Paper -II
Earth, Atmospheric, Oceanic and Planetary Sciences

Booklet Code

A

Test Booklet No.

SUBJECT CODE : 0 2

Roll No. : | | | | | | | | | | | |

(Figures as per admission card)

Roll No. (in words) : _____

_____

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

Name and Signature of Invigilator/s

Signature : _____

Name : _____

Time : 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 roll number in the space provided on the top of this page.
2. This paper consists of hundred (100) multiple-choice type of questions.
3. At the commencement of examination, the test booklet will be given to you. In the first 5 minutes, you are requested **To Open the Booklet and Compulsorily Examine it as Below:**
   (i) To have access to the Test Booklet, tear off the paper seal on the edge of the 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 pages/questions missing or duplicate or not in serial order or any other discrepancy should be got replaced immediately by a correct booklet from the invigilator within the period of 5 minutes. Afterwards, neither the Test Booklet will be replaced nor any extra time will be given.
   (iii) After the verification is over, the Test Booklet Number should be entered in the OMR Sheet and the OMR Sheet Number should be entered on this Test Booklet.
4. Each item 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 (C) is the correct response.
5. Your responses to the questions are to be indicated in the **OMR Sheet kept inside this Booklet**. If you mark at any place other than in the circles, the OMR Sheet will not be evaluated.
6. Read the instructions given in OMR Sheet carefully. Fill the Booklet Code of Paper-II in OMR Sheet **Compulsorily**.
7. Rough Work is to be done in the end of this booklet.
8. If you write your name or put any mark on any part of the OMR Answer Sheet, except for the space provided for the relevant entries, which may disclose your identity, you will render yourself liable to disqualification.
9. You have to return the OMR answer Sheet to the invigilators at the end of the examination compulsorily and must NOT carry it with you outside the Examination Hall.
10. You can take away test booklet and carbon copy of OMR Answer Sheet after the examination.
11. **Use only Blue/Black Ball point pen.**
12. **Use of any calculator, electronic gadgets or log table, etc. is prohibited.**
13. **There is no negative mark for incorrect answer.**

1. Meteorite with 40% olivine, 30% pyroxene, 5-20% Ni-Fe, 10% plagioclase and 6% triolite is called :
   (A) Siderite
   (B) Chondrite
   (C) Aerolite
   (D) Siderolite

2. Which of the following isotopes having longest half-life period?
   (A) ^{147}Sm - ^{144}Nd
   (B) ^{235}U - ^{207}Pb
   (C) ^{232}Th- ^{208}Pb
   (D) ^{87}Rb-^{87}Sr

3. Match List-I and List-II and select the correct answer from the codes given below:

   List-I
   (Dating Method)
   P. Sm-Nd
   Q. U-Th
   R. Be-10
   S. Optically Stimulated Luminescence

   List-II
   (Suitable Application)
   1. Speleothem
   2. Ice core
   3. Sand dunes
   4. Crystallization age of mafic rocks

   Codes:

	P	Q	R	S
(A)	3	4	2	1
(B)	2	3	4	1
(C)	1	2	3	4
(D)	4	1	2	3

4. Major Physiographic features of Peninsular India formed in which of the following era?
   (A) Proterozoic (B) Palaeozoic
   (C) Mesozoic (D) Cenozoic

5. Highly viscous, mechanically weak and ductile upper part of the mantle of the earth that lies at a depth between ~ 80 - 200 km is composed chiefly of:
   (A) Pyroxenite
   (B) Garnet Peridotite
   (C) Spinel Peridotite
   (D) Peridotite

6. Given below are two statements:
   Statement I: Clarke of concentration is defined as the enrichment factor over average concentrations required for an ore to be economic, ranges from a few times for some major elements up to many orders of magnitude for trace metals such as Au, Pt and Hg.
   Statement II: The enrichment factor generally increases with decreasing abundance of elements in the Earth's crust.
   In light of the above statements, choose the most appropriate answer :
   (A) Statement I is correct but Statement II is incorrect
   (B) Statement I is incorrect but Statement II is correct
   (C) Both Statement I and Statement II are correct
   (D) Both Statement I and Statement II are incorrect

