Test Booklet Code & Serial No.
प्रश्नपत्रिका कोड व क्रमांक

A

Paper-II

EARTH, ATMOSPHERIC, OCEAN AND PLANETARY SCIENCE

Signature and Name of Invigilator

1. (Signature) .....

(Name) .....

2. (Signature) .....

(Name) .....

Seat No. | | | | | | | |

(In figures as in Admit Card)

Seat No. .....

(In words)

OMR Sheet No. | | | | | | | |

(To be filled by the Candidate)

JUN - 35225

Time Allowed : 2 Hours] **[Maximum Marks : 200**

Number of Pages in this Booklet : **24** Number of Questions in this Booklet : **100**

Instructions for the Candidates

1. Write your Seat No. and OMR Sheet No. in the space provided on the top of this page.
2. This paper consists of **100** objective type questions. Each question will carry *two* marks. *All* questions of Paper II will be compulsory.
3. At the commencement of examination, the question booklet will be given to the student. In the first 5 minutes, you are requested to open the booklet and compulsorily examine it as follows :
   (*i*) To have access to the Question Booklet, tear off the paper seal on the edge of this cover page. Do not accept a booklet without sticker-seal or open booklet.
   (*ii*) Tally the number of pages and number of questions in the booklet with the information printed on the cover page. Faulty booklets due to missing pages/questions or questions repeated or not in serial order or any other discrepancy should not be accepted and correct booklet should be obtained from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given. The same may please be noted.
   (*iii*) After this verification is over, the OMR Sheet Number should be entered on this Test Booklet.
4. Each question has four alternative responses marked (A), (B), (C) and (D). You have to darken the circle as indicated below on the correct response against each item.
   Example : where (B) is the correct response.

   (A) ● (C) (D)

   Following wrong methods should not be used as they are not recognised by scanning machine in digitized assessment. Candidate using such method will be responsible for their loss.

WRONG METHODS
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5. Your responses to the items are to be indicated in the **OMR Sheet given inside the Booklet only.** If you mark at any place other than in the circle in the OMR Sheet, it will not be evaluated.
6. Read instructions given inside carefully.
7. Rough Work is to be done at the end of this booklet.
8. If you write your Name, Seat Number, Phone Number or put any mark on any part of the OMR Sheet, except for the space allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other unfair means, you will render yourself liable to disqualification.
9. You have to return original OMR Sheet to the invigilator at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. You are, however, allowed to carry the Test Booklet and duplicate copy of OMR Sheet on conclusion of examination.
10. Use only Blue/Black Ball point pen.
11. Use of any calculator or log table, etc., is prohibited.
12. There is no negative marking for incorrect answers.

विद्यार्थ्यांसाठी महत्त्वाच्या सूचना

1. परीक्षार्थींनी आपला आसन क्रमांक या पृष्ठावरील वरच्या कोपऱ्यात लिहावा. तसेच आपणांस दिलेल्या उत्तरपत्रिकेचा क्रमांक त्याखाली लिहावा.
2. सदर प्रश्नपत्रिकेत 100 बहुपर्यायी प्रश्न आहेत. प्रत्येक प्रश्नास **दोन** गुण आहेत. या प्रश्नपत्रिकेतील **सर्व** प्रश्न सोडविणे अनिवार्य आहे.
3. परीक्षा सुरू झाल्यावर विद्यार्थ्याला प्रश्नपत्रिका दिली जाईल. सुरुवातीच्या 5 मिनिटांमध्ये आपण सदर प्रश्नपत्रिका उघडून खालील बाबी अवश्य तपासून पहाव्यात.
   (*i*) प्रश्नपत्रिका उघडण्यासाठी प्रश्नपत्रिकेवर लावलेले सील उघडावे. सील नसलेली किंवा सील उघडलेली प्रश्नपत्रिका स्वीकारू नये.
   (*ii*) पहिल्या पृष्ठावर नमूद केल्याप्रमाणे प्रश्नपत्रिकेची एकूण पृष्ठे तसेच प्रश्नपत्रिकेतील एकूण प्रश्नांची संख्या पडताळून पहावी. पृष्ठे कमी असलेली/कमी प्रश्न असलेली/प्रश्नांचा चुकीचा क्रम असलेली किंवा इतर त्रुटी असलेली सदोष प्रश्नपत्रिका सुरुवातीच्या 5 मिनिटातच पर्यवेक्षकाला परत देऊन दुसरी प्रश्नपत्रिका मागवून घ्यावी. त्यानंतर प्रश्नपत्रिका बदलून मिळणार नाही तसेच वेळही वाढवून मिळणार नाही याची कृपया विद्यार्थ्यांनी नोंद घ्यावी.
   (*iii*) वरीलप्रमाणे सर्व पडताळून पाहिल्यानंतरच प्रश्नपत्रिकेवर ओ.एम.आर. उत्तरपत्रिकेचा नंबर लिहावा.
4. प्रत्येक प्रश्नासाठी (A), (B), (C) आणि (D) अशी चार विकल्प उत्तरे दिली आहेत. त्यातील योग्य उत्तराचा रकाना खाली दर्शविल्याप्रमाणे ठळकपणे काळ्या/निळा करावा.
   उदा. : जर (B) हे योग्य उत्तर असेल तर.

