

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

T.B.C. : BAC-42

Test Booklet Series

Serial No. **601302**

**B**

**TEST BOOKLET**  
**GEOLOGY**

*Time Allowed : 2 Hours*

*Maximum Marks : 300*

**INSTRUCTIONS TO CANDIDATES**

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET **DOES NOT** HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.
2. ENCODE YOUR OPTIONAL SUBJECT CODE AS MENTIONED ON THE BODY OF YOUR ADMISSION CERTIFICATE AND ADVERTISEMENT AT APPROPRIATE PLACES ON THE ANSWER SHEETS.
3. ENCODE CLEARLY THE TEST BOOKLET SERIES **A, B, C** OR **D** AS THE CASE MAY BE IN THE APPROPRIATE PLACES IN THE ANSWER SHEET USING HB PENCIL.
4. You have to enter your **Roll No.** on the Test Booklet in the Box provided along side. **DO NOT** write *anything else* on the Test Booklet.
5. This Test Booklet contains **120** items (questions). Each item comprises four responses (answers). You will select the response which you want to mark on the 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.
6. You have to mark all your responses **ONLY** on the separate Answer Sheet provided by using HB pencil. See instruction in the Answer Sheet.
7. All items carry equal marks. All items are compulsory. Your total marks will depend only on the number of correct responses marked by you in the Answer Sheet. For each question for which a wrong answer is given by you, **one fifth (0.20) of the marks assigned to that question will be deducted as penalty.**
8. Before you proceed to mark in the Answer Sheet the responses to various items in the Test Booklet, you have to fill in some particulars in the Answer Sheet as per instructions sent to you with your **Admission Certificate.**
9. After you have completed filling in all your responses on the Answer Sheet and the examination has concluded, you should hand over to the Invigilator the *Answer Sheet*, the Test Booklet issued to you.

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1. Ca-Cr garnet is
  - (a) Pyrope
  - (b) Andradite
  - (c) Grossularite
  - (d) Uvarovite
2. In the earth's crust which of the following is more abundant than all other minerals combined ?
  - (a) Garnet
  - (b) Feldspar
  - (c) Pyroxene
  - (d) Amphibole
3. Which of the following felspar minerals has the highest sp. gr. ?
  - (a) Microcline
  - (b) High albite
  - (c) Celsian
  - (d) Anorthite
4. Perfect prismatic cleavages parallel to (110) and (100) intersecting at  $56^\circ$  and  $124^\circ$  occur in
  - (a) Calcium amphiboles only
  - (b) Sodium amphiboles only
  - (c) Cummingtonite-grunerite series only
  - (d) All amphibole varieties
5. In most micas, the Al : Si ratio is
  - (a) 1 : 4
  - (b) 2 : 6
  - (c) 3 : 8
  - (d) 1 : 2
6. Which of the following is NOT the altered product of olivine ?
  - (a) Chlorophaeite
  - (b) Serpentine
  - (c) Iddingsite
  - (d) Chlorite
7. Cerussite is
  - (a) Lead carbonate
  - (b) Barium carbonate
  - (c) Copper carbonate
  - (d) Zinc silicate
8. Paramorphism refers to
  - (a) Change in molecular constitution without change of chemical substance
  - (b) Alteration accompanied by loss of ingredients
  - (c) Alteration accompanied by the assumption of an ingredient
  - (d) Alteration due to exchange of constituents
9. Gossan or caprocks are good indicator of
  - (a) Hydrothermal deposits
  - (b) Placer deposits
  - (c) Residual deposits
  - (d) Secondary sulphide deposits
10. Openings or cavities are formed during the formation of mineral veins in
  - (a) Vugs
  - (b) Gossan
  - (c) Dome
  - (d) Paystreaks