7. A distinctive magmatic, sedimentary and metamorphic rock sequence formed in an oceanic environment and composed of crust and mantle components is called:

(A) Tholeiite

(B) Adakaite

(C) Alpine Peridotite

(D) Ophiolite

8. Choose correct Bragg's equation from the following :

(A) $2 \sin\theta \times n\lambda = d$

(B) $d = n\lambda\, 2\sin\theta$

(C) $n\lambda \times d = 2\sin\theta$

(D) $n\lambda = 2\, d \sin\theta$

(where inter-planner (atomic) spacing (d) inside a crystalline material to diffraction angle(θ) as a function of wave length (λ) of X-rays, (n) is an integer such as 1, 2, 3).

9. When alumina saturation in the rock is $Al_2O_3/(CaO+Na_2O) < 1$, the rock is called:

(A) Peraluminous

(B) Peralkaline

(C) Metaaluminous

(D) Sub-alkaline

10. Given below are two statements, one labelled as Assertion (a) and the other labelled as Reason (r). Read the statements and choose the correct answer from the code given below:

Assertion (a) : Crystals must have a regular crystal structure.

Reason (r):All crystals have a lattice and that lattices vary in their symmetry.

(A) Both (a) and (r) are true and (r) is correct explanation of (a)

(B) Both (a) and (r) are true and (r) is not correct explanation of (a)

(C) (a) is true, but (r) is false

(D) (a) is false, but (r) is true

11. Match List-I and List-II and select the correct answer from the codes given below:

List-I

(Bond Types)

P. Metallic bonds

Q. Ionic bonds

R. Covalent bonds

S. van der Waals bonds

List-II

(Cause of bonding produced)

1. Bonds do not involve valence electrons, but result from weak electrostatic forces due to uneven charge distribution in the crystal structure
2. Single electrons are shared between the two atoms in a common orbital
3. Electrostatic attraction between the atoms of different charge, where electrons have been removed (positive charge) or added (negative charge)
4. Some outer electrons removed from the atoms and move freely within the structure

Codes:

	P	Q	R	S
(A)	3	4	1	2
(B)	2	1	4	3
(C)	1	2	3	4
(D)	4	3	2	1

12. Match List-I and List-II and select the correct answer from the codes given below:

List-I

(Refractive Index variations in minerals comparing to Canada Balsam (1.535-1.542) and (refringence) relief types)

P. Very weak and Negative relief

Q. Weak and Low relief

R. Moderate-Strong and High relief

S. Very strong and Very high relief

List-II

(Minerals)

1. Quartz
2. Zircon
3. Hypersthene
4. Fluorite

Codes:

	P	Q	R	S
(A)	2	3	1	4
(B)	3	2	4	1
(C)	4	1	3	2
(D)	1	4	3	2

13. What will be the Degree of Freedom (F) at the Eutectic Point in a binary (isobaric at atmospheric pressure) phase diagram of Diopside ($CaMgSi_2O_6$)–Anorthite ($CaAl_2Si_2O_8$) system?

(A) 3

(B) 2

(C) 1

(D) 0

14. Line connecting points of equal thickness of beds are called:
(A) Isohyets
(B) Isohalines
(C) Isobaths
(D) Isopachs

15. A normal fault has a dip of 45º towards east and a throw of 100m. The heave of the fault (in metres) is:
(A) 50
(B) 100
(C) 200
(D) 400

16. When the axis plunges directly down the dip of the axial plane; the fold is known as:
(A) Plunging fold
(B) Periclinal fold
(C) Reclined fold
(D) Flexure fold

17. The Himalayas began to form approximately _____ when the Indian plate began to collide with Asian plate.
(A) 5 million years ago
(B) 50 million years ago
(C) 500 million years ago
(D) 1 billion years ago

18. Repetition of beds on a geological map may be due to:
(A) Folding
(B) Erosion
(C) Unconformity
(D) Both (A) and (B)

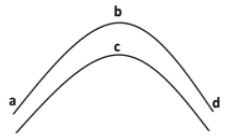
19. Structure contours of a bedding plane at 100 m interval are spaced in such a manner that the horizontal equilvalent is also 100 m. The dip of the bedding plane is:
(A) 30º
(B) 45º
(C) 60º
(D) 90º