   (A) ● (C) (D)

   खालील चुकीच्या पद्धती वापरू नये, कारण डिजिटाइज्ड (Digitized) मूल्यांकनात स्कॅनिंग मशीन त्यांना ओळखत नाही. त्या पद्धती वापरून नुकसान झाल्यास त्यास विद्यार्थीच जबाबदार असतील.

WRONG METHODS
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5. या प्रश्नपत्रिकेतील प्रश्नांची उत्तरे **ओ.एम.आर. उत्तरपत्रिकेतच दर्शवावीत.** इतर ठिकाणी लिहिलेली उत्तरे तपासली जाणार नाहीत.
6. आत दिलेल्या सूचना काळजीपूर्वक वाचाव्यात.
7. प्रश्नपत्रिकेच्या शेवटी जोडलेल्या कोऱ्या पानावरच कच्चे काम करावे.
8. जर आपण ओ.एम.आर. वर नमूद केलेल्या ठिकाणाव्यतिरिक्त इतर कोठेही नाव, आसन क्रमांक, फोन नंबर किंवा ओळख पटेल अशी कोणतीही खूण केलेली आढळून आल्यास अथवा असभ्य भाषेचा वापर किंवा इतर गैरमार्गांचा अवलंब केल्यास विद्यार्थ्याला परीक्षेस अपात्र ठरविण्यात येईल.
9. परीक्षा संपल्यानंतर विद्यार्थ्याने मूळ ओ.एम.आर. उत्तरपत्रिका पर्यवेक्षकांकडे परत करणे आवश्यक आहे. तथापि, प्रश्नपत्रिका व ओ.एम.आर. उत्तरपत्रिकेची द्वितीय प्रत आपल्याबरोबर नेण्यास विद्यार्थ्यांना परवानगी आहे.
10. फक्त निळ्या किंवा काळ्या बॉल पेनचाच वापर करावा.
11. कॅलक्युलेटर किंवा लॉग टेबल वापरण्यास परवानगी नाही.
12. चुकीच्या उत्तरासाठी गुण कपात केली जाणार नाही.

Earth, Atmospheric, Ocean and Planetary Science
Paper II

Time Allowed : 120 Minutes] **[Maximum Marks : 200**

Note : This paper contains **Hundred (100)** multiple choice questions. Each question carrying **Two (2)** marks. Attempt *All* questions.

