Test Booklet Code &No.
प्रश्नपत्रिका कोड व क्र.

D

Paper-III

EARTH, ATMOSPHERIC, OCEAN & 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)

MAY - 35316

Time Allowed : 2½ Hours] **[Maximum Marks : 150**

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

Number of Questions in this Booklet : **75**

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 **75** objective type questions. Each question will carry *two* marks. *All* questions of Paper-III will be compulsory, covering entire syllabus (including all electives, without options).
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 **75** बहुपर्यायी प्रश्न आहेत. प्रत्येक प्रश्नास **दोन** गुण आहेत. या प्रश्नपत्रिकेतील **सर्व** प्रश्न सोडविणे अनिवार्य आहे. सदरचे प्रश्न हे या विषयाच्या संपूर्ण अभ्यासक्रमावर आधारित आहेत.
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 चूकीचा 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 पहिल्यानंतरच 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 लिहीलेली 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 गैरमार्गाचा अवलंब केल्यास विद्यार्थ्याला परीक्षेस अपात्र ठरविण्यात येईल.
9. परीक्षा संपल्यानंतर विद्यार्थ्याने मूळ ओ.एम.आर. उत्तरपत्रिका पर्यवेक्षकांकडे परत करणे आवश्यक आहे. तथापी, 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 & Planetary Science

Paper III

Time Allowed : 2½ Hours] **[Maximum Marks : 150**

Note : This paper contains **Seventy Five (75)** multiple choice questions. Each question carries **Two (2)** marks. Attempt *All* questions.

1. The effects of inflight icing when an aivcraft is flying through clouds containing supercooled droplets that includes :

   (A) Drag decrease, lift decrease, weight increase

   (B) Drag increase, lift decrease, weight decrease

   (C) Drag increase, lift decrease, weight increase

   (D) Drag decrease, lift increase, weight decrease

2. In plate tectonic setting, the thickest continental lithosphere is associated with :

   (A) Ocean-ocean convergent setting

   (B) Ocean-continent convergent setting

   (C) continent-continent convergent setting

   (D) continent-continent divergent

3. The volume of water that an aquifer releases from storage per unit surface area of the aquifer per unit fall in the head normal to the surface is called as :

   (A) Storage coefficient (storativity)

   (B) Transmissivity

   (C) Hydraulic Conductivity

   (D) Compressibility

4. Graphite of workable quantities can be extracted from :

(A) Khondalites

(B) Charnockites

(C) Gondites

(D) Kodurite

5. Which amongst following is the name of Uranium mine :

(A) Zawar

(B) Chaibasa

(C) Sittampundi

(D) Jaduguda

6. Chromite deposits are commonly formed by :

(A) Hydrothermal process

(B) Residual concentration

(C) Magmatic differentiation process

(D) Placers

7. Which of the following mineral assemblages characterizes blue schist facies metamorphism.

(A) Plagioclase-epidote

(B) Lawsonite-glaucophane

(C) Quartz chlorite

(D) Quartz-spinel

8. "D" Layer is identified at the boundary of :

(A) Upper Mantle-Lower Crust

(B) Transition Zone

(C) Lower Mantle-Core

(D) Upper Crust-Lower Crust

9. Which amongst the following has highest IR absorption ?

(A) Alluvium

(B) Rocky Mass

(C) Water Bodies

(D) Sand Dunes

10. The carbonate compensation depth is :

(A) 2500 m

(B) 4500 m

(C) 1200 m

(D) 100 m

11. Which of the following process is not an important cause of subsidance during the development of a sedimentary basin.

(A) Cooling and contraction of the crust

(B) Deposition of sediments

(C) Erosion of sediments

(D) Tectonic down faulting

12. Spinel quartz association corresponds to metamophic PT conditions of :

(A) 5 kb and 700°C

(B) 4 kb and 500°C

(C) 6 kb and 900°C

(D) 10 kb and 700°C

13. In the evolution of vertibrates orthogenesis is best examplified by :

(A) Pigs

(B) Horse

(C) Bovids

(D) Elephants

14. Consider the following statements :

(1) Neaptide occurs during the lunar quadrature

(2) During lunar quadrature tidal producing forces supplement each other

Which statements given above is/are *correct* ?

Codes :

(A) (1) and (2)

(B) Only (2)

(C) Only (1)

(D) Neither (1) nor (2)

15. The type of Dam prefered where the river section is wide and the foundation is unsound is :

(A) Gravity dam

(B) Embarkment

(C) Arch dam

(D) Multiple Arch dam

16. The main boundary thrust separates.

(A) Greater Himalaya and Tethys Himalaya

(B) Lesser Himalaya and Greater Himalaya

(C) Outer Himalaya and Lesser Himalaya

(D) Outer Himalaya and Gangetic Plain

17. Induced polarisation method is best suited for exploration of :

(A) Base metals

(B) Non-metals

(C) PGE

(D) Radioactive metals

18. Rutile crystallizes in :

(A) Isometric system

(B) Tetragonal system

(C) Monoclinic system

(D) Triclinic system

19. Nature of the mineral media with respect to its paleo-density, viscosity, composition temperature and pressure can be directly discerned by ..... studies.