20. In case of simple dipping sequence of beds, older beds are found in the dip direction when the angle of:
(A) Dip > slope
(B) Slope > dip
(C) Slope = dip
(D) None of the above

21. Which of the following tectonic forces tend to push the objects in such way so that they slide past one another?
(A) Tensional
(B) Compressive
(C) Shearing
(D) None of the above

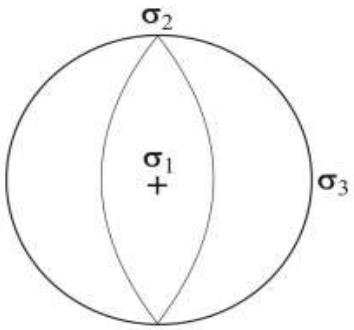
22. Which of the following is not a phenomenon that can occur as a direct result of a tectonic plate movements?
(A) Orogeny
(B) Tornadoes
(C) Tsunamis
(D) Volcanoes

23. In the below given diagram of a fold, which part would experience relatively more extension?



(A) a
(B) b
(C) c
(D) d

24. The stereographic projection below shows the principal stress axes and fault planes:



The projection represents a
(A) Normal fault
(B) Reverse fault
(C) Thrike-slip
(D) Thrust fault

25. The body of which invertebrate fossil can transversely and longitudinally be divided into three distinct parts:
(A) Brachiopods
(B) Gastropods
(C) Trilobites
(D) Cephalopods

26. Sometimes a ridge is present on the ventral side of cephalopod shell which is called:
(A) Sulcus
(B) Keel
(C) Sutures
(D) Septa

27. In Corals, flat or gently domed plates representing the floors of successive growth of Calices are known as:
(A) Dissepiments
(B) Septa
(C) Columella
(D) Tabulae

28. Septal necks in ammonoids are directed forwards or towards the aperture and they are called:
(A) Retrosiphonate
(B) Prosiphonate
(C) Orthosiphonate
(D) Opisthosiphonate

29. Among modern echinoids , there are special features for incubation of fertilized eggs, which are sac like structures known as:
(A) Marsupial brood pouches
(B) Marsupae
(C) Brood sac
(D) Marsupial sac:

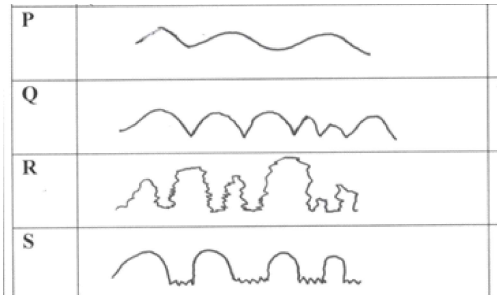
30. A small sensory hair_like structure on the outer side of nematocyst in Cnidarians is known as :
(A) Nema
(B) Cnidocil
(C) Sicula
(D) Barb

31. Organisms having narrow range of salinity tolerance are known as :
(A) Euryhaline
(B) Alkohaline
(C) Aquahaline
(D) Stenohaline

32. In Nautiloids, the body chamber is provided with an aperture , which has a shallow notch known as 'Hyponomic Sinus' on the :
(A) Dorsal side
(B) Anterior side
(C) Posterior side
(D) Ventral side

33. Match List-I and List-II and select the correct answer from the codes given below :

List-I



List-II
1. Ammonoid
2. Nautiloid
3. Ceratite
4. Goniatite

Codes :

	P	Q	R	S
(A)	4	3	2	1
(B)	1	2	3	4
(C)	2	4	1	3
(D)	4	2	3	1

34. Which fossils are useful in biostratigraphy, palaeoecology, Palaeogeography and oil exploration?
(A) Corals
(B) Conodonts
(C) Foraminifers
(D) Diatoms

35. The fluids in laminar flow are :
(A) Heterogeneous and parallel
(B) Homogeneous and parallel
(C) Heterogeneous and random
(D) Homogeneous and random