1. The nucleosynthesis have occurred progressively producing heavier and heavier elements with the following processes in sequence :

   (A) Fusion in stars—Fusion in Big Bang—Fission in Supernova

   (B) Big Bang Nucleosynthesis—Fusion in stars—Fusion in Supernova explosion

   (C) Big Bang fission—Star Fusion–Galactic collapse–Big Bang fusion

   (D) Star formation—Electroweak formation—Nuclear fusion

2. Non-compensated spin moments and the positive exchange interaction of the co-directed spins results in :

   (A) Antiferromagnetic material

   (B) Diamagnetic material

   (C) Paramagnetic material

   (D) Ferromagnetic material

3. The most important mechanism of heat transfer in the earth is :

   (A) Conduction in the crust and mantle

   (B) Convection in the crust and mantle

   (C) Convection in the mantle and core

   (D) Radiation from the surface of the earth

4. Which one of the following decay series is incorrect along with their half life ?

   (A) Carbon-14 to Nitrogen-14 at 5730 years

   (B) Uranium-235 to Lead-350 at 200 million years

   (C) Potassium-40 to Argon-40 at 1280 million years

   (D) Rubidium-87 to Strontium-87 at 48,800 million years

5. The apparent resistivity sounding curve representing the resistivity structure $p1 > p2 < p3 < p4$ of a four-layer Earth is :

   (A) HA-type

   (B) HK-type

   (C) KH-type

   (D) KQ-type

6. The porosity information provided by the sonic log is :

   (A) Total porosity

   (B) Primary porosity

   (C) Secondary porosity

   (D) Water-filled porosity

7. India's northward drift from Gondwanaland is believed to have started approxinately (in million years ago) :

   (A) 50

   (B) 150

   (C) 300

   (D) 400

8. Transform faults are :

   (A) Reverse faults

   (B) Normal faults

   (C) Strike-slip faults

   (D) Thrust faults

9. Which one of the following earthquakes was triggered by impoundment of water reservoirs ?

   (A) 1934 Bihar-Nepal earthquake

   (B) 1995 Kobe (Japan) earthquake

   (C) 1967 Koyna earthquake

   (D) 1950 Assam earthquake

10. The magnitude of an earthquake is a measure of the energy released during the earthquake. The difference in energy released between an earthquake of magnitude 4 and one of magnitude 7 on the Richter scale is about :

(A) 30 times

(B) 900 times

(C) 27,000 times

(D) 3,000 times

11. Which of the following stratigraphic unit is of Permian-Triassic age ?

(A) Haimanta Group

(B) Kali Formation

(C) Muth Formation

(D) Guruyul ravines

12. Which stratigraphic 'Global stratotype section and point' boundary is marked in an 'Ice-Core' of the Northern Green land.

(A) Permian-Triassic boundary

(B) Miocene-Pliocene boundary

(C) Pliocene-Pleistocene boundary

(D) Pleistocene-Holocene boundary

13. The geological age of *Glossopteris* is :

(A) Ordovician

(B) Pleistocene

(C) Permian

(D) Cretaceous

14. Trace fossil *Fodichnia* indicate which strategy ?

(A) Escoping

(B) Crawling

(C) Feeding

(D) Grazing

15. The skeletal of an entire coral colony is :

(A) Corallite

(B) Corallum

(C) Coenenchyme

(D) Calyx

16. Dental formula of primitive *Equidae* from the Eocene Epoch is :

(A) 3 I/i, 1 C/c, 4 P/p and 3 M/m

(B) 3 I/i, 4 C/c, 1 P/p and 3 M/m

(C) 3 I/i, 3 C/c, 4 P/p and 1 M/m

(D) 3 I/i, 4 C/c, 3 P/p and 1 M/m

17. Spicules are part of the skeleton in :

(A) Annelids

(B) Mollusca

(C) Platyhelminthes

(D) Porifera

18. An influent stream is one which :

(A) Recharges the groundwater

(B) Flows into a parent stream

(C) Flows parallel to a consequent stream

(D) Receives discharges from the groundwater

19. Which of the following is Active sensor ?

(A) LISS

(B) AVHRR

(C) RADAR

(D) MSS

20. The main principle behind the working of GPS is .....

(A) Reselection

(B) Revolving movement

(C) Trisection

(D) Trilateration

21. Which of the following rocks shows dendritic drainage pattern on aerial photo ?

(A) Sedimentary

(B) Igneous

(C) Both (A) and (B)

(D) Neither (A) nor (B)