11. According to Lindgren's classification a hydrothermal deposit is formed at 500—600°C and at very high pressure in
- (a) Xenothermal
  - (b) Telethermal
  - (c) Mesothermal
  - (d) Hypothermal
12. Chromite is a member of
- (a) Spinel group
  - (b) Epidote group
  - (c) Olivine group
  - (d) Mellilite group
13. In Orissa iron ore occurs in an association with
- (a) Banded haematite quartzite
  - (b) Banded haematite jasper
  - (c) Both (a) and (b)
  - (d) Gneiss
14. Aluminium ores are
- (a) Bauxite
  - (b) Cryolite
  - (c) Gibbsite
  - (d) All
15. Kolar gold deposit is an example of
- (a) Fissure vein deposit
  - (b) Shear zone deposit
  - (c) Ladder vein deposit
  - (d) Stock work
16. Lead and Zinc are confined to
- (a) Older Archeans
  - (b) Lower Proterozoic
  - (c) Upper Proterozoic
  - (d) Cretaceous
17. Parot coal is a variety of
- (a) Bituminous Coal
  - (b) Lignite
  - (c) Anthracite
  - (d) Peat
18. The following is not a refractory
- (a) Fire-Clay
  - (b) Kyanite
  - (c) Kaoline
  - (d) Lignite
19. The texture of an Igneous rock may be regarded as a function of
- (a) Crystallinity
  - (b) Granularity
  - (c) Fabric
  - (d) All the above
20. Earliest mineral of the Bowen's discontinuous reaction series is
- (a) Plagioclase
  - (b) Olivine
  - (c) Orthopyroxene
  - (d) Biotite
21. Zoning in plagioclase is caused by
- (a) Variation in chemical composition
  - (b) Variation in T and P
  - (c) Variation in crystal size
  - (d) (a) and (b) both

22. Porphyritic texture exhibits \_\_\_\_\_ stage of crystallization.
- One
  - Two
  - Three
  - None
23. Point at which constant proportion of two constituents crystallizes simultaneously is known as
- Eutectic
  - Peritectic
  - Graphic
  - Solvus
24. Obsidian is
- Holocrystalline
  - Holohyaline
  - Hypocrystalline
  - Microcrystalline
25. The volcanic equivalent of granite is
- Rhyolite
  - Rhyodacite
  - Monzonite
  - Andesite
26. Jointed/faulted rocks are projected as
- Dendritic drainage
  - Centripetal drainage
  - Rectangular drainage
  - Pinnate drainage
27. The surface of fresh snow reflects light intensity by
- 35—40%
  - 22%
  - 5—15%
  - 75—90%
28. The bottom part of a bed is indicated by the
- ripple marks
  - truncated end of the current bedding
  - tangential end of the current bedding
  - dolerite dykes
29. Which one is the dip direction of a bed, if it strikes in 30-210 direction ?
- S 30 W
  - S 30 E
  - North
  - South
30. Which one is the property of the reclined fold ?
- The axial plane and axis are inclined in the same direction by same amount.
  - The axial plane and axis are inclined in the same direction by different amount.
  - The axial plane and axis are inclined in the opposite direction.
  - It is a refolded recumbent fold.

31. At the limb of a fold, the slaty cleavage and the bed dip in the same direction, but the cleavage dips at a lower amount than the bed. The limb is
- less metamorphosed than the other limb
  - overturned
  - thicker than the other limb
  - normal
32. For accurate measurement of altitude of the bed by a clinometer, which is measured first ?
- Plunge
  - Pitch
  - Strike
  - Dip
33. In a single stage of folding, the intersection lineation between bedding plane and slaty cleavage trends
- Parallel to fold axis
  - Perpendicular to fold axis
  - $45^\circ$  to fold axis
  - $60^\circ$  to fold axis
34. What type of fault will result if maximum and minimum stress axes are horizontal ?
- Normal fault
  - Reverse fault
  - Thrust
  - Strike-slip fault
35. How many lines of no longitudinal finite strain are there in a strain ellipse ?
- Four
  - Three
  - Two
  - One
36. What is the altitude of the foliation if its pole lies at the centre of the stereonet ?
- Inclined by  $45^\circ$  to south
  - Inclined by  $45^\circ$  to north
  - Horizontal
  - Vertical
37. The beds show a V pattern along a stream. This is because
- The dip of the beds is in the same direction as the slope of the stream, but the dip of the bed is more than the slope.
  - The dip of the beds is in the same direction as the slope of the stream, but the dip of the bed is less than the slope.
  - The dip of the beds is in the opposite direction as the slope of the stream, but the dip of the bed is more than the slope.
  - The dip of the beds is in the opposite direction as the slope of the stream, but the dip of the bed is less than the slope.
38. Which of the following systems has no axes of symmetry ?
- Monoclinic
  - Orthorhombic
  - Triclinic
  - Trigonal