36. The shape of clast in gravel and conglomerate are determined by :
(A) Fracture property
(B) Spherical clast
(C) Prolate clast
(D) Outline of property

37. Upper Gondwana is characterised by the presence of :
(A) Ptilophyllum
(B) Vertebraria
(C) Glossopteris
(D) Gangamopteris

38. Which of the following formations account for almost 90 % of the Indian Coal Reserves ?
(A) Barren Measures
(B) Barakar Formation
(C) Raniganj Formation
(D) Karharbari Formation

39. Semri Group belongs to :
(A) Cuddapah Supergroup
(B) Vindhyan Supergroup
(C) Dharwar Supergroup
(D) Delhi Supergroup

40. Erinpura granite is intrusive into the rocks of:

(A) Delhi Supergroup

(B) Cuddapah Supergroup

(C) Aravalli Supergroup

(D) Marwar Supergroup

41. Flow within the viscous sublayer is subject to irregularities known as :

(A) Streamline

(B) Turbulent sweeps

(C) Cross laminae

(D) Starved ripple

42. Arkose is a :

(A) Sandstone with less than 15% matrix and 25% of feldspar

(B) Sandstone with more than 15% matrix and 25% of feldspar

(C) Sandstone with less than 15% matrix and 25% rock fragments

(D) Sandstone with more than 15% matrix and 25% of rock fragments

43. A limestone with round particles fine grained calcium carbonates less than 2mm in diameter without any concentric or radial structure is :

(A) Oolitic limestone

(B) Pellatic limestone

(C) Intraclastic limestone

(D) Bioclastic limestone

44. The turbidities deposits are found in :

(A) Inland

(B) Mountain

(C) Coastal region

(D) Deep sea

45. Match List-I and List-II and select the correct answer from the codes given below:

List-I

(Element and isotopic ratio measurements)

P. Carbon ($^{13}C/^{12}C$)

Q. Oxygen ($^{18}O/^{16}O$)

R. Sulphur ($^{14}S/^{32}S$)

S. Silicon ($^{30}Si/^{28}Si$)

List-II

(Standards commonly used in the analysis)

1. SMOW

2. Canayon Diablo meteorite triolite

3. Quartz vein, Mother lode California

4. Calcite-PDB (belemnite)

Codes:

	P	Q	R	S
(A)	4	1	3	2
(B)	4	1	2	3
(C)	3	2	1	4
(D)	2	3	4	1

46. Given below are two statements, one labelled as Assertion (a) and the other labelled as Reason (r). Read the statements and choose the correct answer from the code given below:

Assertion (a): Zr does not enter into common rock-forming minerals. It appears in specific phase as zircon. It is more abundant in later differentiates. The Zr:Hf ratio remains almost constant (50) throughout the fractional crystallization process.

Reason (r): Combination of high charge and high ionic radius sets Zr unique and not found in any of the major elements of igneous rocks. Also, Hf having the same charge as Zr and about same radius. It is always camouflaged in Zr-minerals.

(A) (a) is true, but (r) is false

(B) (a) is false, but (r) is true

(C) Both (a) and (r) are true and (r) is correct explanation of (a)

(D) Both (a) and (r) are true and (r) is not correct explanation of (a)

47. Match List-I and List-II and select the correct answer from the codes given below:

List-I

(Elements)

P. H, He, Ar

Q. Ga, Hg, Ag

R. Zr, Hf, U

S. Au, Pt, Sn

List-II

(Geochemical classification)

1. Chalcophile

2. Lithophile

3. Siderophile

4. Atmophile

Codes :

	P	Q	R	S
(A)	3	4	2	1
(B)	4	1	2	3
(C)	1	3	4	2
(D)	4	2	3	1

48. Given below are two statements:
Statement I: The U and Th being highly electropositive elements and concentrated in the Earth's crust as oxides or silicates. Au and Pt metals have no tendency to form silicates and alloy with Fe, therefore concentrated in the Earth's core.
Statement II: The distribution of elements in the Earth is not directly controlled by their densities or atomic weights, but major phases that can be formed. The distribution of elements within these phases depends upon electronic configuration/electronic bonding characteristics/chemical potentials.
In light of the above statements, choose the most appropriate answer :
(A) Both Statement I and Statement II are incorrect
(B) Statement I is incorrect but Statement II is correct
(C) Statement I is correct but Statement II is incorrect
(D) Both Statement I and Statement II are correct