22. Vegetation reflects maximum radiations in which wavelength ?

(A) Near Infrared

(B) Microwave

(C) Visible

(D) Ultraviolet

23. The Schlumberger configuration is used in :

(A) Electric profiling

(B) Magnetic profiling

(C) Seismic profiling

(D) Geomagnetic profiling

24. Hydraulic conductivity of ..... is high.

(A) Coarse grained and fractured material

(B) Fine grained and non-fractured material

(C) Both (A) and (B)

(D) Neither (A) nor (B)

25. The hardness in water is typically caused by the presence of :

(A) Sodium and potassium ions

(B) Suspended matter

(C) Carbonate and bicarbonate ions

(D) Calcium and magnesium ions

26. Which of the following is the advantage of conservation of geological resources ?

(A) Less waste to dispose

(B) Less land lost to mining

(C) Both (A) and (B)

(D) Neither (A) nor (B)

27. The point where the energy is released during the earthquake is called :

(A) Epicentre

(B) Hypocentre

(C) Circumcentre

(D) Isocentre

28. Consumption (drinking) of water with high concentration of nitrates causes :

(A) Knock knee syndrome

(B) Skeletal fluorosis

(C) Black foot disease

(D) Blue baby syndrome

29. What will be the focal length of the camera when the scale of the aerial photograph is 1:4500, the flying height of the aircraft is 3780 meters above MSL and the average height of the terrain is 820 meters above sea level ?

(A) 607.8 mm

(B) 657.8 mm

(C) 555.9 mm

(D) 595.7 mm

30. Which one of the following statement is not true about dust particles and aerosols in the atmosphere ?

(A) The dust particles include sea salts, fine soil, smoke, pollens, soot

(B) Dust particles act as surfaces on which water vapour condenses

(C) The concentration of dust particles is maximum in mesosphere

(D) Dust in the air contributes to the various hues of red and orange at sunrise and sunset

31. A geographic boundary marking the limits of the potential distribution of species is sometimes referred to as :

(A) Speciation

(B) Bioclimatic frontier

(C) Geographic isolation

(D) Polyploidy

32. In which state Manas Wildlife Sanctuary and Tiger Reserve is located ?

(A) Assam

(B) Madhya Pradesh

(C) Bihar

(D) Karnataka

33. Which one amongst the following is not a tributary of Indus river ?

(A) Ramanganga

(B) Zaskar

(C) Gortang

(D) Hanza

34. An orbit is the course of motion taken by the satellite in space and the ground trace of the orbit is called :

(A) Path

(B) Row

(C) Column

(D) Apogee

35. Match the sections of electromagnetic spectrum (List-I) with their percentage representation in the energy emitted by sun (List-II)

List-I

(*a*) X-rays, Gamma-rays & radio waves region

(*b*) Visible region

(*c*) Near infrared region

(*d*) Ultraviolet region

List-II

(*i*) 43

(*ii*) 7

(*iii*) less than 1

(*iv*) 49

Codes

	(*a*)	(*b*)	(*c*)	(*d*)
(A)	(*iii*)	(*iv*)	(*i*)	(*ii*)
(B)	(*iii*)	(*i*)	(*iv*)	(*ii*)
(C)	(*iii*)	(*ii*)	(*i*)	(*iv*)
(D)	(*iii*)	(*iv*)	(*ii*)	(*i*)

36. Given below are two statements Assertion (A) and Reason (R). Read the statements carefully and choose correct answer from the codes given below :

(A) Subsidence inversions are of common occurrence in regions of high pressure

(R) Winds around high pressure cell are characterized by clockwise circulation in northern hemisphere

Codes :

(A) Both (A) and (R) are true and (R) is the correct explanation of (A)

(B) Both (A) and (R) are true and (R) is not the correct explanation of (A)

(C) (A) is true but (R) is false

(D) (A) is false but (R) is true

37. Read the following statements and choose the correct answer from the codes given below :

(*i*) Dune sand is most commonly composed of mineral quartz.

(*ii*) Mineral quartz is extremely hard and largely immune to chemical decay.

