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Previous Year Paper
(Earth Science)
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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)

APR- 35224

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 (C) is the correct response.

   (A) (B) ● (D)

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. परिक्षार्थींनी 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 मिनीटांमध्ये आपण सदर प्रश्नपत्रिका उघडून खालील बाबी अवश्य तपासून पहाव्यात.
   (*i*) प्रश्नपत्रिका उघडण्यासाठी प्रश्नपत्रिकेवर लावलेले सील उघडावे. सील नसलेली किंवा सील उघडलेली प्रश्नपत्रिका स्विकारू 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 काळा/निळा करावा.
   उदा. : जर (C) हे योग्य उत्तर असेल तर.

   (A) (B) ● (D)

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 ठिकाणा व्यतिरीक्त 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.

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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. Which of the following minerals contains Barium ?
   (A) Corundum
   (B) Apatite
   (C) Gypsum
   (D) Celsian

2. New metamorphic mineral due to chemical reaction changes its :
   (A) Phase
   (B) Texture
   (C) Form
   (D) Size

3. What is a concentration of Ni in an olivine crystal, in equilibrium with a melt having 150 ppm Ni and
$$^{Ni}D_{01-liq.} = 12$$
   (A) 0.18 wt%
   (B) 12.5 wt%
   (C) 18 wt%
   (D) 1.25 wt%

4. Pb isotopic data from southern hemisphere shows compositional similarity to EM type of mantle reservoir is known as :
   (A) HIMU
   (B) NHRL
   (C) FOZO
   (D) DUPAL

5. Higher ratios of $^{87}Sr/^{86}Sr$ and lower values of epsilon Nd (εNd) are observed in continental flood basalts because of :
   (A) Its derivation from deeper mantle source
   (B) Due to lower amounts of partial melting
   (C) Entrainment of mantle material
   (D) Assimilation of continental crust

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6. Which one of the following Uranium isotopes is not occurring in the nature ?

(A) U^{235}

(B) U^{234}

(C) U^{238}

(D) U^{232}

7. Composition of the resultant partial melts is different from the composition of original rock primarily because of :

(A) Melt induced buoyancy

(B) Varying amounts of fractional crystallization

(C) The difference in melting temperatures of minerals

(D) Similarity in melting temperatures of minerals

8. Crystallization of new phlogopite mineral in the existing mantle peridotite is an example of which of the following process ?

(A) Cryptic metasomatism of Dawson (1984)

(B) Patent Metasomatism of Harte (1983)

(C) Sulphide metasomatism

(D) Mantle depletion

9. Consider the following statements :

Statement–1 : The radius of Cr^{+3} ion is close to Fe^{+3} ion but chromium show a high degree of preferential concentration relative to ferric ion.

Statement–2 : Cr^{+3} ion has strong crystal field stabilisation energy relative to that of Fe^{+3} ion.

Which of the statement is correct with respect to the above statements ?

(A) Both Statement–1 and Statement–2 are true and Statement–1 is the correct explanation of Statement–2

(B) Both Statement–1 and Statement–2 are true and Statement–1 is not the correct explanation of Statement–2

(C) Statement–1 is true but Statement–2 is false

(D) Statement–1 is false but Statement–2 is true

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10. Which of the following processes is responsible for the incorporation of sulphides in the komatiite magmas ?

(A) Very low amounts of partial melting

(B) Assimilation of crustal material

(C) Extreme fractionation of magma

(D) Higher amounts of partial melting

11. Amba Dongar in India is known for which of the following ?

(A) Carbonatite complex

(B) Anorthosite complex

(C) Chromite complex

(D) Kimberlite complex

12. The maximum permissible limit of fluoride in drinking water as per WHO guidelines is :

(A) 1.5 mg/L

(B) 1.0 mg/L

(C) 2.5 mg/L

(D) 3.0 mg/L

13. Complete the reaction :

Gedrite + Quartz = Hypersthene + ... + H_2O

(A) Cordierite

(B) Kyanite

(C) Both (A) and (B)

(D) Plagioclase

14. Choose the *correct* sequence of deformation and metamorphism :

(A) Shale → Slate → Phyllite → Schist → Gneiss

(B) Shale → Slate → Phyllite → Gneiss → Schist

(C) Shale → Phyllite → Schist → Slate → Gneiss

(D) Gneiss → Phyllite → Slate → Schist → Shale

15. Orthopyroxene occurs in high temperature anhydrous granitoids is known as :

(A) Plagiogranite

(B) Charnockite

(C) Enderbite

(D) Tonalite

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16. Which amongst the following are true characteristics of simple shear ?