39. Who among the following considered as the 'father of Crystallography' ?
- Haüy
  - N. Steno
  - F.C. Phillips
  - R. Hooke
40. Which of the following systems has the maximum number of classes ?
- Cubic
  - Trigonal
  - Orthorhombic
  - Tetragonal
41. Hexoctahedra  $\{hkl\}$  is the general form of
- Hexagonal system
  - Cubic system
  - Monoclinic system
  - Triclinic system
42. Elbow twin is exhibited by
- Spinel
  - Rutile
  - Plagioclase
  - Gypsum
43. Brewster's law is related to
- Birefringence
  - Pleochroism
  - Extinction angle
  - Polarization of light
44. Crystals of which of the following system are uniaxial ?
- Orthorhombic
  - Hexagonal
  - Monoclinic
  - Triclinic
45. In biaxial minerals, the maximum birefringence is observed due to the difference in R-I of which two of the  $\alpha$ ,  $\beta$ ,  $\gamma$  rays ?
- $\gamma-\alpha$
  - $\gamma-\beta$
  - $\beta-\alpha$
  - None of the above
46. Calcite is used in Nicol Prism due to its
- Pleochroism
  - Extinction angle
  - Birefringence
  - None of the above
47. Extinction angle can be determined accurately by
- Gypsum plate
  - Mica plate
  - Quartz wedge
  - None of the above
48. Spodumene is a
- Calcium pyroxene
  - Lithium pyroxene
  - Sodium pyroxene
  - Alkali Felspar

49. Minerals in which each silicate tetrahedron shares all four oxygens with other tetrahedra are called
- Tektosilicates
  - Phyllosilicates
  - Inosilicates
  - Cyclosilicates
50. Anorthosites are monomineralic rocks composed essentially of
- Plagioclase
  - Plagioclase and potash feldspar
  - Potash feldspar and olivine
  - Plagioclase and pyroxene
51. The typical rapakivi texture is characterised by
- Ovoids of plagioclase surrounded by potash feldspar
  - Ovoids of quartz surrounded by potash feldspar
  - Ovoids of potash feldspar surrounded by plagioclase
  - Vermicular quartz surrounded by plagioclase
52. In the Streckeisen classification, the igneous rocks are named according to their
- Textural properties
  - Mode of crystallization
  - Modal mineral composition
  - Normative mineral compositions
53. A sandstone containing more than 15% fine grained matrix, 70% quartz, rest rock fragments, feldspars and accessory minerals can be termed as
- Litharenite
  - Arkosic arenite
  - Greywacke
  - Quartzwacke
54. Wackestone is a type of limestone where
- Grains are in contact without matrix
  - Coarse grains floating in matrix
  - Grains in contact with matrix
  - Micrite with few grains
55. Lamination is generally defined as a sedimentary layer whose thickness is
- > 5 cm
  - Between 5 cm and 2 cm
  - Between 2 cm and 1 cm
  - < 1 cm
56. The downstream migration of ripples, sand waves and dunes under conditions of net sedimentation gives rise to
- Massive bedding
  - Graded bedding
  - Cross bedding
  - Contorted bedding

57. The association of bedded chert with black shales and phosphorites indicates
- Shallow marine protected area
  - Deep water environment
  - Lacustrine environment
  - Fluvial environment
58. Caldera is formed due to
- Earthquake
  - Volcano
  - Mountain Building
  - Continental drift
59. Gutenberg discontinuity exists at a depth of
- 35 kms
  - 1800 kms
  - 1000 kms
  - 2900 kms
60. The density of Earth as a whole is
- 2.7 grams/cc
  - 1.9 grams/cc
  - 5.5 grams/cc
  - 3.3 grams/cc
61. Red Planet is the other name of
- Jupiter
  - Mercury
  - Mars
  - Venus
62. A planet known as "Earths twin" because of similar size and mass as earth is
- Mercury
  - Venus
  - Mars
  - Jupiter
63. Plates are made up of
- Crust only
  - Crust and upper mantle
  - Crust and whole of mantle
  - Crust, mantle and outer core
64. Geosynclines are the zones of
- Seismic activity
  - Sea floor spreading
  - Complex Mountain Building
  - Stable areas
65. Remanents of oceanic crust is represented by
- Tektite
  - Tholeiite
  - Quartz-tholeiite
  - Ophiolite
66. At oceanic trenches the oceanic crust is
- Pulled into the mantle
  - Generated
  - Melted
  - Altered
67. Transform faults are zones of
- Construction of plates
  - Destruction of plates
  - Plates move past one another without any change
  - Construction and destruction of plates
68. Karst landscapes are seen in
- Granitic terrains
  - Sandstone terrains
  - Limestone terrains
  - Basaltic terrains



