

BOOKLET NO.

013

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TBC : AKG-MINING OFF.

Time Allowed : 2 Hours]

[Maximum Marks : 100

INSTRUCTIONS

1. **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.**
2. You have to enter your Roll Number on the Test Booklet in the Box provided alongside. **DO NOT** write **anything** else on the Test Booklet.
3. This Test Booklet contains **100** items (questions). 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.
4. You have to mark all your responses **ONLY** on the separate Answer Sheet provided. No erasing/correction fluid is allowed.
5. All items carry equal marks.
6. Before you proceed to mark in the Answer Sheet the response 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.
7. 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 **only the Answer Sheet**. You are permitted to take away with you the Test Booklet.
8. Sheets for rough work are appended in the Test Booklet at the end.
9. **Penalty for wrong answers :**
THERE WILL BE PENALTY (NEGATIVE MARKING) FOR WRONG ANSWERS MARKED BY A CANDIDATE IN THE OBJECTIVE TYPE QUESTION PAPERS.
 - (i) There are four alternatives for the answers to every question. For each question for which a wrong answer has been given by the candidate, **one fourth (0.25)** of the marks assigned to that 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 answer happen to be correct and there will be same penalty as above for that 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.
10. Use and carrying of Mobile Phone and Electronic Gadget is prohibited in Examination Hall.

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1. Which of the following is *not* a volcanic igneous rocks ?
 - (A) Trachyte
 - (B) Ignimbrite
 - (C) Anorthosite
 - (D) Dacite
2. Which of the following is a mismatch ?
 - (A) Garnet
 - (B) Aventurine
 - (C) Amethyst
 - (D) Citrine
3. Which of the following rocks is different from the rest ?
 - (A) Charnockite
 - (B) Andesite
 - (C) Amphibolite
 - (D) Granulite
4. Which of the following represents *correct* sequence of appearance of minerals during progressive regional metamorphism ?
 - (A) Biotite – Chlorite – Garnet – Kyenite – Sillimanite – Staurolite
 - (B) Garnet – Biotite – Chlorite – Sillimanite – Kyenite – Staurolite
 - (C) Chlorite – Biotite – Garnet – Staurolite – Kyenite – Sillimanite
 - (D) Biotite – Garnet – Chlorite – Staurolite – Sillimanite – Kyenite

5. Which of the following phenomena is responsible of production of intense heat in the sun ?

- (A) Nuclear fission
- (B) Nuclear fusion
- (C) Neutron activation
- (D) Gama radiation

6. Which of the following is a type of 'strike slip fault' ?

- (A) Transform fault
- (B) Reverse fault
- (C) Normal fault
- (D) Thrust

7. Which of the following represents the ratio of earthquake magnitudes measured 4 and 6 on the Richter Scale ?

- (A) 4 : 6
- (B) 1 : 3
- (C) 1 : 100
- (D) 1 : 10

8. Which of the following minerals exhibits Double Refraction ?

- (A) Dogtooth spar
- (B) Satin spar
- (C) Iceland spar
- (D) None of the above

9. Which of the following statements is *not* true for Earth's crust ?

- (A) Its average thickness is 30-35 km
- (B) It has two compositional layers
- (C) Its average composition is basaltic
- (D) It is thicker in continental regions as compared to oceans

10. Name the most abundant element in the Earth's crust ?

- (A) Aluminium
- (B) Carbon
- (C) Silicon
- (D) Oxygen

11. Which of the following statements is *true* for the mantle ?

- (A) It is homogenous in composition
- (B) It is the most voluminous layer of the Earth
- (C) Its average density is 2.9 g/cm^3
- (D) Its average composition is andesitic

12. What is the average thickness of Asthenosphere ?

- (A) 50-70 km
- (B) 170-190 km
- (C) 250-270 km
- (D) 300-320 km

13. Which of the following represents the site for juvenile crust formation ?

- (A) Subduction zone
- (B) Transform fault zone
- (C) Continent – continent collision zone
- (D) Mid Oceanic Ridges

14. Which of the following is an example of collision between oceanic and continental plates ?

- (A) Himalayas
- (B) Circum Pacific Belt
- (C) East African rift zone
- (D) Red Sea

15. What is the generally accepted age of the Earth ?

- (A) About 45400000 years
- (B) About 454000000 years
- (C) About 4540000000 years
- (D) About 45400000000 years

16. An equigranular plutonic igneous rock contains ~65% alkali feldspar, ~20% sodic plagioclase, ~10% biotite + hornblende and accessory quartz ? What can be its possible name ?