Codes :

(A) Both (*i*) and (*ii*) are true

(B) Both (*i*) and (*ii*) are false

(C) (*i*) is true but (*ii*) is false

(D) (*i*) is false but (*ii*) is true

38. Match the following :

List-I

(*a*) Retrogradation

(*b*) Groin

(*c*) Progradation

(*d*) Backwash

List-II

(*i*) Shoreline moves oceanward

(*ii*) Wall of embankment built at right angles to the shoreline

(*iii*) Undertow

(*iv*) Shoreline moves landward

Codes :

	(*a*)	(*b*)	(*c*)	(*d*)
(A)	(*i*)	(*iii*)	(*iv*)	(*ii*)
(B)	(*i*)	(*ii*)	(*iv*)	(*iii*)
(C)	(*iv*)	(*i*)	(*ii*)	(*iii*)
(D)	(*iv*)	(*ii*)	(*i*)	(*iii*)

39. The Mesoproterozoic-Neoproterozoic sedimentary basins in the Peninsular India are known as :

(A) Dharwar

(B) Purana

(C) Indo-Gangetic plans

(D) Siwalik

40. The earliest traces of Dharwar, Singhbhum and Bastar cratons can be postulated within the :

(A) Ur assembly

(B) Kenorland assembly

(C) Columbia assembly

(D) Rodinia assembly

41. Which of the following does not lie in the Dharwar craton ?

(A) Bababudan Group

(B) Closepet Granite

(C) Khairagarh volcanics

(D) Kolar schist belt

42. Granitoids with high magnesium composition that are commonly formed by plate collusion events in Archaean are called :

(A) Sanukitoids

(B) Anatectic granites

(C) Adakite

(D) Tonalite

43. Climax type of porphyry deposits are characterised by high traces of :

(A) Gold

(B) Tin and tungsten

(C) Iron

(D) Silver

44. Cyprus type Cu-Zn deposits are found in :

(A) Island arcs

(B) Passive continental margins

(C) Mid oceanic ridges

(D) Continental rifts

45. Choose the correct combination of ore and location of its deposits :

(A) Uranium – Jaduguda

(B) Lead – Khetri

(C) Gold – Panna

(D) Iron – Malanjkhand

46. Which of the following is *not* a type of VHMS deposit ?

(A) Sedex type

(B) Kuroko type

(C) Cyprus type

(D) Algoma type

47. Banded iron formation closely related to glaciogenic marine sediments are called :

(A) Lake superior type

(B) Rapitan type

(C) Algoma type

(D) Kiruna type

48. Which one of the following ore minerals show internal reflection ?

(A) Orpiment

(B) Magnetite

(C) Pyrite

(D) Molybdenite

49. Types of oil traps formed due to accumulation of hydrocarbons along the folds and faults is called :

(A) Stratigraphic traps

(B) Structural traps

(C) Chemical traps

(D) Fractured reservoirs

50. The age of Gondwana coal in India is :

(A) Permo-Carboniferous

(B) Jurassic

(C) Palaeogene

(D) Neogene

51. Self potential method is the most suitable method for prospecting of :

(A) Carbonate ore bodies

(B) Sulphide ore bodies

(C) Ferruginous ove bodies

(D) Silicate ore bodies

52. The magnitude of gravity on the earth's surface depends on :

(A) Latitude, elevation and topography

(B) Latitutde, elevation, topography and density variations in the subsurface

(C) Latitude, elevation, topography and earth tides

(D) Latitude, elevation, topography, earth tides and density variations in the subsurface

53. Medium range forecast is valid for :

(A) 3 to 5 weeks

(B) 4 to 6 weeks

(C) 3 days to about 2 weeks

(D) about 2 weeks to about 3 weeks

54. The rate of cooling or warming of vertically moving unsaturated (dry) air is :

(A) 20ºC/1000 meters

(B) 30ºC/1000 meters

(C) 10ºC/1000 meters

(D) 25ºC/1000 meters

55. Winds that blow of a constant speed parallel to curved isobars are termed as :

(A) Gradient winds

(B) Thermal winds

(C) Geostrophic winds

(D) Hydrostatic winds

56. The Madden-Julian Oscillations (MJO) has a zonal wavenumber 1 with maximum amplitude in the deep tropics, and it moves eastward around the equator with a period of :