(1) Lines along the shear plane deform or rotate

(2) Physical lines rotate faster than the axes of the strain ellipse

(3) In the Schmidt net, lines rotate along great circle outward from the shearing direction

(4) The sense of line rotation is the same for any line orientation

(A) (1) and (3) are true; (2) and (4) are false

(B) (2) is true; (1), (3) and (4) are false

(C) (2) and (4) are true; (1) and (3) are false

(D) (1), (2), (3) and (4) are true

17. X = Y > Z = 1 indicates :

(A) Uniaxial contraction

(B) Uniaxial extension

(C) Biaxial contraction

(D) Biaxial extension

18. Plotting pitch is useful when rocks contain :

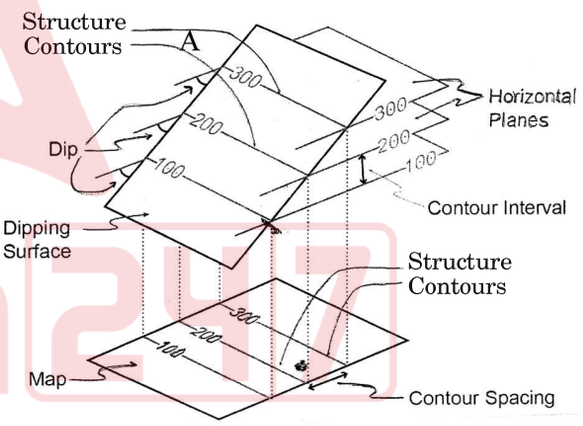
(A) Lineation

(B) Foliation

(C) Gneissosity

(D) Parting

19. In the given diagram below, the dip of the plane A is :



(A) 30°

(B) 60°

(C) 45°

(D) 24°

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20. Despite being older, the Aravali rocks from the type area are lower grade than the juxtaposed Delhi metasediments :

(A) The two units experienced different metamorphism at same place

(B) The two units were temporally apart then accreted

(C) Delhi experience thermal metamorphism due to Lava flow

(D) The Aravalis deposited latter than Delhi

21. The triple junction between African, Indo-Australian and Antarctic plates is of the type :

(A) RTR

(B) RTF

(C) RRR

(D) FTR

22. The separation between arrival times of P and S waves increases with distance; the ratio of P and S waves velocity ..... .

(A) Remains same with distance

(B) Decreases with distance

(C) Decreases logarithmically

(D) Becomes infinity

23. The mineral assemblage Larnite-Merwinite-Spurrite-Ranikinite is typical of :

(A) Zeotite facies

(B) Blue schist facies

(C) Sanidinite facies

(D) Granulite facies

24. The Acheulean hand axes begin to appear at around :

(A) 4.6 Ma

(B) 1.76 Ma

(C) 0.78 Ma

(D) 50,000 years BP

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25. The amino acid formation is dextro i.e. right rotating after an organism dies then, which one of the following is true ?

(A) The amount of dextro rotations can be counted for age

(B) Dextro to Levo ratio can be determined for age

(C) There is no use for age calculation

(D) Amino acids complete the rotation by 10000 years

26. During quaternary, the magneto-stratigraphy boundary; Brunhes/ Matuyam occur presicely at :

(A) 2.56 Ma

(B) 0.78 Ma

(C) 3.58 Ma

(D) 1.78 Ma

27. The average movement of glacial ice in the glaciers are of the order of :

(A) 10 to 300 m/year

(B) 10 to 300 km/year

(C) 1.5 to 250 cm/year

(D) 100 to 200 m/day

28. The intrinsic strength parameters of a soil are $c' = 0$, $\phi' = 30°$. Assuming that in an element of this soil failure has been reach on a plane at 45° to the horizontal, with a value $\sigma'_f = 10$ kPa. Find the shear stress at failure τ_f :

(A) 9.76 kPa

(B) 8.26 kPa

(C) 7.90 kPa

(D) 5.77 kPa

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

Tectonic setting :

Mostly found in rifting continental grabens, foreland basin, overthrust mountain belts undergoing rapid uplift.

Geometry :

Wedge-shaped, limited in lateral extend upto few meters to kilometers, thickness can be tremendous if subsidence is persistent.