69. Radial drainage pattern is associated with
- Domes
  - Antidioria
  - Syncline
  - Flat terrain
70. Fumaroles eject
- Liquid only
  - Liquid and solid
  - Solid only
  - Gases only
71. The transportation of material by Glaciers is by
- Flotation
  - Suspension
  - Solution
  - Saltation
72. Description and interpretation of Landforms is called as
- Geomagnetism
  - Geophysics
  - Geodynamics
  - Geomorphology
73. Indian Remote Sensing Satellites Product is
- Landsat
  - Spot
  - IRS-series
  - Ikonos
74. Aerial Photographs are taken from an altitude of
- 100 meters
  - 10—100 kms
  - 1 km
  - 1000 kms
75. Geometric centre of the Aerial Photograph is called
- Photo scale
  - Over lap
  - Principal point
  - Mosaic
76. The biotite zone in metamorphosed argillaceous rocks correspond to
- Epidote-amphibolite facies
  - Zeolite facies
  - Eclogite facies
  - Greenschist facies
77. The mineral assemblage formed by metamorphism of siliceous dolomite at the lowest temperature is
- Talc-calcite-quartz-tremolite
  - Dolomite-quartz-talc-calcite
  - Tremolite-dolomite-forsterite-calcite
  - Tremolite-calcite-forsterite-diopside
78. Transition from greenschist to amphibolite facies metamorphism of a basic rock is marked by
- Increase in anorthite content of plagioclase
  - Decrease in anorthite content of plagioclase
  - Increase in Mg of chlorite
  - Change in amphibole composition from hornblende to actinolite

79. The mineral assemblage glaucophane-jadeite typifies
- Greenschist facies
  - Amphibolite facies
  - Blueschist facies
  - Granulite facies
80. In a metamorphosed argillaceous rock, biotite and garnet constitute an equilibrium assemblage, which can be explained by the reaction
- $\frac{1}{3}\text{Fe}_3\text{Al}_2\text{Si}_3\text{O}_{12} + \text{MgSiO}_3 = \frac{1}{3}\text{Mg}_3\text{Al}_2\text{Si}_3\text{O}_{12} + \text{FeSiO}_3$
  - $\text{Fe}_3\text{Al}_2\text{Si}_3\text{O}_{12} + \text{KMg}_3\text{AlSi}_3\text{O}_{10}(\text{OH})_2 = \text{Mg}_3\text{Al}_2\text{Si}_3\text{O}_{12} + \text{KFe}_3\text{AlSi}_3\text{O}_{10}(\text{OH})_2$
  - $\frac{1}{3}\text{Fe}_3\text{Al}_2\text{Si}_3\text{O}_{12} + \text{CaMgSi}_2\text{O}_6 = \frac{1}{3}\text{Mg}_3\text{Al}_2\text{Si}_3\text{O}_{12} + \text{CaFeSi}_2\text{O}_6$
  - $\frac{1}{3}\text{Fe}_3\text{Al}_2\text{Si}_3\text{O}_{12} + \frac{1}{2}\text{Mg}_2\text{SiO}_4 = \frac{1}{3}\text{Mg}_3\text{Al}_2\text{Si}_3\text{O}_{12} + \frac{1}{2}\text{Fe}_2\text{SiO}_4$
81. Which of the following does not help in the fossilization of organisms ?
- Rapid burial
  - Low Sedimentation Rate
  - Uniform Temperature
  - Quiet conditions of deposition
82. Brachiopods are exclusively
- Brackish water
  - Terrestrial
  - Lecustrine
  - Marine
83. Pallial sinus is mainly located on which side of a Pelecypod shell ?
- Anterior side
  - Posterior side
  - Ventral side
  - Dorsal side
84. Pelecypod shell is closed and opened by means of
- Muscles
  - Teeth and Sockets
  - Pallial Line
  - Ligament
85. A left-handed Gastropod shell is called as
- Sinistral
  - Dextral
  - Conispiral
  - Patelliform
86. What is the stratigraphic range of Trilobites ?
- Silurian to Recent
  - Cambrian to Recent
  - Permian to Cretaceous
  - Cambrian to Permian
87. Which of the following is a characteristic Lower Gondwana flora ?
- Equisetites*
  - Ptilophyllum*
  - Glossopteris*
  - Nilssonia*

