

Test Booklet No.

प्रश्नपत्रिका क्र.

**F****Paper-II****EARTH, ATMOSPHERIC, OCEAN & PLANETARY SCIENCE****Signature and Name of Invigilator**

Seat No.

(In figures as in Admit Card)

1. (Signature) .....

(Name) .....

Seat No. ....

(In words)

2. (Signature) .....

(Name) .....

OMR Sheet No.

(To be filled by the Candidate)

**DEC - 35213****Time Allowed : 1¼ Hours]****[Maximum Marks : 100****Number of Pages in this Booklet : 16****Number of Questions in this Booklet : 50****Instructions for the Candidates**

- Write your Seat No. and OMR Sheet No. in the space provided on the top of this page.
- This paper consists of 50 objective type questions. Each question will carry two marks. All questions of Paper-II will be compulsory, covering entire syllabus (including all electives, without options).
- 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 :
  - 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.
  - 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.**
  - After this verification is over, the OMR Sheet Number should be entered on this Test Booklet.
- 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     C     D
- 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.
- Read instructions given inside carefully.
- Rough Work is to be done at the end of this booklet.
- 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.
- 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.
- Use only Blue/Black Ball point pen.**
- Use of any calculator or log table, etc., is prohibited.**
- There is no negative marking for incorrect answers.**

**विद्यार्थ्यांसाठी महत्त्वाच्या सूचना**

- परिक्षार्थींनी आपला आसन क्रमांक या पृष्ठावरील वरच्या कोपऱ्यात लिहावा. तसेच आपणांस दिलेल्या उत्तरपत्रिकेचा क्रमांक त्याखाली लिहावा.
- सदर प्रश्नपत्रिकेत 50 बहुपर्यायी प्रश्न आहेत. प्रत्येक प्रश्नास दोन गुण आहेत. या प्रश्नपत्रिकेतील सर्व प्रश्न सोडविणे अनिवार्य आहे. सदरचे प्रश्न हे या विषयाच्या संपूर्ण अभ्यासक्रमावर आधारित आहेत.
- परीक्षा सुरु झाल्यावर विद्यार्थ्यांला प्रश्नपत्रिका दिली जाईल. सुरुवातीच्या 5 मिनीटांमध्ये आपण सदर प्रश्नपत्रिका उघडून खालील बाबी आवश्यक तपासून पहाव्यात.
  - प्रश्नपत्रिका उघडण्यासाठी प्रश्नपत्रिकेवर लावलेले सील उघडावे. सील नसलेली किंवा सील उघडलेली प्रश्नपत्रिका स्विकारू नये.
  - 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 वेळी वाढवून मिळणार नाही याची कृपया विद्यार्थ्यांनी नोंद घ्यावी.
  - वरीलप्रमाणे सर्व पडताळून पहिल्यानंतरच प्रश्नपत्रिकेवर ओ.एम.आर. उत्तरपत्रिकेचा नंबर लिहावा.
- प्रत्येक प्रश्नासाठी (A), (B), (C) आणि (D) अशी चार विकल्प उत्तरे दिली आहेत. त्यातील योग्य उत्तराचा रकाना खाली दर्शविल्याप्रमाणे ठळकपणे काळा/निळ्या करावा.  
**उदा. :** जर (C) हे योग्य उत्तर असेल तर.  

A     B     C     D
- या प्रश्नपत्रिकेतील प्रश्नांची उत्तरे ओ.एम.आर. उत्तरपत्रिकेतच दर्शवावीत. इतर ठिकाणी लिहिलेली उत्तरे तपासली जाणार नाहीत.
- आत दिलेल्या सूचना काळजीपूर्वक वाचाव्यात.
- प्रश्नपत्रिकेच्या शेवटी जोडलेल्या कोऱ्या पानावरच कच्चे काम करावे.
- जर आपण ओ.एम.आर. वर नमूद केलेल्या ठिकाणा व्यतिरीक्त इतर कोठेही नाव, आसन क्रमांक, फोन नंबर किंवा ओळख पटेल अशी कोणतीही खूप केलेली आढळून आल्यास अथवा असभ्य भाषेचा वापर किंवा इतर गैरमार्गाचा अवलंब केल्यास विद्यार्थ्यांला परीक्षेस अपात्र ठरविण्यात येईल.
- परीक्षा संपल्यानंतर विद्यार्थ्यांने मूळ ओ.एम.आर. उत्तरपत्रिका पर्यवेक्षकांकडे परत करणे आवश्यक आहे. तथापी, प्रश्नपत्रिका व ओ.एम.आर. उत्तरपत्रिकेची द्वितीय प्रत आपल्याबरोबर नेण्यास विद्यार्थ्यांना परवानगी आहे.
- फक्त निळ्या किंवा काळ्या बॉल पेनचाच वापर करावा.**
- कॅलक्युलेटर किंवा लॉग टेबल वापरण्यास परवानगी नाही.**
- चुकीच्या उत्तरासाठी गुण कपात केली जाणार नाही.**