- (A) Diorite
- (B) Gabbro
- (C) Granite
- (D) Syenite

17. Which of the following represents the age of oldest dated zircon from the surface of the Earth ?

- (A) 4.4 Billion years
- (B) 3.8 Billion years
- (C) 3.3 Billion years
- (D) 2.9 Billion years

18. Which of the following aluminium-bearing minerals is characteristic of low pressure metamorphism ?

- (A) Kyanite
- (B) Sillimanite
- (C) Corundum
- (D) Andalusite

19. Which of the following states in India has the largest iron ore deposits in terms of volume ?

- (A) Rajasthan
- (B) Odisha
- (C) Goa
- (D) Maharashtra

20. Which of the following statements is *true* for P-waves ?

- (A) They travel along the surface of the Earth.
- (B) They can travel through both solid and liquid media
- (C) Their velocity does not depend upon the density of medium
- (D) Their vibration direction is perpendicular to the direction of propagation

21. Which among the following stratigraphic units represents the shortest time span ?

- (A) Cambrian
- (B) Silurian
- (C) Triassic
- (D) Jurassic

22. Which of the following statements is *not* true for Angular Unconformity separating a set of inclined and horizontal strata ?

- (A) The inclined strata are usually older
- (B) The horizontal strata are usually younger
- (C) The unconformity post-dates deformation
- (D) Inclined strata usually have clasts derived from horizontal strata

23. Which of the following demarcates the boundary between Lesser Himalaya and Greater Himalaya ?

- (A) Main Frontal Thrust
- (B) Main Boundary Thrust
- (C) Main Central Thrust
- (D) South Tibetan Detachment

24. Which of the following criteria is *not* suitable for stratigraphic correlation of deformed and metamorphosed Precambrian rocks ?

- (A) Paleontological criterion
- (B) Radiometric ages
- (C) Similarity in structural geometry
- (D) Lithologic similarity

25. A granitic pluton was emplaced during Precambrian and later underwent low grade metamorphism. Which of the following geochronologic age dating methods is suitable for determining the crystallization age of the granite ?
- (A) Rb-Sr method
 - (B) Sm-Nd method
 - (C) U-Pb method
 - (D) Ar-Ar method
26. Which of the following statements describes characteristics of Polymorphs ?
- (A) They are the minerals with same chemical composition but different physical characteristics
 - (B) They are the minerals that appear many times during metamorphism
 - (C) They are the minerals with same physical but different chemical properties
 - (D) They are the minerals with no similarity in physical and chemical properties
27. The crystal system of gypsum is :
- (A) Orthombic
 - (B) Triclinic
 - (C) Tetragonal
 - (D) Monoclinic
28. Which of the following is a copper – bearing mineral ?
- (A) Bornite
 - (B) Chalcopyrite
 - (C) Covelite
 - (D) All of the above
29. Which of the following is an alkali pyroxene ?
- (A) Diopside
 - (B) Aegirine
 - (C) Grunerite
 - (D) Augite

30. Which of the following is the most important parameter for inferring environmental conditions of a sedimentary basin ?

- (A) Type of cementing material
- (B) Radioactive properties of heavy minerals
- (C) Lithological variation
- (D) Characteristics and distribution of fossils

31. Based on the seismic hazard map of India which of the following cities has the highest possibility of earthquake concurrence ?

- (A) Chennai
- (B) Jaipur
- (C) Guwahati
- (D) Nagpur

32. Which of the following is *not* an inner planet of the solar system ?

- (A) Earth
- (B) Jupiter
- (C) Mars
- (D) Mercury

33. Which of the following statements describes metamorphism ?

- (A) Partial melting and reconstitution of minerals
- (B) Liquid state reconstitution of minerals
- (C) Gaseous-liquid state reconstitution of minerals
- (D) Solid state reconstitution of minerals

34. Which of the following represents Green schist facies metamorphic conditions ?

- (A) Low pressure and low temperature
- (B) High pressure and low temperature
- (C) High pressure and high temperature
- (D) Low pressure and high temperature