(A) 10-20 days

(B) 70-80 days

(C) 30-60 days

(D) 80-90 days

57. At any given time, there are an estimated ..... thunderstorms in progress over the globe.

(A) 50,000

(B) 30,000

(C) 20,000

(D) 2,000

58. Middle clouds generally occupy heights :

(A) from 7000 to 8000 meters

(B) from 500 to 1000 meters

(C) from 1000 to 1500 meters

(D) from 2000 to 6000 meters

59. Which among the following is a warm ocean current of the Pacific Ocean ?

(A) Kuroshio current

(B) Mozambiqe current

(C) Canaries current

(D) Humboldt current

60. Clouds that usually form as the leeward side of mountains are called :

(A) Lenticular clouds

(B) Cirrus clouds

(C) Cumulonimbus clouds

(D) Contrails clouds

61. Density of seawater depends on :

(A) Salinity and pressure

(B) Salinity and temperature

(C) Temperature and pressure

(D) Salinity, temperature and pressure

62. Which of the following warm ocean currents is associated with the Indian Ocean ?

(A) Canary current

(B) Florida current

(C) Agulhas current

(D) Kurile current

63. The boundaries of the three plates which meet at the Rodrigues Triple Junction are :

(A) African, Indo-Australian, Antarctic

(B) Eurasian, Indo-Australian, North American

(C) Australian, North American, Pacific

(D) African, Antarctic, Eurasian

64. Isohaline line on a map is :

(A) The line that join the places of equal precipitation

(B) The line that joins the places of equal salinity

(C) The line that joins the places of equal temperature

(D) The line that joins the places of equal humidity

65. The deposition of sulphide minerals nearest to the hydrothermal vent depends on :

(A) Lighter density and higher solubility

(B) Higher density and lower solubility

(C) Lower density and lower solubility

(D) Higher density and higher solubility

66. Features given below are diagnostic to which sedimentary environment ?

Tectonic Setting :

Typically in fault grabens, downwarped basins with internal drainage or limited outflow.

Geometry :

Coursing upward from laminated shales, marls, limestone to rippled and cross-bedded sandstone, sequence shows cyclic alternation of lamine.

Sedimentology :

Finely lamined mudstones rich in kerogen with marl and freshwater limestone, fluvial muds and sand with cross-beds, wave ripples and climbing ripple drift, association of regular sequence of carbonate and evaporites with desicussion and mudcracks.

Fossils :

Nonmarine ostracods, diatoms, molluscs and fish and insects.

(A) Glacial

(B) Eolian

(C) Lacustrine

(D) Alluvials fans

67. A building is to be founded on a clay stratum. The water table is practically at ground surface level. Laboratory test show that the unit weight of the soil is r = 20 kN/m^3 and classify the soil as a firm clay. The uniaxial compressive strength is q_u = 150 kN/m^2.

Suppose that the footing will be square, 2 m wide, and the foundation depth will be 2 m below the ground surface, calculate the ultimate bearing capacity.

(A) 502.6 kPa

(B) 743.2 kPa

(C) 801.6 kPa

(D) 304.0 kPa

68. In a soil mechanics and engineering project, a stratigraphic column below the horizontal ground level of a wide valley is formed by 3 m of coarse gravels over a 12 m clay deposit. Below the clay is a highly permeable fractured sandstone. The water table in the gravel layer is 0.6 m below ground surface. In the sandstone substratum artesian condition with a piezometric height of 6 m above ground level exist. The gravel layer is very permeable and assumed to be hydrostatic. Determine the pore water pressure distribution.

(A) 23.54 kPa

(B) 54.23 kPa

(C) 70.45 kPa

(D) 96.01 kPa

69. A limestone classified as oomicrite by Folk's classification but when combining Folk's and Dunham's classification it can be classified as :

(A) Oomicrite Mudstone

(B) Oomicrite Boundstone

(C) Oomicrite Packstone

(D) Oomicritic crystalline limestone

70. According to Zingg diagram ..... particles have a flattened cylindrical or disk-like shape such that one axis is much shorter than the other two with $a \approx b << c$

(A) Equant

(B) Oblate

(C) Prolate

(D) Bladed

71. A modern roadway which is made of three layers, its second layer is termed as :

(A) Base and sub-base

(B) Wearing surface

(C) Subgrade surface

(D) Geomembranes

72. The ground beneath a large consists of a 50 m thick deposit of clays with a rock substratum. The bed of the lake is flat and 20 m deep. The action of geological processes generates clays in suspension which in a very short time from a 2 m thick layer of sediments that completely cover the bottom of the lake.