88. When did Brachiopods reach acme of their development ?
- Ordovician
  - Devonian
  - Permian
  - Triassic
89. A cephalopod suture with frilled lobes and undivided saddles is known as
- Orthoceratitic
  - Ceratitic
  - Ammonitic
  - Goniatic
90. Which of the following is a Rugose Coral ?
- Calceola*
  - Montlivaltia*
  - Favosites*
  - Syringopora*
91. What is the stratigraphic range of *Natica* ?
- Pliocene to Recent
  - Silurian to Recent
  - Triassic to Recent
  - Paleocene to Recent
92. Which of the following is a Lower Cambrian Trilobite ?
- Olenellus*
  - Calymene*
  - Paradoxides*
  - Olenus*
93. *Nautilus* has which of the following sutural patterns ?
- Agoniatitic
  - Orthoceratitic
  - Ammonitic
  - Ceratitic
94. Which of the following is a low-oxygen benthic foraminifer assemblage ?
- Textularia, Quinqueloculina, Ammonia*
  - Cibicides, Pyrgo, Ammonia*
  - Globigerina, Globigerinoides, Globorotalia*
  - Uvigerina, Bulimina, Bolivina*
95. Which of the following is an earliest land plant ?
- Baragwanthia*
  - Selaginella*
  - Phyllothea*
  - Sphenophyllum*
96. The uppermost stage of Semri Group is
- Kheinjua
  - Porcellanite
  - Nimbahera shales
  - Rohtas
97. Gypsum beds are associated with
- Semri Group
  - Kaimur Group
  - Rewa Group
  - Bhander Group
98. Raghavapuram shales of Upper Gondwana are found in
- Sone valley
  - Godavari valley
  - Damodar valley
  - Mahanadi valley

99. The richest fossiliferous stage of the Siwalik supergroup is
- Kamlial
  - Chinji
  - Nagri
  - Dhok Pathan
100. The principle of uniformitarianism which states that 'Present is the key to the past' was coined by
- William Smith
  - James Hutton
  - Werner
  - Graban
101. A body of rock characterised by lithological homogeneity is called
- Supergroup
  - Formation
  - Group
  - Bed
102. The equivalent time unit of 'System' is
- Epoch
  - Period
  - Age
  - Era
103. Jharia Coal Seams of Gondwana belongs to
- Raniganj
  - Barren Measures
  - Barakar
  - Talchir
104. Peninsular Gneiss is a mixture of gneisses with
- Granite
  - Syenite
  - Diorite
  - Gabbro
105. Neogene includes
- Oligocene and Miocene
  - Paleocene and Eocene
  - Miocene and Pliocene
  - Eocene and Oligocene
106. The Siwalik Supergroup is characteristic of deposits of
- shallow fresh water basin
  - purely marine origin
  - mostly marine and partly fresh water
  - lacustrine nature
107. The basic unit in Biostratigraphic classification is
- Subzone
  - Zone
  - Zonule
  - Biozone
108. The Dharwarian rocks have a regional strike of
- SSW-NNE
  - NNW-SSE
  - NW-SE
  - WSW-ENE

109. 'Needle Shales' are found in
- Talchir
  - Barakar
  - Raniganj
  - Panchet
110. Upper Gondwana rocks in Cuttack (Orissa) is represented by
- Baisakhi formation
  - Chaibasa formation
  - Athgarh formation
  - Lathi formation
111. The formation of ooids takes place in the oceanic area of
- Quiet water
  - Agitated water
  - Deep water
  - Turbidity current
112. Silt refers to particle whose grain size lies between
- 0.5 and 0.1 mm
  - 0.1 and 0.062 mm
  - 0.062 and 0.04 mm
  - < 0.04 mm
113. Packing of sedimentary particles is an important consideration since it affects
- Porosity
  - Permeability
  - Sorting of grains
  - Porosity and permeability both
114. Textural maturity in sandstones is largely a reflection of
- Depositional process
  - Diagenetic process
  - Provenance
  - Mineral composition
115. Flute marks are characteristic structures of
- Tidal deposit
  - Beach deposit
  - Turbidities
  - Fluviatile deposit
116. Metamorphism caused by intrusion of a pluton in a calcareous sedimentary terrain is termed as
- Contact metamorphism
  - Dynamo-thermal metamorphism
  - Burial metamorphism
  - Cataclastic metamorphism
117. The right sequence of index minerals that indicates increase in grade for Barrovian metamorphism of argillaceous rocks is represented by
- Chlorite→biotite→kyanite→garnet
  - Chlorite→garnet→biotite→kyanite
  - Biotite→chlorite→garnet→kyanite
  - Chlorite→biotite→garnet→kyanite
118. The  $Al_2SiO_5$  mineral(s) stable at 525°C and 7 kbar is
- Sillimanite
  - Kyanite
  - Andalusite
  - Sillimanite + kyanite

119. If the internal schistosity, defined by biotite flakes within a garnet porphyroblast has the same orientation as the external schistosity in the matrix, then the garnet is

- (a) Post-tectonic
- (b) Syn-tectonic
- (c) Pre-tectonic
- (d) None of the above

120. The appropriate mineral assemblage characteristic of low grade metamorphism of basalt is represented by

- (a) Chlorite-muscovite-plagioclase
- (b) Chlorite-muscovite-K-feldspar
- (c) Chlorite-plagioclase-actinolite
- (d) Chlorite-K-feldspar-plagioclase