**DEC - 35213/II**

# Earth, Atmospheric, Ocean and Planetary Science

## Paper II

**Time Allowed : 75 Minutes]**

**[Maximum Marks : 100**

**Note :** This Paper contains **Fifty (50)** multiple choice questions. Each question carries **Two (2)** marks. Attempt *All* questions.

- |                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. A progressive increase of toxic substances through food-chain result into toxic effects on the consumers. This is due to :</p> <p>(A) Accumulation</p> <p>(B) Biomagnification</p> <p>(C) Bioexcretion</p> <p>(D) Biorejection</p>                        | <p>3. If an engineering structure has to be built in an area covered with water, the area is surrounded by a wall made of combination of various materials, such structure is referred to as :</p> <p>(A) Cofferdam</p> <p>(B) Pilaster</p> <p>(C) Cut and Cover</p> <p>(D) Caissons or Piers</p>           |
| <p>2. The ecological process that undergoes series of changes bringing in development of biological communities over time and space is known as :</p> <p>(A) Ecological Succession</p> <p>(B) Ecological habitat</p> <p>(C) Ecosystem</p> <p>(D) Autecology</p> | <p>4. Zones that are characterized by shallow, intermediate and deep seismicity, negative gravity anomaly, very low heat flow and sites for sediment accumulations are :</p> <p>(A) Subduction Zones</p> <p>(B) Transform Fault Zones</p> <p>(C) Constructive Plate Margins</p> <p>(D) Triple Junctions</p> |

5. Identify the youngest Continental Flood Basalt Province amongst the following :
- (i) Siberian Traps
  - (ii) Parana Province
  - (iii) Karoo Province and
  - (iv) Columbia River Province
- (A) Karoo Province  
(B) Parana Province  
(C) Siberian Traps  
(D) Columbia River Province
6. Arrange the following rocks in the order of increase in shearing :
- (i) Rock with mortar texture
  - (ii) Mylonite
  - (iii) Ultramylonite and
  - (iv) Rock with flaser structures
- Codes :
- (A) (i), (iv), (iii) and (ii)  
(B) (i), (iv), (ii) and (iii)  
(C) (ii), (iii), (iv) and (i)  
(D) (iii), (ii), (iv) and (i)
7. The field strengths of the Earth's magnetic field are usually expressed in :
- (A) Kilogauss (KG)  
(B) Nano Tesla (nT)  
(C) Ampere/meter (A/m)  
(D) Volts/meter (V/m)
8. When a set of seismic waves meet a gap they tend to spread out on other side, the phenomenon can be described as :
- (A) Refraction  
(B) Reflection  
(C) Diffusion  
(D) Diffraction

9. The Cretaceous-Tertiary boundary

is characterised by :

- (A) Iridium Anomaly
- (B) Strontium Anomaly
- (C) Eu Anomaly
- (D) Nd Anomaly

10. Mark the *correct* order of ion

mobility in a generalized chemical weathering zone :

- (A)  $\text{Al} > \text{Na} > \text{K} > \text{SO}_4$
- (B)  $\text{Na} > \text{SO}_4 > \text{K} > \text{Ca}$
- (C)  $\text{Na} > \text{K} > \text{Si} > \text{Al}$
- (D)  $\text{Ca} > \text{Mg} > \text{Fe} > \text{SO}_4$

11. A tributary stream which flows for some distance parallel to the main channel as the levees prevent it from entering main stream is called :

- (A) Yazoo river
- (B) Crevasse splay
- (C) Sabkha stream
- (D) Yardang

12. The bowl or arm-chair shaped glacier sources enclosed by steep head walls are known as :

- (A) Cirque
- (B) Kame
- (C) Kettle
- (D) Roche Montonee

13. The transition between Laminar flow and turbulent flow occurs when the ratio of the inertia fluid force is significantly larger than :