49. Which of the following radioactive isotope systematic helps to understand timing and evolution of an acidic igneous intrusion in the Precambrian terrain?
(A) K-Ar system
(B) Rb-Sr system
(C) Sm-Nd system
(D) U-Th-Pb system

50. Which of the following pair of elements is diadochic in lattice structure of dolomite?
(A) Fe-Mn (B) Ca-Na
(C) Fe-Al (D) Na-K

51. Which of the following ore deposit is genetically related to high degree of magma fractionation(in progressive crystallization), marked with leucocratic granitic composition of the host rock and low (5) K/Rb ratios?
(A) Podiform chromite
(B) PGE sulphide
(C) Massive Ni-Cu sulphide
(D) Rare-metals zor rare-elements

52. Given below are two statements, one labelled as Assertion (a) and the other labelled as Reason (r). Read the statements and choose the correct answer from the code given below:
Assertion (a): Pegmatites are ores for rare metals, such as Li, Be,Ta, Sn and U, which are incompatible in common rock-forming minerals.
Reason (r): Extreme fractionation during progressive crystallisation of magma causes concentration of incompatible elements which are not partitioned into crystallising minerals increases. Enrichment of incompatible trace elements is possible in the last remaining melt.
(A) (a) is true, but (r) is false
(B) (a) is false, but (r) is true
(C) Both (a) and (r) are true and (r) is correct explanation of (a)
(D) Both (a) and (r) are true and (r) is not correct explanation of (a)

53. Match List-I and List-II and select the correct answer from the codes given below:

List-I

(Ore deposit types)

P. Porphyry Cu deposits

Q. Bushveld type Chromite deposits

R. Algoma type Banded Iron deposits

S. Kambalda type Nickel Deposits

List-II

(Typical associated rocks)

1. Kometitic Peridotite

2. Volcanogenic sediments

3. Felsic rocks

4. Harzburgite

Codes:

	P	Q	R	S
(A)	4	1	3	2
(B)	3	4	2	1
(C)	2	3	1	4
(D)	1	2	3	4

54. Given below are two statements:

Statement I: SEDEX deposits are stratiform or stratabound Pb-Zn sulphide ore deposits hosted in sedimentary rocks of early-Proterozoic to Mesozoic age, with Ag or Cu as by-products.

Statement II: SEDEX ores formed syngenetically or during early diagenesis in fine-grained carbonaceous clastic sedimentary rocks.

In light of the above statements, choose the most appropriate answer :

(A) Statement I is correct and Statement II is incorrect

(B) Statement I is incorrect and Statement II is correct

(C) Both Statement I and Statement II are correct

(D) Both Statement I and Statement II are incorrect

55. Which of the following is the chief hydrocarbon producing series of rocks in the Assam area?

(A) Barail

(B) Tipam

(C) Surma

(D) Dupi Tila

56. Given below are two statements:

Statement I: Unconformity –related U deposits contain sandstone hosted irregular coffinite-uraninite ore bodies straddling immediately below the unconformity and base of an intra-cratonic sedimentary basin.

Statement II: The host rocks are desilicified and clay-chlorite-sericite rich and restricted to Palaeoproterozoic age.