Assuming the free water surface remains unchanged, determe the pore pressure in the original situation.

Given :

The saturated unit weight of the clays in constant and equal to γ_{sat} = 200 kN/m^3.

The unit weight of water is γ_w = 10 kN/m^3

The rock substratum is impervious for practical purpose.

The surface of the water in the lake is taken as the origin of the depth axis, Z.

(A) 250 kPa

(B) 700 kPa

(C) 908 kPa

(D) 1114 kPa

73. The movements of dry-bottom glaciers is characteristic of :

(A) Ductile deformation and sliding

(B) Plastic deformation and basal sliding

(C) Gravity flow

(D) Push force

74. Under the thermohaline circulation, the oldest waters with a transit time of about 1600 years are upwalled in the :

(A) Indian Ocean

(B) North Atlantic

(C) South Atlantic

(D) North Pacific

75. The Middle Paleolithic tools are marked by the presence of :

(A) Chopper and Bifaces

(B) Harpoon and Spears

(C) Knife and Scraper

(D) Needles and Perforators

76. Kame terraces are the typical features in glaciated regions to be assigned to :

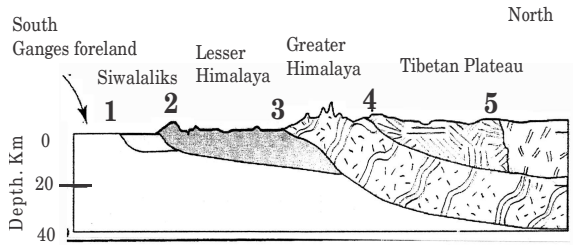
(A) Glacio-lacustrine processes

(B) Aeolian processes

(C) Glacio-fluvial processes

(D) Glacio-eustatic processes

77. The correct sequence of thrust (numbered 1 to 5) in the figure from south to north in the Himalayas are (ITS, Indus-Tsangpo Suture; MFT, Main frontal thrust; STD, Southern Tibetan detachment normal fault; MCT, Main central thrust; MBT, Main Boundary thrust) :



(A) MFT-MBT-MCT-STD-ITS

(B) MBT-MCT-MFT-STD-ITS

(C) ITS-STD-MFT-MCT-MBT

(D) MFT-MCT-STD-MBT-ITS

78. The apparent thickness of an outcropping bed in 20 m. The bed dips at 30°, what will be the true thickness of the bed ?

(A) 20 m

(B) 30 m

(C) 10 m

(D) 12.5 m

79. In carbonate and siliclastic sedimentary rocks uniaxial strain can be accommodated by chemical compaction, by the process of :

(A) Wedge deformation

(B) Screw dislocation

(C) Pressure solution

(D) Kink banding

80. Isotropic pressure at depth in the Earth arising from the overlying rock column :

(A) Lithostatic stress

(B) Normal stress

(C) Homogeneous stress

(D) Isotropic stress

81. The Doppler effect is a relative effect due to the change in ..... of a moving source relative to a stationary observer.

