) Tachylyte
(c) Spilite
(d) tholeiite
22. Odd-Harkins rule states that elements of _____ atomic number are more abundant than those of _____ atomic number.
(a) odd, even
(b) even, odd
(c) lower, higher
(d) higher, lower
23. Which is the most abundant element in the earth as a whole?
(a) Si
(b) O
(c) Fe
(d) Ni

24. Na is a –
- (a) Siderophile element
 - (b) Lithophile element
 - (c) Chalcophile element
 - (d) Atmosphile element
25. Which is the characteristic mineral of blue schist facies?
- (a) quartz
 - (b) sillimanite
 - (c) actinolite
 - (d) glaucophane
26. Tectonic setting in which blueschists form are -
- (a) Extensional setting
 - (b) Subduction zone
 - (c) Within plate setting
 - (d) None of the above
27. Two pyroxene association is characteristic of -
- (a) Granulite facies
 - (b) Greenschist facies
 - (c) Amphibolites facies
 - (d) Hornfels facies
28. Laumontite and heulandites are restricted to _____ facies.
- (a) prehnite-pumpellyite
 - (b) blue schist
 - (c) eclogite
 - (d) zeolite
29. If the heat of function of an Oxide is greater than that of FeO, the element is:-
- (a) chalcophile
 - (b) atmophile
 - (c) siderophile
 - (d) lithophile
30. Which sedimentary rock is most abundant in the Earth's crust?
- (a) sandstone
 - (b) shale
 - (c) limestone
 - (d) conglomerate
31. Degana hill tungsten deposit has been formed by which of these processes?
- (a) Residual Process
 - (b) Mechanical Process
 - (c) Sedimentation process
 - (d) Bacterial process

32. Who compiled the first adequate table of cosmic abundances of elements and isotopes?
(a) Oddo Hackins
(b) Gold Schmidt
(c) Clarke
(d) Wedepohl
33. Foliated tectonites are called –
(a) L tectonites
(b) S tectonites
(c) L-S tectonites
(d) K tectonites
34. Crystals accidentally incorporated in magmas and preserved in partly resorbed state are known as-
(a) Xenoliths
(b) Spherulites
(c) Variolites
(d) Perthites
35. Which of the following rocks is deposited only by non-biological, chemical precipitation?
(a) Halite
(b) Limestone
(c) Chert arenite
(d) Coal
36. Siliceous environments, named for the silica-rich shells deposited in them occur _____
(a) in an evaporite environment
(b) in a swamp environment
(c) in a reef environment
(d) in a deep-sea environment
37. In which of the following environments would you expect to find symmetrical ripples?
(a) alluvial
(b) beach
(c) deep sea
(d) desert
38. Which among the given options is a non-marine evaporite mineral?
(a) mirabilite
(b) carnallite
(c) gypsum
(d) halite
39. Modern Bog Iron deposits are included –
(i) Goethite, Siderite, Psilomelane and Pyrolusite
(ii) High Latitude swamps and Lakes in Northern Hemisphere
(iii) Low Latitude swamps and Lakes in Southern Hemisphere
- (a) (i) & (ii)
(b) (i) & (iii)
(c) (ii) & (iii)
(d) none of the above

40. Explosive interaction of hot magma with groundwater which flashes to steam is called –
- (a) Mare Cone
 - (b) Scoria Cone
 - (c) Tuff Ring
 - (d) Tuff cone
41. An ultramafic igneous coarse-grained rock constituted of 40% to 90% olivine along with significant orthopyroxene and lesser amounts of calcic chromium rich clinopyroxene is-
- (a) dunite
 - (b) lherzolite
 - (c) granite
 - (d) diorite
42. Alaskite is type of granite having –
- (a) Only Quartz and K-feldspar
 - (b) K-feldspar and plagioclase
 - (c) Pyroxene and quartz and plagioclase
 - (d) None of the above
43. Which of the following mineral is REE bearing?
- (a) allanite
 - (b) apatite
 - (c) bastnaesite
 - (d) all the above
43. Polymetallic nodules on the ocean floor contain significant amounts of -
- (a) Cu–Ni–Co
 - (b) Pb–Zn–Ti
 - (c) Hg–Mo–Pt
 - (d) U–Th–Nb
44. In the supergene enrichment process Bornite is deposited -
- (a) Above the water table
 - (b) Below the water table with oxidizing condition
 - (c) Below the water table with reducing condition
 - (d) At hypogene zone.
46. Gold deposits found in Swarnarekha river of Jharkhand is a type of -
- (a) Riffle deposit
 - (b) Pay Streak deposit
 - (c) Meander type deposit
 - (d) Alluvial fan type
47. Lapsaburu kyanite deposits is formed by which of these processes?
- (a) Residual Process
 - (b) Mechanical Process
 - (c) Sedimentation process
 - (d) Bacterial process

48. Which of the following is an example of positive uniaxial mineral?
(a) calcite
(b) zircon
(c) beryl
(d) tourmaline
49. Metamorphism generated by explosive volcanic eruption or relatively rare collision of extraterrestrial objects with Earth is called -
(a) Contact metamorphism
(b) Dynamo thermal metamorphism
(c) Ocean Floor metamorphism
(d) Impact metamorphism
50. Vogesite is variety of lamprophyre having –
(a) hornblende and orthoclase
(b) augite and plagioclase
(c) biotite and plagioclase
(d) labradorite and augite

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. Define Pleochroism with an example. What is its primary cause?
52. Briefly explain ophitic texture.
53. How are pyroclastic deposits formed? Give examples.
54. Write a note on mica group of minerals.
55. Define metasomatism. What causes metasomatism?
56. Write a note on the significance of Digboi Oil Field.
57. Differentiate between rudaceous and arenaceous rocks.
58. What are migmatites? What are their different types?
59. Define diagenesis and lithification. Is lithification part of diagenesis? Explain.
60. Write a note on Singhbhum Copper Belt and its significance.
61. Outline five properties and five uses of granodiorite.
62. Explain Alkali Lime Index with the help of a diagram.
63. What is extinction angle and how is it measured?

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. Discuss the criteria for identification of Replacement Deposits.
65. Discuss the important lead and zinc deposits of India.
66. Explain dynamo-thermal metamorphism.
67. Describe paired metamorphism belts.
68. Discuss optical properties of biotite and hornblende under crossed nicols.
69. Explain QAPF classification of granites.
70. Define ophiolite sequence and its significance.
71. Explain alluvial, eluvial and beach places deposits.

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. Describe in detail different types of primary and secondary sedimentary structures with their significance with reference to India.
73. Discuss the characteristics of the source and reservoir rocks for hydrocarbon. Also describe different types of hydrocarbon traps with suitable sketches.
74. Describe in detail distribution, emplacement, genesis and mineral resources associated with Deccan Traps in India.
75. Give an account of the structure, chemistry and classification of Feldspar group of minerals.