35. Which of the following is a high temperature polymorph of $KAlSi_3O_8$?

- (A) Sanidine
- (B) Adularia
- (C) Aventurine
- (D) Moonstone

36. Which of the following features is *not* useful in defining Plate Boundaries ?

- (A) Distribution of volcanoes
- (B) Distribution of earthquake belts
- (C) Distribution of mountain ranges
- (D) Drainage system

37. An uplifted wedge shaped geological feature bounded on both the sides by normal faults can be described as

- (A) Thrust
- (B) Graben
- (C) Horst
- (D) Block mountain

38. Skarn is usually produced during

- (A) Contact metamorphism
- (B) Quenching of basic lava
- (C) Burial metamorphism
- (D) Deposition of sulphur around volcanic vent

39. Which of the following CIPW

normative mineral pairs is most unlikely to occur together ?

- (A) Quartz—hypersthene
- (B) Hypersthene—nepheline
- (C) Hypersthene—olivine
- (D) Olivine—nepheline

40. Which of the following minerals is regarded as the 'pathfinder' in search of gold deposits ?

- (A) Pyrrhotite
- (B) Pyrite
- (C) Chalcopyrite
- (D) Arsenopyrite

41. Beach placer deposits of south India are an example of

- (A) Residual concentration
- (B) Sedimentation
- (C) Sublimation
- (D) Cavity filling

42. Which of the following is *not* a sulphide mineral ?
- (A) Beryl
 - (B) Cinnabar
 - (C) Molybdenite
 - (D) Covelite
43. Which of the following is considered as the most likely host for diamond ?
- (A) Eclogite
 - (B) Ophiolite
 - (C) Kimberlite
 - (D) Andesite
44. Which among the following rocks will be the least susceptible to chemical weathering ?
- (A) Diorite
 - (B) Arkose
 - (C) Quartzite
 - (D) Gabbro
45. Which of the following is the most dominant gas in the Earth's atmosphere ?
- (A) Oxygen
 - (B) Nitrogen
 - (C) Methane
 - (D) Carbon dioxide
46. Which of the following represents *correct* sequence of different components of atmosphere from the lowest part ?
- (A) Stratosphere – Troposphere – Mesosphere – Thermosphere
 - (B) Thermosphere – Troposphere – Stratosphere – Mesosphere
 - (C) Mesosphere – Troposphere – Stratosphere – Thermosphere
 - (D) Troposphere – Stratosphere – Mesosphere – Thermosphere

47. Which of the following represents the boundary between mantle and core ?
- (A) Low Velocity Zone
 - (B) Gutenberg Discontinuity
 - (C) Mohorovicic Discontinuity
 - (D) Inversion Zone
48. Which of the following is an isotropic mineral ?
- (A) Quartz
 - (B) Calcite
 - (C) Tourmaline
 - (D) Garnet
49. Which of the following is *not* an Al-bearing mineral ?
- (A) Andalusite
 - (B) Sillimanite
 - (C) Siderite
 - (D) Kyanite
50. Which of the following is a *not* a High Field Strength Element ?
- (A) Thorium
 - (B) Uranium
 - (C) Zirconium
 - (D) Niobium
51. The chemical composition of mineral halite is :
- (A) KCl
 - (B) NaCl
 - (C) CaCl_2
 - (D) MgCl_2
52. Which of the following geophysical exploration method is *not* suitable for the search of oil and gas ?
- (A) Magnetic susceptibility method
 - (B) Electrical resistivity method
 - (C) Self potential method
 - (D) All of the above

53. Which of the following statements is *true* for Tsunami ?

- (A) It is associated with high magnitude earthquake
- (B) It involves displacement of rocks under deep sea conditions
- (C) Its destructive effect is confined to the coastal region only
- (D) All of the above

54. Earthquakes that originate between 60 and 300 km below Earth's surface are known as :

- (A) Shallow focus earthquakes
- (B) Intermediate focus earthquakes
- (C) Deep focus earthquakes
- (D) None of the above

55. Which of the following samples is used for geochemical prospecting ?

- (A) Rock
- (B) Soil
- (C) Stream sediments
- (D) All of the above

56. Which of the following properties is associated with basic lavas ?

- (A) Low viscosity
- (B) High temperature
- (C) Large areal extent
- (D) All of the above

57. A quartz vein in a vertical road section perpendicular to the strike shows 45° dip towards N50E direction. What will be the trend of quartz vein ?