(A) Fission track

(B) Fluid-inclusion geothermometry

(C) Mössbaur studies

(D) DTA

20. Enechelon veins, Enechelon joints and Enechelon stynolites are commonly formed in :

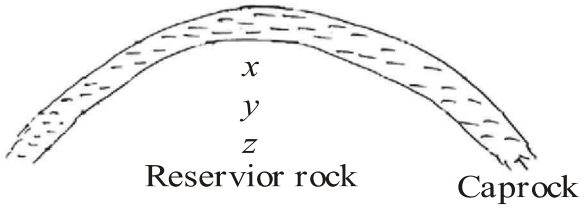
(A) Brittle shear zones

(B) Ductile shear zones

(C) Semi-brittle shear zones

(D) Brittle-ductile shear zones

21. Identify correctly the content in the porespace of x y z layers of the reservior rocks.



(A) x-oil, y-water, z-gas

(B) x-water, y-oil, z-gas

(C) x-gas, y-oil, z-water

(D) x-oil, y-gas, z-water

22. Gamierite is an one mineral of :

(A) Zinc

(B) Copper

(C) Nickle

(D) Manganese

23. The phenomenon by which minerals emit light when they are activated by an energy is called :

(A) Luminescence

(B) Play of colours

(C) Irridescence

(D) Labradorescence

24. Panchromatic film records the amount of light reflected from objects in various tones of :

(A) Blue

(B) Green

(C) Grey

(D) Red

25. Which type of sedimentary structures is used to determine current direction ?

(A) Ripple marks and cross bedding

(B) Mud cracks

(C) Graded bedding

(D) Growth bedding

26. A set of three photographs taken at the same time, one vertical and two at about 60° to the vertical in a direction at right angle to the line of flight is called as :

(A) Bimetrogon

(B) Trimetrogon

(C) Unimetrogon

(D) Pentametrogon

27. For a given discharge one of the following streams has the deepest channel gradient.

(A) Meandering

(B) Braided

(C) Anastomosing

(D) Anabranching

28. When the reservoir is full the maximum compressive force in a gravity dam is produced at ..... .

(A) The toe

(B) The heel

(C) The centre of base

(D) With the middle third of base

29. In an area a stream is neither progressively aggrading or degrading or changing its cross-section area, such streams are called :

(A) Alluvial streams

(B) Graded streams

(C) Anabranching streams

(D) Misfit streams

30. In arid terrains underlain by crystalline rocks, one of the following pair of landforms are commonly found.

(A) Pediments and inselbergs

(B) Inselbergs and mesas

(C) Cuestas and mesas

(D) Yardangs and pedestal rocks

31. ..... are formed where pair of electrons of equivalent energy and opposite spins are shared between atoms.

(A) Vander Walls Bond

(B) Metallic Bond

(C) Covalent Bond

(D) Ionic Bond

32. The major deposits of Mn-ores are hosted in :

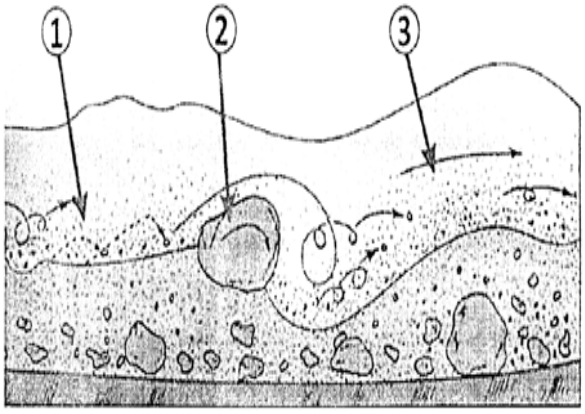
(A) Chattisgarh Group

(B) Sakoli Group

(C) Nandgaon

(D) Sausar Group

33. Name the events marked as '1', '2' and '3' for sediment transport.



(A) (1) Bedload, (2) Saltation load, (3) Suspended load

(B) (1) Saltation load, (2) Bedload, (3) Suspended load

(C) (1) Suspended load, (2) Saltation load, (3) Bedload

(D) (1) Bedload, (2) Suspended load, (3) Saltation load

34. The assemblage olivine + augite is characteristic of all basaltic rocks formed under crustal conditions regardless of their degree of silica saturation. Above a pressure of 2.9 GPa however, this assemblage is no longer stable in the presence of CO_2 vapor phase; instead it is converted to :