Typical Sequence :

Coarsing upward of cross-bedded sandstone channel lag conglomerates, unsorted debris-flow deposits.

Sedimentology :

Extreme range in grain size boulders to clay, fanglomerate and cross-bedded sandstone common unsorted debris-flow, reverse grading, sieve deposit, sediment immature and angular with rock fragments and feldspar.

Fossils :

Fossils and organic matter are rare.

(A) Lacustrine

(B) Meandering fluvial

(C) Alluvial fans

(D) Braded fluvial

30. ..... is shallow diagensis stage occurring shortly after burial.

(A) Paragensis

(B) Eodiagensis

(C) Mesodiagensis

(D) Telodiagensis

31. Pettijohn proposed the "Fluidity Index" based on :

(A) Matrix-Rich Wacke Versus Matrix-Poor Arenite

(B) Ratio of Rock Fragments to Feldspar

(C) Perentage of Quartz or Ratio of Quartz to Feldspar + Rock Fragments

(D) Accessory Mineral Versus Mica and Clay Minerals

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32. An engineering mechanics soil 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 layer a highly permeable fractured sandstone. The water table in the gravel bed is 0.6 m below ground surface. The sandstone bed has aretesian condition having piezometric height of 6 m above ground level and the gravel bed is very parmeable and assumbed to be hydrostatic. Determine the hydraulic gradient.

(A) 0.04

(B) 0.55

(C) 0.70

(D) 0.96

33. A large landfill is planned on 10 m of normally consolidated clays with an underlying rock stratum. The water table is at ground surface. Clay samples extracted from the stratum at an intermediate point at a depth of 5 m indicated following soil properties : saturated unit weight, r_{sat} = 20 kN/m^3, void ratio, e_0 = 0.8 and compression index C_c = 0.15.

Determine the settlement of the clay layer if the increase in vertical stress due to the landfill load is $\Delta\sigma$ = 80 kPa :

(A) 05 cm

(B) 33 cm

(C) 97 cm

(D) 106 cm

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34. The foundation footing for a viaduct are to be sunk into sand and gravel alluvium. According to the borehole data the water table is at considerable depth, below the foundation area of influence. The unit weight of the ground is $r = 20$ kN/m^3 and the effective angle of internal friction, as deduced from penetrometer test is $\phi' = 35°$.

Find the effective ultimate bearing capacity for the footing of the viaduct, 4 m wide and 8 m long on the ground plan, if they are sunk 2 m below ground level.

(A) 1105 kPa

(B) 3313 kPa

(C) 5002 kPa

(D) 8017 kPa

35. The zone of transition between a continent and an ocean basin is known as :

(A) Continental slope

(B) Continental shelf

(C) Continental margin

(D) Abyssal floor

36. Abyssal hills covers approximately how much area in seafloor ?

(A) 20-25%

(B) 40-50%

(C) 80-85%

(D) 30-40%

37. Which of the following statements about seafloor hydrothermal vents are correct ?

(*i*) They are most common near passive continental margin.

(*ii*) They are so hot and deepseated, the environment prevents organisms from living there.

(*iii*) They form when dissolved minerals in the hot fluid form solid precipitates when exposed to cold seawater.

(*iv*) They form when seawater percolates into the oceanic crust and gets superheated by magma chamber.

(A) (*i*) and (*ii*)

(B) (*i*) and (*iii*)

(C) (*iii*) and (*iv*)

(D) (*ii*) and (*iv*)

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38. The highest salinity is observed between :

(A) 0-5° N latitude

(B) 5-10° N latitude

(C) 20-40° N latitude

(D) 10-20° N latitude

39. The average annual temperature of surface seawater at the equator is :

(A) 35.45 °C

(B) 37.5 °C

(C) 26.7 °C

(D) 24.5 °C

40. Primary reason of current flowing from Atlantic ocean to the Mediterranean Sea is :

(A) Gibralter strait

(B) Salinity difference

(C) Temperature difference

(D) Density difference

41. The height of tropopause decreases rapidly in :

(A) Intertropical convergence zone

(B) Subtropical and polar front zone

(C) The tropics from east to west

(D) The tropics from west to east

42. In general, electrical methods are commonly employed for :

(A) Relatively shallow subsurface exploration

(B) Deep subsurface exploration

(C) Very deep subsurface exploration

(D) Groundwater exploration only

43. In Wenner configuration the electrodes are :

(A) Equally spaced

(B) Unequally spaced

(C) Space between current electrodes is more than the potential electrodes

(D) Space between current electrodes is less than the potential electrodes

44. Coal which burns like a candle when ignited is called :

(A) Boghead coal

(B) Cannel coal

(C) Lignite

(D) Anthracite

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45. Which method is used for detailed exploration of oil and gas ?