In light of the above statements, choose the most appropriate answer :

(A) Statement I is correct but Statement II is incorrect

(B) Statement I is incorrect but Statement II is correct

(C) Both Statement I and Statement II are correct

(D) Both Statement I and Statement II are incorrect

57. Match List-I and List-II and select the correct answer from the codes given below:

List-I

(Coal macerals)

P. Resinite

Q. Cutinite

R. Micronite

S. Sclerotinite

List-II

(Diagnostic characters)

1. Opaque, massive or granular, fine grained

2. Opaque, oval with cell strucure

3. Yellow or red, oval with resinous luster

4. Yellow or brown wavy and opaque at both the ends

Codes:

	P	Q	R	S
(A)	4	3	2	1
(B)	3	4	1	2
(C)	4	1	2	3
(D)	1	2	3	4

58. Which of the following represents the longest time period ?

(A) Precambrian

(B) Palaeozoic

(C) Mesozoic

(D) Coenozoic

59. Stratigraphic correlation of Archean rocks is primarily based on :
(A) Presence of index fossils
(B) Radiometric dating
(C) Lithology
(D) Micro fossils

60. The most ancient crust in the Peninsular craton is represented by which of the following?
(A) Granitic plutons
(B) Older greenstone belt
(C) Newer greenstone belt
(D) Deccan volcanic rocks

61. Which of the following was the dominating life during Palaeoproterozoic?
(A) Fungi
(B) Cyanobacteria
(C) Red algae
(D) Green algae

62. The value of Digital Number would be minimum for a water body in an image of the following wavelength:
(A) 0.3 to 0.4 μm
(B) 0.4 to 0.5 μm
(C) 0.5 to 0.6 μm
(D) 0.7 to 0.8 μm

63. Wein's displacement law is expressed by the following equation where λ max is wavelength :
A is constant
T is temperature of object
(A) $A = \frac{\lambda max}{T}$
(B) $T = A.\lambda max$
(C) $\lambda max = A / T$
(D) $\lambda max = T / A^2$

64. Edge enhancement in an image is best performed by :
(A) Low pass filtering
(B) High pass filtering
(C) Linear Stretching
(D) Band Ratioing

65. Match List-I and List-II and select the correct answer from the codes given below:
List - I
P. Spring Line
Q. Drift
R . Adit
S. Spillway
List-II
1. A small length tunnel that is bored nearly at the same level or close to the main tunnel
2. Passage for entry of men and equipment for tunneling
3. Meeting point of the roof and two side walls of a tunnel
4. Tunnel for releasing water from reservoir
Codes:

	P	Q	R	S
(A)	3	1	2	4
(B)	4	2	1	3
(C)	4	1	2	3
(D)	2	1	4	3

66. Schmidt Hammer is an instrument used to determine:
(A) Tensile strength
(B) Uniaxial Compressive strength
(C) Shear strength
(D) Modulus of elasticity

67. Match List-I and List-II and select the correct answer from the codes given below:

List-I

(Engineering property)

P. Porosity

Q. Sonic velocity

R. Permeability

S. Durability

List-II

(Explanation of terms)

1. Tendency for eventual breaking down of rock component with degradation of rock quality

2. Relative interconnection of pores

3. Evaluates degree of fissuring

4. Identifies relative proportion of solids and voids

Codes:

	P	Q	R	S
(A)	1	2	3	4
(B)	4	3	2	1
(C)	3	2	1	4
(D)	2	1	4	3

68. Given below are two statements, one labelled as Assertion (a) and the other labelled as Reason (r). Read the statements and choose the correct answer from the code given below:

Assertion (a): In case of an exhalative sedimentary deposit, ore minerals vary with the change in the sedimentary facies.

Reason (r): Metamorphism of ore and host rocks are isofacial.

(A) Both (a) and (r) are true and (r) is correct explanation of (a)

(B) Both (a) and (r) are true and (r) is not correct explanation of (a)

(C) (a) is true, but (r) is false

(D) (a) is false, but (r) is true

69. Match List-I and List-II and select the correct answer from the codes given below:

List-I

(Geophysical method)

P. Self-potential

Q. Induced polarisation

R. Magnetic

S. Electromagnetic

List-II

(Direct and Indirect targets)

1. Disseminated porphyry type Cu ore deposit

2. Mapping of igneous body

3. Geological structure

4. Graphites

Codes:

	P	Q	R	S
(A)	3	2	1	4
(B)	2	3	4	1
(C)	3	4	1	2
(D)	4	1	2	3

70. Given below are two statements:

Statement I: The principle of Geiger-Muller (G. M) counter is based on the fact that when atoms collide with the high velocity radioactive particles, ionisation takes place.