(A) Enstatite + dolomite

(B) Olivine + dolomite

(C) Augite + dolomite

(D) Augite enstatite

35. Choose the correct order of succession (from bottom to top) of the groups of the Vindhyan super group.

(A) Semri-Kaimur-Rewa-Bhander

(B) Semri-Rewa-Kaimur-Bhander

(C) Bhander-Rewa-Semri-Kaimur

(D) Bhander-Rewa-Kaimur-Semri

36. The modal composition of a sand stone is as follows :

Quartz	90%
Feldspar	1%
Rock Fragment	1%
Matrix	8%

The rock may be classified as :

(A) Quartz Arenite

(B) Lithic Wacke

(C) Arkose

(D) Gray Wacke

37. Which of the following rocks is phosphatic ?

(A) Diatomite

(B) Enevinite

(C) Chalk

(D) Guano

38. The age of deep waters channel and fan complexes consisting hydrocarbon reservoirs in K-G basin is :

(A) Pliocene-Pleistocene

(B) Late palacocene

(C) Cretaceous

(D) Early Jurassic

39. Which of the following is the principal reservoir rocks of Cambay Basin ?

(A) Kadi Formation

(B) Tarapur Shale

(C) Broach Formation

(D) Jambusar Formation

40. During the process of maturation of kerogen, significant generation of oil occurs at temperatures.

(A) below 60°C

(B) between 60°C to 120°C

(C) between 120°C to 225°C

(D) above 225°C

41. The taxodont dentition in Bivalvia is characterised by :

(A) Series of alternating teeth and sockets

(B) Two equally developed teeth

(C) Cardinals and laterals

(D) Small, curved teeth

42. The topmost unit of the marine cretaceous rocks of Cauvery basin is :

(A) Dalmiapuram Formation

(B) Uttatur Formation

(C) Ariyalur Formation

(D) Niniyur Formation

43. Consider the following :

(1) Palacozoic era started about 600 Ma

(2) Reptiles evolved during carboniferous period

(3) Permian was the longest period in palaeozonic era

Which one of the following statements is *correct* ?

Codes :

(A) (1) and (2) only

(B) (2) and (3) only

(C) (1) and (3) only

(D) (1), (2) and (3) only

44. Sequence boundaries form as a result of :

(A) Relative rise in sea-level

(B) Global climate change

(C) Relative drop in sea level

(D) Global atmospheric change

45. The age of Syringothyris limestone is :

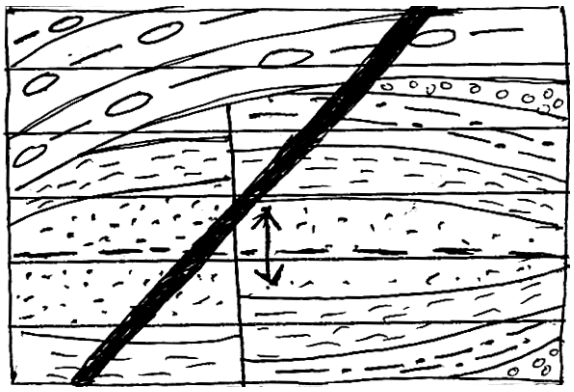
(A) Permian

(B) Devonian

(C) Silurian

(D) Cambrian

46. On the basis of cross cutting relationship, which one of the following statements is correct ?



(A) Folding—Faulting—Unconformity—Intrusion

(B) Faulting—Folding—Intrusion—Unconformity

(C) Faulting—Folding—Unconformity—Intrusion

(D) Folding—Faulting—Intrusion—Unconformity

47. Cross bedding is a :

(A) Scalar property

(B) Vector property

(C) Either scalar or vector property

(D) Linear property

48. Ophiomorpha is a :

(A) Foraminifera

(B) Ichnofossil

(C) Ostracoda

(D) Algae

49. Snow ball earth existed ..... period.

(A) 2300 Ma

(B) 700 Ma

(C) 360 Ma

(D) 540 Ma

50. The characteristic mineral assemblage of khondalite is :

(A) Gamet—Feldspar

(B) Biotite—Orthopyroxene

(C) Plagioclase—Clinopyroxene

(D) Cordierite—Spinel

51. A transform fault is a :

(A) Strike-slip fault

(B) Dip-slip fault

(C) Oblique-slip fault

(D) Up-slip fault

52. Low-angle Normal faults are called :

(A) Thrusts

(B) Lags

(C) Horst and Grabben

(D) Listric faults

53. The effective shear stress on a plane will be maximum when the plane is inclined to the compression direction at an angle of :