- (A) 240°
- (B) 140°
- (C) 045°
- (D) 260°

58. In Plate Tectonics Context which of the following indicates a Constructive Plate Margin ?

- (A) When two plates collide with each other
- (B) When two plates slide past each other
- (C) When a plate breaks away into two parts
- (D) All of the above

59. In groundwater exploration the electrical sounding provides information about :

- (A) Lateral variation
- (B) Vertical variation
- (C) Both lateral and vertical variation
- (D) None of the above

60. Which of the following statements explains Darcy's Law ?

- (A) The discharge is inversely proportional to head loss
- (B) The discharge is inversely proportional to head loss and directly proportional to the length
- (C) The discharge is directly proportional to head loss and inversely proportional to area of flow and to the length of the path
- (D) The discharge is directly proportional to head loss and area of flow and inversely proportional to the length of the path

61. Which of the following represents a *correct* pair in terms of ore genesis ?

- (A) Placer—Weathering
- (B) Magmatic—Cavity filling
- (C) Hydrothermal—Reconstitution
- (D) Metasomatic—Disseminations

62. The main reason for cyclic occurrence of day and night is :

- (A) Earth's revolution round sun
- (B) Earth's rotation round its axis
- (C) Eccentricity of Earth's orbit
- (D) None of the above

63. Arrange the following sediment grain size types in descending order of grain size :

- I. Gravel
- II. Silt
- III. Sand
- IV. Clay

- (A) I, III, IV, II
- (B) I, III, II, IV
- (C) I, II, III, IV
- (D) II, III, IV, I

64. The boundary between outer core and inner core is situated at approximately km from the surface.

- (A) 3550
- (B) 2900
- (C) 5150
- (D) 6100

65. Which of the following water pollutants belongs to the category of Heavy Metal ?

- (A) Cadmium
- (B) Mercury
- (C) Lead
- (D) All of the above

66. Which of the following is considered as the most acceptable reason for extinction of Dinosaurs during end Cretaceous ?

- (A) Widespread epidemic
- (B) Forest fire
- (C) Meteorite impact
- (D) Global warming

67. Which of the following does *not* make a *correct* pair ?

- (A) Sphalerite—Cu
- (B) Gibbsite—Al
- (C) Siderite—Fe
- (D) Monazite—Th

68. Which of the following defines Rapakivi texture ?

- (A) Quartz-feldspar intergrowth
- (B) Alkali feldspar with plagioclase rim
- (C) Plagioclase inclusions within alkali feldspar
- (D) Presence of only one type of feldspar in granite

69. A plutonic rock composed essentially of calcic plagioclase and clinopyroxene, minor orthopyroxene and accessory quantities olivine and magnetite can be appropriately named as

- (A) Norite
- (B) Anorthosite
- (C) Gabbro
- (D) Troctolite

70. Which of the following states in India is the major producer of Rock Phosphate in India ?

- (A) Rajasthan
- (B) Jharkhand
- (C) Chhattisgarh
- (D) Karnataka

71. Which of the following marks a global scale major extinction event ?

- (A) Beginning of Cambrian
- (B) End Permian – Early Triassic
- (C) Beginning of Holocene
- (D) Middle of Mesozoic

72. Which of the following represents Upper Vindhyan Supergroup ?

- (A) Bhandar Group
- (B) Rewa Group
- (C) Kaimur Group
- (D) All of the above

73. Which of the following is a stable isotope ?

- (A) ^{14}C
- (B) ^{235}U
- (C) ^{18}O
- (D) ^{230}Th

74. Which of the following regions in India is the largest producer of Rare Earth minerals ?

- (A) Kerala Coast
- (B) Sarnu Dandali in Barmer
- (C) Lower Himalayas
- (D) Andaman Nicobar islands

75. The acronym GPS stands for

- (A) Ground Penetration Sensor
- (B) Global Positioning System
- (C) Ground Potential Standards
- (D) Geomagnetic Propagation Spectrum