Statement II: This process becomes continuous and presence of neutrons so produced is detected.

In light of the above statements, choose the most appropriate answer :

(A) Both Statement I and Statement II are correct

(B) Both Statement I and Statement II are incorrect

(C) Statement I is correct but Statement II is incorrect

(D) Statement I is incorrect but Statement II is correct

71. Match List-I and List-II and select the correct answer from the codes given below:

List-I

(Element)

P. U

Q. Co

R. Zn

S. Cr

List-II

(Effect on plants)

1. Yellow leaves with green veins
2. Stunned roots
3. White dead patches on leaves
4. Abnormal chromosome number in nuclei

Codes:

	P	Q	R	S
(A)	4	3	2	1
(B)	3	4	1	2
(C)	2	1	4	3
(D)	1	2	3	4

72. Which of the following guide is the most important as for as exploration of bauxite deposits is concerned?

(A) Stratigraphic

(B) Physiographic

(C) Structural

(D) Mineralogical

73. Match List-I and List-II and select the correct answer from the codes given below:

List-I

(Type of waves produeed in elastic media)

P. Love waves

Q. Sheer waves

R. Rayleigh waves

S. Compressional waves

List-II

(Particle motion)

1. Particles motion in the same or opposite direction of wave propagation
2. Particles have Gyratory motion in the vertical plane
3. Particles motion at right angles to the direction of wave propagation
4. Particle motion in both horizontal and transverse direction of propagation

Codes:

	P	Q	R	S
(A)	4	3	2	1
(B)	2	4	3	1
(C)	3	1	4	2
(D)	3	2	1	4

74. Last Glacial Maxima (LGM) refers to the time of maximum extent of ice sheets during :

(A) Holocene Time

(B) Around 22,000 years B.P.

(C) Between 110,000 to 60,000 years B.P.

(D) Around 280 Ma B.P.

75. Interstadials during Quaternary period are :

(A) Long warm events between the generally colder periods

(B) Short warm events between the generally colder periods

(C) Short cold events between the generally warmer periods

(D) Long very cold events between the generally cooler periods

76. Match List-I and List-II and select the correct answer from the codes given below:

List–I

(Terms used for climate change)

P. Marine Isotope Stage (MIS) III

Q. Holocene Climatic Maximum

R. Interstadial period

S. Younger dryas

List-II

(Time period/Explanation of event)

1 . Cold event at about 12,900 to 11,500 years B.P.

2. Warm period at around 8,000 years B.P.

3. Sudden and Short-lived event during generally colder conditions

4. Warm event around 60,000 years B.P.

Codes:

	P	Q	R	S
(A)	1	2	3	4
(B)	4	3	2	1
(C)	4	2	3	1
(D)	2	1	4	3

77. Which of the following marks the farthest advance of a glacier?

(A) Recessional moraine

(B) Lateral moraine

(C) Terminal moraine

(D) Ground moraine

78. The boundary between the Continental Crust and the Oceanic Crust lies within:
(A) Continental Shelf
(B) Continental rise
(C) Continental slope
(D) Abyssal plane

79. Stream which flows in the opposite direction to the original consequent streams is described as:
(A) Obsequent
(B) Subsequent
(C) Insequent
(D) Resequent

80. The surface expression of continent-continent collision is:
(A) Double Wadati zone
(B) Hollow zone
(C) Suture zone
(D) Plunging zone

81. Which one of the following rocks has widest range of resistivity?
(A) Granite
(B) Gabbro
(C) Sandstone
(D) Schist

82. Which component of the secondary field (H_s) is 180° out of phase with the primary field (Hp) in the electromagnetic method? (Φ = Phase lag)
(A) $H_s \cos(\Phi)$
(B) $H_s \sin(\Phi)$
(C) $H_p \sin(\Phi)$
(D) $H_p \cos(\Phi)$