(A) Gravity method

(B) Magnetic method

(C) Seismic reflection method

(D) Electrical resistivity method

46. Which of the following minerals is best suited for fluid inclusion thermometry ?

(A) Magnetite

(B) Ilmenite

(C) Fluorite

(D) Chalcopyrite

47. Minerals that form natural solutions in each other and at determined lower temperature unmix to form distinguishable mineral inter-growths called :

(A) Colloform

(B) Colloidal

(C) Exsolution

(D) Replacement

48. Lake Superior type of deposits are related to :

(A) Sedimentary BIF

(B) VHMS

(C) Greisens

(D) Skarns

49. Match the following :

I

(1) Magmatic dissemination

(2) Magmatic segregation

(3) Residual liquid segregation

(4) Residual liquid injection

II

(*i*) Chromite deposits of Keonjhar, Odisha

(*ii*) Titaniferous magnetite deposits of Adirondack region of New York

(*iii*) Diamond deposit of Panna, Madhya Pradesh

(*iv*) Titaniferous magnetite bands of Bushveld Complex, South Africa

Codes :

	(1)	(2)	(3)	(4)
(A)	(*iii*)	(*i*)	(*iv*)	(*ii*)
(B)	(*ii*)	(*iii*)	(*iv*)	(*i*)
(C)	(*i*)	(*ii*)	(*iii*)	(*iv*)
(D)	(*iii*)	(*i*)	(*ii*)	(*iv*)

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50. The association of serpentinites, radiolarian cherts and podiform chromites is found in :

(A) Mid oceanic ridges

(B) Layered igneous complexes

(C) Continental rift zones

(D) Suture zones

51. Which of the following is *not* a type of carbonate hosted strata-bound deposit ?

(A) Mississippi valley-type

(B) Irish-type

(C) Appalachian-type

(D) Kiruna-type

52. The government defines less than ..... cubic meters per person per year as water scarcity.

(A) 1000

(B) 2000

(C) 2500

(D) 3000

53. Just prior to a Tsunami coming ashore, sea level appears to fall quickly. This phenomenon is called :

(A) Sea level drop

(B) Draw fall

(C) Draw down

(D) Dip in sea level

54. The embankments constructed parallel to river for flood protection are called :

(A) Terraces

(B) Groynes

(C) Levees

(D) Guide banks

55. The saline water-fresh water interface in coastal aquifers was thoroughly studied by :

(A) Darcy

(B) Dupuit

(C) Ghyben-Herzberg

(D) Bousinesq

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56. The boundary between vadoze and phreatic zone is called as ..... .

(A) Water Depth

(B) Water Table

(C) Ground Table

(D) Water Line

57. Which water remains in the soil after gravitational water is drained out and that is in the form of a film around the soil grains ?

(A) Gravitational

(B) Hydroscopic

(C) Capillary

(D) Pellicular

58. In Dharwar craton, amphibolite to granulite facies transition that takes place from north to south across the orthopyroxene isograd is popularly known as :

(A) Moyar-Bhavani Shear Zone

(B) Fermor Line

(C) Palghat-Cauvery Shear Zone

(D) Achankovil Shear Zone

59. Which of the following is *not* a craton ?

(A) Singhbhum

(B) Dharwar

(C) Bastar

(D) Eastern ghats

60. Which one of the following schist belt *does not* belong to Dharwar craton ?

(A) Sonakhan schist belt

(B) Holenarasipur schist belt

(C) Sandur schist belt

(D) Wayanad schist belt

61. Which one of the following belong to Purana sedimentary basins of peninsular India ?

(A) Krishna-Godavari basin

(B) Khariar-Indravati basin

(C) Cambay basin

(D) Cauvery basin

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62. Match the following :

List-I

(*a*) Palamau Tiger Reserve

(*b*) Sultanpur Bird Sanctuary

(*c*) Shikari Devi Wildlife Sanctuary

(*d*) Bandipur National Park

List-II

(*i*) Haryana

(*ii*) Karnataka

(*iii*) Jharkhand

(*iv*) Himachal Pradesh

Codes :

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

63. Which of the following statement/s is/are not correct with respect to positive southern Oscillation Index ?

(*i*) Port Darwin pressure exceeds Tahiti

(*ii*) Pressure high over Indian Ocean and low over east pacific

(*iii*) Low rainfall over eastern pacific and prospects of good monsoon rain over India and Indian ocean.