76. Which one of the following is the first Indian satellite ?

- (A) Bhaskar
- (B) Aryabhata
- (C) Rohini
- (D) INSAT 1A

77. What is a horizontal entry into an underground mine called ?

- (A) Shaft
- (B) Winze
- (C) Adit
- (D) Tunnel

78. Name the geological formation that *cannot* retain or transmit water ?

- (A) Aquiclude
- (B) Aquifer
- (C) Aquifuge
- (D) Aquitard

79. What is the difference between equatorial and polar radius of the Earth ?

- (A) 11.5 km
- (B) 21.5 km
- (C) 43.5 km
- (D) 23.5 km

80. What are the flat-topped hills called that are formed by stream action ?
- (A) Mesas
 - (B) Stream terraces
 - (C) Buttes
 - (D) Cuestas
81. Deepika Kumari is associated with what sports ?
- (A) Squash
 - (B) Boxing
 - (C) Archery
 - (D) Rowing
82. A person can contest panchayat election, if he has attained the age of :
- (A) 25 years
 - (B) 21 years
 - (C) 30 years
 - (D) 18 years
83. Which one of the following is *not* associated to the "group" ?
- (A) Shale
 - (B) Limestone
 - (C) Gneiss
 - (D) Sandstone
84. Which of the following states in India is famous for rubber cultivation ?
- (A) Tamil Nadu
 - (B) Karnataka
 - (C) Kerala
 - (D) Andhra Pradesh
85. Which of the following are battle tanks ?
- (A) Arjun and T-72
 - (B) Maharaja and A-15
 - (C) Maharaja and Indra
 - (D) AN-32 and T-15

86. Who is described as the "Father of Indian Nationalism" ?
- (A) Gopal Krishna Gokhale
(B) M.K. Gandhi
(C) B.G. Tilak
(D) Raja Ram Mohan Roy
87. What is the tenure of Chief Election Commissioner of India ?
- (A) Five years
(B) Four years
(C) Six years or 65 years of age, whichever is earlier
(D) Five years or 65 years of age, whichever is earlier
88. Elephanta caves is in :
- (A) Karnataka
(B) Gujarat
(C) Madhya Pradesh
(D) Maharashtra
89. Minamata disease is caused due to :
- (A) Mercury poisoning
(B) Lead poisoning
(C) Cadmium poisoning
(D) Arsenic poisoning
90. The highest Plateau of the world is :
- (A) Tibetan Plateau
(B) Deccan
(C) Colorado
(D) Santiago
91. Theog, Koti, Ghund, Madhan and Ratesh were feudatories of :
- (A) Jubbah state
(B) Keonthal state
(C) Baghal
(D) Rampur-Bushahr

92. Who said, "The Emperor of China and I govern half the human race and yet we find time to breakfast" ?

(A) Major Kennedy

(B) Lord Curzon

(C) Lord Dalhousie

(D) Lord Amherest

93. To defeat Gorkhas, Sansar Chand had sought help from :

(A) Chamba Raja

(B) British

(C) Sikhs

(D) None of the above

94. Which of the following is the birth place of Mahabharat warrior Ghatotkch (Son of Bhima) ?

(A) Dungri (Kullu)

(B) Renuka (Sirmour)

(C) Balson (Shimla)

(D) Shonitpur (Rampur)

95. In which princely state, "Kira" is considered to be violent, uncivilized and destroyer caste ?

(A) Sirmour

(B) Bilaspur

(C) Chamba

(D) Kangra

96. In which historical building of Shimla A.O. Hume mooted the idea of forming Indian National Congress ?

- (A) Bernes Court
- (B) Peterhoff
- (C) Rothney Castle
- (D) Axis Bank

97. "Jhugga agitation" took place in princely state of :

- (A) Sirmour
- (B) Chamba
- (C) Bilaspur
- (D) Bhagat

98. Guru Ghantal monastery was established by Padmasambhava, he is also known as :

- (A) Rinpoche
- (B) Zlaod
- (C) Shi-Tope
- (D) None of the above

99. Which two princely states took a pledge that, "Till a black crow turn white and snow of Kailash mountain melts, the two states will remain friends" ?

- (A) Mandi—Suket
- (B) Sirmour—Mahasu
- (C) Tibet—Rampur Bushahr
- (D) Bilaspur—Kangra

100. Which Gorkha ruler commander liberated Ishwari Sen (Mandi ruler) from the imprisonment of Sansar Chand ?

- (A) Amar Singh Thapa
- (B) Ranjor Singh
- (C) Kirti Prakash
- (D) Khadak Bahadur