- (A) Viscous fluid forces
- (B) Turbulent flow
- (C) Laminar flow
- (D) Bed load

14. Choose the formation containing reservoir rocks in Cambay Basin :

- (A) Panna Formation
- (B) Naredi Formation
- (C) Broach Formation
- (D) Ankaleshwar Formation

15. Choose the *correct* combination of lithology and age of the major petroleum reservoirs in Bombay High :

- (A) Shale-Eocene
- (B) Sandstone-Eocene
- (C) Limestone-Miocene
- (D) Sandstone-Miocene

16. Which of the following statements is *true* for Ekman transport in ocean ?

- (A) It causes upwelling in coastal regions
- (B) It leads to decrease in biological productivity
- (C) It causes downwelling of surface waters
- (D) Due to Ekman transport the upper layer of the ocean exhibit a net motion parallel to the wind direction

17. The pelagic sediment in deep-sea floor, known as ooze, consists dominantly of :
- (A) wind-blown clay particles
  - (B) turbidities
  - (C) tiny shells of marine organisms
  - (D) phosphates
18. A rock sample contains 3 genera of brachiopod whose stratigraphic ranges are, Ordovician to Permian, Devonian to Permian and Cambrian to Devonian respectively. The age of the sample is :
- (A) Cambrian to Permian
  - (B) Devonian
  - (C) Cambrian
  - (D) Cambrian to Devonian
19. The age of the oldest fossils is :
- (A) 500 million years
  - (B) 1 to 2 billion years
  - (C) 2 to 3 billion years
  - (D) > 3 billion years
20. Which of the following genera has taxodont dentition ?
- (A) *Gryphaea*
  - (B) *Ostrea*
  - (C) *Pecten*
  - (D) *Arca*
21. For separation of which of the following microfossils you will *not* treat the samples with acid ?
- (A) Dinoflagellate
  - (B) Diatoms
  - (C) Radiolaria
  - (D) Ostracoda

22. As per the BIS for drinking water, the desirable limit of TDS is :

- (A) 300 mg/l
- (B) 750 mg/l
- (C) 75 mg/l
- (D) 0.01 mg/l

23. Addition of nutrients such as nitrates and phosphates to water bodies is called :

- (A) Hypoxia
- (B) Eutrophication
- (C) Anoxia
- (D) Algal bloom

24. An impermeable geologic formation that neither contains nor transmits water is called :

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

25. Yield of a well per unit drawdown is called :

- (A) Specific capacity
- (B) Specific retention
- (C) Specific yield
- (D) Safe yield



26. Baden Ghyben-Herzberg relationship states that for every foot of groundwater above sea level there are forty feet of fresh water below sea level. This statement is *true* in case of :
- (A) Homogenous medium
  - (B) Heterogenous medium
  - (C) Multiple aquifers
  - (D) Aquitards
27. Arrange the following in the order of their decreasing hydraulic conductivity :
- (i) Sandstone
  - (ii) Gravel
  - (iii) Unfractured basalt and
  - (iv) Clay
- Codes :*
- (A) (i), (ii), (iii) and (iv)
  - (B) (ii), (i), (iv) and (iii)
  - (C) (iv), (iii), (ii) and (i)
  - (D) (ii), (i), (iii) and (iv)
28. In lapse rate, adiabatic means that there is :
- (A) No exchange of heat
  - (B) Exchange of heat
  - (C) Latent heat release
  - (D) Heat gain
29. Temperature inversion occurs when :
- (A) Cold air covers warm air
  - (B) Warm air covers cold air
  - (C) There is moisture adiabatic lapse rate
  - (D) There is dry adiabatic lapse rate

30. Solar flux density reaching earth (solar constant) is :
- (A)  $\sim 1200 \text{ W/m}^2$
  - (B)  $\sim 1000 \text{ W/m}^2$
  - (C)  $\sim 1400 \text{ W/m}^2$
  - (D)  $\sim 800 \text{ W/m}^2$
31. The Earth's average albedo is :
- (A)  $\sim 31\%$
  - (B)  $\sim 25\%$
  - (C)  $\sim 40\%$
  - (D)  $\sim 20\%$
32. In the tropics the net radiation throughout the year is :
- (A) Positive
  - (B) Negative
  - (C) Zero
  - (D) Positive in summer and negative in winter
33. A medium to fine grained sedimentary rock with angular framework of quartz, chert and rock fragments is called :
- (A) Arkose
  - (B) Graywacke
  - (C) Arenite
  - (D) Sandstone
34. Below the carbonate compensation depth (CCD), much of the carbonate is dissolved. The CCD is around meter for calcite :
- (A) 1000 m
  - (B) 2000 m
  - (C) 5000 m
  - (D) 10 m