Codes :

(A) (*i*) only

(B) (*i*) and (*ii*) only

(C) (*ii*) and (*iii*) only

(D) (*iii*) only

64. The absolute humidity of a rising air parcel is 20 grams per cubic meter. The volume of the air parcel is one cubic meter. If the volume of air parcel increases four times of its initial size, what will be the absolute humidity ?

(A) 80 grams per cubic meter

(B) 10 grams per cubic meter

(C) 8 grams per cubic meter

(D) 5 grams per cubic meter

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65. Which of the following statements correctly describes barchan ?

(*i*) This type of dune has the outline of a crescent and the points of crescent are directed downwind.

(*ii*) On the upwind side of the crest, the sand slope is steep.

(*iii*) On the downwind side of the dune, within the crescent the stope is gentle.

Codes :

(A) (*i*) only

(B) (*i*) and (*ii*) only

(C) (*iii*) only

(D) (*ii*) and (*iii*) only

66. The earth wobbles slowly as it spins on its axis. This is known as :

(A) Precession

(B) Variability

(C) Obliquity

(D) Eccentricity

67. Amongst the given states, in India tropical thorn forests occur in :

(*i*) Maharashtra

(*ii*) Nagaland

(*iii*) Karnataka

(*iv*) Arunachal Pradesh

Codes :

(A) (*i*) only

(B) (*ii*) and (*iii*) only

(C) (*i*) and (*iii*) only

(D) (*iv*) only

68. Read the following statements carefully and select the correct answer from the codes given below :

(*i*) When sand arrives at a particular section of a beach more rapidly than it is carried away, the beach is widened and built oceanward, causing retrogradation.

(*ii*) When sand leaves a section of a beach more rapidly than it is brought in, the beach is narrowed and the shoreline moves landward, causing progradation.

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

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69. In terms of area which land-forms dominate the terrestrial environment ?

(A) Landforms made by waves and currents

(B) Landforms made by wind action

(C) Landforms made by glacial ice

(D) Landforms made by fluvial action

70. Which is the point on the ground vertically beneath the center of the camera lens at the time the aerial photograph was taken ?

(A) Fudicial mark

(B) Camera lens center

(C) Isocenter

(D) Gound Nadir

71. Which of the following statements regarding remote sensing is correct ?

(A) The interaction of EMR with target

(B) The emission of EMR from the target

(C) Both (A) and (B)

(D) Neither (A) nor (B)

72. Which of the following rock type show light tone ?

(A) Marble

(B) Basalt

(C) Dolerite

(D) Magnetite quartzite

73. Which of the following is not a radiometric correction used in image processing when there is interference with the radiance measured by an instrument ?

(A) Noise removal

(B) Ozone depletion correction

(C) Sun angle correction

(D) Haze correction

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74. By 'Spatial Data' we mean that data that has :

(A) Complex values

(B) Positional values

(C) Graphic values

(D) Decimal values

75. What is the correct set of combination in radio waves ?

(A) Shorter wavelength : high frequency

(B) Shorter wavelength : less frequency

(C) Longer wavelength : less frequency

(D) Longer wavelength : high frequency

76. Thermal maturation of sedimentary organic matter to hydrocarbons is driven by :

(A) Temperature only

(B) Time only

(C) Both temperature and time

(D) Temperature and pressure

77. The location of an earthquake's epicentre can be determined from the arrival times of the P and S waves at a seismograph station. The exact position of the epicentre can be determined from data at :

(A) One station

(B) Two stations

(C) Three or more stations

(D) One near and one far station

78. If P-wave and S-wave were to go from a solid to a liquid medium, what would happen to their velocity ?

(A) Velocity of P-wave and S-wave would increase

(B) Velocity of P-wave and S-wave would decrease

(C) Velocity of P-wave would decrease and velocity of S-wave would decrease to zero

(D) P-wave and S-wave velocities would not change

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79. Plate boundary zones are characterized by the presence of :

(A) High heat flow

(B) High seismic and magmatic activity

(C) Both (A) and (B)