(A) Amplitude

(B) Velocity

(C) Displacement

(D) Frequency

82. The S-wave that is reflected from the outer core is denoted as :

(A) SOcS

(B) SKP

(C) ScS

(D) ScOS

83. The Northward drift of the Cimmerian continents resulted in the opening of :

(A) Neotethys

(B) Prototethys

(C) Paleotethys

(D) Southern Indian Ocean

84. The correct order of ages for Kerguelen Hotspot, Reunion Hotspot and the Marion plume hotspot is :

(A) 60 Ma, 90 Ma, 117 Ma

(B) 90 Ma, 65 Ma, 117 Ma

(C) 117 Ma, 65 Ma, 90 Ma

(D) 120 Ma, 95 Ma, 65 Ma

85. Which mineral is having 6 hardness in Moho's scale ?

(A) Topaz

(B) Quartz

(C) Calcite

(D) Orthoclase

86. Anthophyllite-Commingtonite series belong to the subclass :

(A) Cyclosilicate

(B) Inosilicate

(C) Sorosilicate

(D) Phyllosilicate

87. The depleted MORB Mantle (DMM) reservoir shows following Sr-Nd isotopic compositions :

(A) High $^{87}Sr/^{86}Sr$ and low $^{143}Nd/^{144}Nd$

(B) Low $^{87}Sr/^{86}Sr$ and low $^{143}Nd/^{144}Nd$

(C) Low $^{87}Sr/^{86}Sr$ and high $^{143}Nd/^{144}Nd$

(D) High $^{87}Sr/^{86}Sr$ and high $^{143}Nd/^{144}Nd$

88. Re and Os elements dominantly possesses which of the following geochemical character ?

(A) Chalcophile

(B) Siderophile

(C) Lithophile

(D) Immobile

89. The following isotopic ratio is useful in constraining the time of separation of melt from the enriched or depleted mantle :

(A) $^{86}Sr/^{57}Sr$

(B) $^{143}Nd/^{144}Nd$

(C) $^{206}Pb/^{238}U$

(D) $^{297}Pb/^{235}U$

90. In nuclear energy production, the processed or enriched Uranium is :

(A) U^{238}

(B) U^{234}

(C) U^{232}

(D) U^{235}

91. Which of the following is True for the compatable elements ?

(A) The value of partition coefficient, D > 1 and they are preferentially retained in liquid

(B) The value of partition coefficient D > 1 and they are preferentially retained in solid

(C) The value of partition coefficient D < 1 and they are preferentially retained in solid

(D) The value of partition coefficient D < 1 and they are preferentially retained in liquid.

92. Which of the following hotspot is related to the eruption of flood basalts of the Columbia plateau ?

(A) Kerguelen

(B) Tristan

(C) Hawaii

(D) Yellowstone

93. Which of the following tectonic settings are primarily characterized by thin crust, normal faults, shallow earthquakes and basalt and rhyolite magmatism ?

(A) Mid oceanic rifts

(B) Continental rifts

(C) Convergent plate boundaries

(D) Transform plate boundaries

94. Which of the following represents the approximate age of Malanjkhand Granite ?

(A) 1800 million year

(B) 1100 million year

(C) 2300 million year

(D) 3100 million year

95. Harzburgite is ultramafic igneous rocks having composition :

(A) Olivine + Orthopyroxene

(B) Orthopyroxene + Clinopyroxene

(C) Only Olivine

(D) Only Pyroxene

96. Shand (1927) grouped igneous rock based on the total molar alkali verse alumina content. Which condition will be suitable in case of Pre-aluminous ?

(A) $Al_2O_3 < (Na_2O + K_2O)$

(B) $Al_2O_3 > (CaO + Na_2O + K_2O)$

(C) $Al_2O_3 < (CaO + Na_2O + K_2O)$ but $Al_2O_3 > (Na_2O + K_2O)$

(D) $Al_2O_3 = (Na_2O + K_2O)$

97. If the dark portion is on a vanishing stage and is recognised by dark schlieren streaks within the granitic portion (Leucosome), this migmatite is known as :

(A) Agmatite

(B) Melanosome

(C) Nebulite

(D) Neosome

98. Comlplete the reaction :

Microcline + Chlorite = ... + Muscovite + (Quartz + H_2O)

(A) Biotite

(B) Kyanite

(C) Garnet

(D) Chloritoid

99. The reaction Opx + Plagioclase = Garnet + Cpx + Quartz is :

(A) Exsolution Reaction

(B) Solid-solid Net-Transfer Reaction

(C) Exchange Reaction

(D) Ion Exchange Reaction

100. The ACF value of $Mg_3Al_2Si_3O_{12}$ is :

(A) F = 75; A = 25 & C = O

(B) F = 50; A = 25 & C = 25

(C) F = 0; A = 75 & C = 25

(D) F = 25; A = 0 & C = 75

ROUGH WORK