83. The sensitivity of Hydrophone is:
(A) 1 $mVPa^{-1}$
(B) 5 VPa^{-1}
(C) 0.1 VPa^{-1}
(D) 0.1 $mVPa^{-1}$

84. Cross-correlation of wavelet A={2, 1, -1, 0, 0} with wavelet B={0, 0, 2, 1, -1} is:
(A) {0,0,0,0,-2,1,6,1,-2}
(B) {-2,1,6,1,-2,0,0,0,0}
(C) {-2,1,0,0,6,1,0,0,-2}
(D) {-2,0,0,1,6,0,0,1,-2}

85. Which one of the following Maxwell's equation is a mathematical expression of Ampere's law?
(A) $\nabla \times E = -\partial B/\partial t$
(B) $\nabla \times H = J+(\partial E/\partial t)$
(C) $\nabla .B = 0$
(D) $\nabla .D = Q$
(where J=current density, E= electric field, B= magnetic field, H= magnetic field intensity, D=displacement current, Q=electric charge density)

86. Simpson's 1/3rd rule is used to solve the order of polynomial equation of:
(A) 1st order
(B) 2nd order
(C) 3rd order
(D) 4th order

87. Which of the following is correct for a geophysical well posed problem?
(A) Solution exists
(B) Solution is unique
(C) Solution is stable
(D) All of the above

88. The wavelength of a gravity anomaly is a measure of :
(A) Depth of the anomalous mass only
(B) Size of the anomalous mass only
(C) Depth and size of the anomalous mass both
(D) None of the above

89. An electro-bed corresponds to an interval of depth in which log response is:
(A) Variable
(B) Zero
(C) Constant
(D) Zero and variable both

90. What is the maximum volumetric percentage of water vapour in the atmosphere near the Earth's surface?
(A) 1 (B) 2
(C) 3 (D) 4

91. Greenhouse gases in the atmosphere are:
(A) Ozone (O_3), CFCs and Carbon dioxide (CO_2) only
(B) Ozone (O_3), CFCs, Methane (CH_4) and Carbon dioxide (CO_2) only
(C) Ozone (O_3), CFCs, Nitrous oxide (N_2O) and Carbon dioxide (CO_2) only
(D) Ozone (O_3), CFCs, Methane (CH_4), Nitrous oxide (N_2O), Water vapor (H_2O) and Carbon dioxide (CO_2)

92. For midlatitude synoptic scale disturbances, Geostrophic approximation is balance between :
(A) Coriolis force and pressure gradient force
(B) Coriolis force and centrifugal force
(C) Pressure gradient force and centrifugal force
(D) Coriolis force and thermal force

93. The geostrophic wind that turns counter clockwise with height is called as :
(A) Backing and associated with warm-air advection
(B) Sheering and associated with warm-air advection
(C) Backing and associated with cold-air advection
(D) Sheering and associated with cold-air advection

94. Which branch examines the factors that affect transfer of energy and material between trophic levels and that ultimately control secondary production ?
(A) Monodynamic
(B) Stratodynamic
(C) Trophodynamic
(D) Phytodynamic

95. How do Ekman currents vary with depth?

(A) Decrease linearly

(B) Decrease logarithmically

(C) Decrease exponentially

(D) Increase exponentially

96. Spatial variability of Ekman transport due to spatial variability of winds over distances of hundreds of kilometres and days, lead to:

(A) Only convergence of the transport.

(B) Only divergence of the transport.

(C) Convergence and divergence of the transport.

(D) No effect on the transport.

97. In the case of Thermohaline Circulation:

(A) The deep ocean currents are relatively stronger

(B) The deep circulation has no influence on Earth's heat budget

(C) Stratification of ocean has no influence on ocean dynamics

(D) The volume of deep water is far larger than the volume of surface water

98. In northern hemisphere, the Ekman transport directed perpendicular to the applied anticyclonic stress will lead to ..... flow :

(A) divergent and downwelling

(B) divergent and upwelling

(C) convergent and downwelling

(D) convergent and upwelling

99. Which of the following is not the process of removal of salinity from drinking water?

(A) Reverse osmosis

(B) Use of electrodialysis membrane

(C) Distillation

(D) Coagulation

100. How old are the oldest oceanic crust basalts?

(A) 25 million years

(B) 4 billion years

(C) 200 million years

(D) 570 million years

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