35. Choose the youngest stratigraphic unit from the following :

- (A) Iron Ore Group
- (B) Cuddapah Supergroup
- (C) Patcham Formation
- (D) Subathu Formation

36. Lesser Himalayan domain in Himalaya is separated from Great Himalaya by :

- (A) Main Central Thrust
- (B) Main Boundary Thrust
- (C) Himalayan Frontal Fault
- (D) Indus Suture Zone

37. Which one of the following is the largest felsic volcanic province of India ?

- (A) Malani Suite
- (B) Deccan Traps
- (C) Rajmahal Traps
- (D) Sylhet Traps

38. The Jurassic succession in Jaisalmer, Rajasthan commences with :

- (A) Ukra Beds
- (B) Gajansar Beds
- (C) Lathi Beds
- (D) Bagh Beds

39. Rapakivi texture is characterized by :
- (A) K-feldspar is surrounded by sodic-plagioclase
  - (B) K-feldspar is surrounded by calcic-plagioclase
  - (C) Plagioclase is rimmed by K-feldspar
  - (D) Plagioclase with exsolved K-feldspar
40. Ocean Island Basalt (OIB) magmas are characterized by :
- (A) Depletion in LILE and LREE compare to MORB
  - (B) Enrichment in LREE and LILE compare to MORB
  - (C) Large scale contamination of continental crust
  - (D) Enrichment of LREE and LILE compare to continental crust
41. The characteristic assemblage of granulite facies is :
- (A) Hornblende-plagioclase-garnet
  - (B) Orthopyroxene-plagioclase-garnet
  - (C) Scapolite-plagioclase-quartz
  - (D) Omphacite-garnet lawsonite
42. The ore deposits developed most often, but not invariably at the contact of intrusive plutons and carbonate country rocks are called as :
- (A) Skarn deposits
  - (B) Calc-silicate hornfels
  - (C) Skarnoid
  - (D) Isochemical metamorphic

43. A mineral although complex in composition but essentially an isomorphous mixture of two members gehlenite (CaAl) and akermanite (CaMg) that occurs in subsilicic igneous rock is :
- (A) Melilite
  - (B) Nepheline
  - (C) Sodalite
  - (D) Cancrinite
44. A characteristic contact metamorphic mineral closely related to olivine and usually found in limestones and dolemites is recognized as :
- (A) Tephroite
  - (B) Monticellite
  - (C) Larnite
  - (D) Myalosiderite
45. Ore deposits associated with granoblastic aggregate of quartz and muscovite with accessory amounts of topaz, tourmaline and fluorite formed by the post-magmatic metasomatic alteration of granite are referred to as :
- (A) Greisen deposits
  - (B) Skarn deposits
  - (C) Sedex deposits
  - (D) Kuroko type deposits
46. Deep weathering processes akin to lateritisation can also give rise to the formation of high grade manganese deposits generally classified as deposits of :
- (A) Supergene enrichment
  - (B) Nodular type
  - (C) Gondite type
  - (D) Khondalite type

47. The geological Eon when the planet earth was formed and till the crust stabilized on Earth is called :

- (A) Archean (~4 to 2.7 b.y.)
- (B) Proterozoic (~2.7 to 1.5 b.y.)
- (C) Neoproterozoic (~1.5 to 0.5 b.y.)
- (D) Hadean (~4.6 to 3.8 b.y.)

48. The average composition of planet Earth corresponds to :

- (A) Peridotite
- (B) Harzburgite
- (C) Siderite
- (D) Chondrite

49. The Jovian planets composed of :

- (A) Refractory elements
- (B) Volatile elements
- (C) Lithophile elements
- (D) High field strength elements

50. The most abundant element in the solar system is :

- (A) Helium
- (B) Oxygen
- (C) Hydrogen
- (D) Nitrogen

**DEC - 35213/II**

**ROUGH WORK**

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**ROUGH WORK**