(D) Neither (A) nor (B)

80. Continental convergent zones may be related with :

(A) Compression and thin crust

(B) Compression and thick crust

(C) Extension and thin crust

(D) Extension and thick crust

81. Earth acts as a :

(A) Low pass filter, which attenuates the high frequency signals

(B) High pass filter, which attenuates the high frequency signals

(C) High pass filter, which attenuates the low frequency signals

(D) Low pass filter, which attenuates the low frequency signals

82. Which of the following logs is used for depth matching and well to well correlation while running other logs ?

(A) Natural gamma

(B) Gamma-gamma

(C) Neutron log

(D) S.P. log

83. How much time will be required for a sample of hydrogen-3 to lose 75% of its radioactivity ? Half life of tritium is 12.26 years :

(A) 36.8 years

(B) 24.5 years

(C) 49 years

(D) 20.6 years

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84. If the geothermal gradient is $0.02 \frac{K}{m}$ and the corresponding rock thermal conductivity is 3 W/m/K, the estimated heat flow would be :

(A) 6 milli Watt/m^2

(B) 60 milli Watt/m^2

(C) 600 milli Watt/m^2

(D) 0.06 milli Watt/m^2

85. The greater the distance between the seismic event and a recording seismograph station, the ..... is the time it takes for the first wave to arrive, and the ..... the interval between the arrival of P and S waves.

(A) Shorter, longer

(B) Greater, longer

(C) Longer, shorter

(D) Shorter, shorter

86. ENSO is a complex interannual tropical oscillation due to the unstable coupling of the :

(A) Ocean and the atmosphere

(B) Ocean and the land

(C) Land and the ocean

(D) The atmosphere and the land

87. Long-range or seasonal forecasting aims to predict weather at lead times of :

(A) 3 to 5 days

(B) 7 days to 3 weeks

(C) annual

(D) a month or a season

88. The effects of gravity acting on perturbations to a density gradient in vertical are referred as :

(A) Rossby waves

(B) Kelvin waves

(C) Gravity waves

(D) Inertia waves

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89. Anticyclones in the wind plots are :

(A) Clockwise circulations north of the equator

(B) Clockwise circulations south of the equator

(C) Anticlockwise circulations south of the equator

(D) Clockwise circulations of the equator

90. The chemical composition of the planktic foraminifera's shell/test is :

(A) $CaCO_3$

(B) $MgSO_4$

(C) SiO_2

(D) $Ca_3(PO)_4$

91. Widely spaced isobars indicate a :

(A) Steap pressure gradient and strong winds

(B) Weak pressure gradient and light winds

(C) Steap pressure gradient and light winds

(D) Weak pressure gradient and strong winds

92. Which brachiopod genus has a straight hinge line ?

(A) *Gryphus*

(B) *Spirifer*

(C) *Terebratula*

(D) *Lingula*

93. The feeding body of bryozoan is called :

(A) Cystid

(B) Coelom

(C) Polypide

(D) Operculum

94. Trace fossil pascichnia indicate which strategy ?

(A) Crawling

(B) Grazing

(C) Resting

(D) Escaping

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95. Which foraminifera is used as an index fossil for the Eocene and Oligocene ?

(A) Miogypinid

(B) Globotruncanella

(C) Lepidocycilina

(D) Fusulinid

96. Which Global Stratigraphic Section and Point (GSSP) stage boundary is marked in a speleothem ?

(A) Northgrippian stage

(B) Meghalayan stage

(C) Gelesian stage

(D) Zanclean stage

97. The age of Takche Formation, Spiti Valley, Himachal is :

(A) Ordovician

(B) Cambrian

(C) Jurassic

(D) Palaeocene

98. The infiltration rate of a soil depends on the ..... .

(A) Initial soil moisture condition

(B) Physical properties of the soil

(C) Both (A) and (B)

(D) Neither (A) nor (B)

99. The gravity measurements over the oceans indicate that generally the free-air anomaly is nearly zero. This is because :

(A) The ocean basins are poorly sedimented

(B) Ocean basins are in isostatic equilibrium

(C) Mantle below oceans are isostatic

(D) Free-air anomaly is invalid due to ocean waters

100. Low concentration of Fe in surface ocean waters after the Late Archaean may be linked to :

(A) Less submarine volcanism

(B) Great carbon event

(C) Great oxidation event

(D) Decreased sea floor spreading

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