(A) 90°

(B) > 45°

(C) < 45°

(D) 45°

54. Which of the following formulae for 'Normalised Vegitation Index (NDVI)' is correct :

(A) NDVI = (near IR – visible red)/(near IR + visible Red)

(B) NDVI = (Far IR – Near IR)/(Far IR + Near IR)

(C) NDVI = (visible Red – visible green)/(visible red + visible green)

(D) NDVI = (visible blue – visible green)/(visible blue + visible green)

55. One of the following is not correct about coral reefs :

(A) They are confined to tropical coastlines

(B) They were responsible for formation of much of the limestone

(C) They exist only in deep water

(D) They provide information about the history of ocean basins and sea level changes

56. Majorite is stable at the depth of :

(A) 400 km

(B) 230 km

(C) 100 km

(D) 660 km

57. Archaean crust is characterised by :

(A) Abundant ultra high pressure rocks

(B) Abundant ophiolites

(C) Abundant TTG-greenstone sequences

(D) Abundant blue schists

58. With decreasing normative anorthite content the sodic series passes from :

(A) alkali basalt—hawaiite—mugerite—benmoreite—tratchyte

(B) alkali basalt—trachybasalt—tristanite—tradryte

(C) alkali basalt—trachybasalt—benmorite—trachyte

(D) alkali basalt—tristanite—mugerite—trachyte

59. The age of the oldest granetic rocks of singhbhum Craton is about :

(A) 2.5 Ga

(B) 2.5 Ma

(C) 3.5 Ga

(D) 3.5 Ma

60. Which one of the following statements is not correct ?

(A) Stream discharge increases with stream order

(B) Drainage density is highest over resistant rocks

(C) Drainage density is inversely related to infilteration

(D) Dendritic drainage network is more common over areas of uniform lithology

61. Pyrope garnet and chrome diopside are characteristics minerals of :

(A) Kimberlite

(B) Komatiite

(C) Ophiolite

(D) Boninite

62. The stress must be increased above yield stress for plastic deformation to advance is called :

(A) Strain hardening

(B) Stress hardening

(C) Rheologic yield

(D) Ductile deformation

63. The characteristic mineral assemblage of eclogite facies is :

(A) Lawsonite glaucophane

(B) Chlorite epidote

(C) Omphacite garnet

(D) Garnet diopside

64. The trace element that discriminates plume and arc sources is :

(A) Nb

(B) Sr

(C) Ba

(D) Th

65. ^{4}He nucleus that escapes from decaying heavy radiogenic isotope is called :

(A) alpha particle

(B) gamma radiation

(C) X-ray

(D) beta particle

66. "All points on a wave front can be regarded as point sources for the production of new spherical waves, and the new wavefront is envelop for secondary wavelet." This concept for wave propagation is given by :

(A) Pauli's Principle

(B) Huygen's Principle

(C) Snell's Law

(D) Wadath Principle

67. Thermohaline circulation is the :

(A) Small-scale circulation of the ocean driven by density differences

(B) Large scale circulation of the ocean driven by density differences

(C) Micro-scale circulation of the surface layer of the ocean

(D) Eddies in the ocean

68. The large ocean tides caused by the linear alignment of the Sun, Earth and Moon called the spring tides occurs during :

(A) New Moon and First quarter Moon

(B) Full Moon and thrid quarter Moon

(C) New Moon and Full Moon

(D) First quarter Moon and third quarter Moon

69. The law governing the relation between wavelength of peak emission for a black body at temperature of the body is :

(A) Wien's displacement Law

(B) Kirchhoff's Law

(C) Planck's Law

(D) Beer's Law

70. Sunspots which are the visible spots seen on the solar disk have an average cycle called the "Sunspot cycle" of :

(A) 6 years

(B) 11 years

(C) 14 years

(D) 2 years

71. Droplet growth in clouds by condensation process is :

(A) Directly proportional to cloud droplet radius

(B) Inversly proportional to cloud droplet radius

(C) Exponentially proportional to cloud droplet radius

(D) Directly proportional to the square root of cloud droplet radius

72. In a baroclinic atmosphere the density depends on :

(A) Temperature

(B) Pressure

(C) Temperature and pressure

(D) Temperature, pressure and acceleration due to gravity

73. Somali Jet is a cross equatorial flow of low level wind in the Monsoon system originating near :

(A) Indonesia

(B) Coast of Oman

(C) Madagascar

(D) Thailand

74. In the Thermodynamic diagram "Tephigram" the angle between the dryadiabats and the isotherms is :

(A) 45°

(B) 90°

(C) 60°

(D) 30°

75. In Gradient wind :

(A) Pressure gradient and coriolis forces

(B) Pressure gradient and centrifugal froces

(C) Pressure gradient, centrifugal and coriolis frocess

(D) Coriolis and centrifugal forces are balanced

ROUGH WORK

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