

**SET 2013**  
**PAPER – III**

**EARTH, ATMOSPHERIC, OCEAN AND PLANETARY SCIENCES**

Signature of the Invigilator

Question Booklet No. ....

1.

OMR Sheet No.. ....

**Subject Code**

**ROLL No.**

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**Time Allowed : 150 Minutes**

**Max. Marks : 150**

**No. of pages in this Booklet : 12**

**No. of Questions : 75**

**INSTRUCTIONS FOR CANDIDATES**

1. Write your Roll No. and the OMR Sheet No. in the spaces provided on top of this page.
2. Fill in the necessary information in the spaces provided on the OMR response sheet.
3. This booklet consists of Seventy five (75) compulsory questions each carrying 2 marks.
4. Examine the question booklet carefully and tally the number of pages/questions in the booklet with the information printed above. **Do not accept a damaged or open booklet.** Damaged or faulty booklet may be got replaced within the first 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time given.
5. Each Question has four alternative responses marked (A), (B), (C) and (D) in the OMR sheet. You have to completely darken the circle indicating the most appropriate response against each item as in the illustration.



6. All entries in the OMR response sheet are to be recorded in the original copy only.
7. Use only Blue/Black Ball point pen.
8. Rough Work is to be done on the blank pages provided at the end of this booklet.
9. If you write your Name, Roll Number, Phone Number or put any mark on any part of the OMR Sheet, except in the spaces 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.
10. You have to return the Original OMR Sheet to the invigilators 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 the duplicate copy of OMR Sheet** on conclusion of examination.
11. Use of any calculator, mobile phone or log table etc. is strictly prohibited.
12. **There is no negative marking.**

02-13

# EARTH, ATMOSPHERIC, OCEAN AND PLANETARY SCIENCES

## PAPER–III

**Note :—** This paper contains **seventy five (75)** objective type questions of **two (2)** marks each. **All** questions are compulsory.

1. Which of the following is known as the ‘Age of fishes ?’
  - (A) Cambrian
  - (B) Pliocene
  - (C) Devonian
  - (D) Jurassic
2. The structures belonging to different organisms that perform the same function but have different origin, are termed as :
  - (A) Homologous organs
  - (B) Analogous organs
  - (C) Vestigial organs
  - (D) Connecting organs
3. Past seawater temperature can be reconstructed from the :
  - (A) Oxygen isotopic composition of the calcareous foraminifera
  - (B) Carbon isotopic composition of the calcareous foraminifera
  - (C) Carbon isotopic composition of agglutinated foraminifera
  - (D) Oxygen isotopic composition of agglutinated foraminifera
4. The thickness of the crust is comparatively more :
  - (A) Below the mountains
  - (B) Below the oceans
  - (C) Below the stable cratons
  - (D) Below the large cities
5. Earth’s magnetic field has its origin in the :
  - (A) Movement inside the Earth’s core
  - (B) Earth’s rotation
  - (C) Solar storms
  - (D) Plate motion
6. Mineral deposit associated with the older greenstone belt :
  - (A) BIF of Gangpur
  - (B) Mn deposit of Champaner
  - (C) Kolar goldfields of Karnataka
  - (D) Chromite deposits of Krishna
7. Economic deposit of Uranium is most likely to be found in :
  - (A) Gabbro
  - (B) Granite
  - (C) Carbonates
  - (D) Peridotite

8. A reservoir is to be constructed. The main geological problems encountered are :
- Ground water table higher than the highest water level, permeable rock and heavy silting.
  - Ground water table lower than the highest water level, permeable rock and heavy silting.
  - Ground water table lower than the highest water level, non permeable rock and heavy silting.
  - Ground water table higher than the highest water level, non permeable rock and low silting.
9. To prevent landslides which of the following order of preference is correct ?
- Grass and trees should be planted
  - Cement grouting done and chemical consolidators added
  - Surface water is to be diverted and rapid runoff away from the area is to be provided
  - Water is to be removed by drain pipes by drainage through tunnels or by pumping
- (i), (ii), (iii), (iv)
  - (i), (iii), (iv), (ii)
  - (iii), (iv), (i), (ii)
  - (ii), (iii), (iv), (i)
10. Eclogites are found in :
- Rift tectonic setting
  - Orogenic Belt
  - Anorogenic Belt
  - Transform Plate Margins
11. Which of the following is a mechanically strained rock ?
- Marble
  - Mylonite
  - Granulite
  - Sandstone
12. Polymictic conglomerate comprise of :
- Pebbles of single rock type
  - Pebbles of different rock types
  - Sand size grains of basalt and gabbro
  - Clay size grains of sedimentary rocks
13. Hydraulic action, solution, and abrasion are all examples of :
- Stream erosion
  - Stream deposition
  - Transportation
  - Stream discharge
14. The geothermal gradient in the crust averages :
- 25 degrees Celsius per kilometer
  - 1 degree Celsius per kilometer
  - 10 degrees Celsius per kilometer.
  - 100 degrees Celsius per kilometer
15. Folds and reverse faults in a mountain range suggest :
- Crustal shortening
  - Tensional stresses
  - Deep water deposition of sediments
  - All of these

16. Effective precipitation in a drainage basin refers to :
- Precipitation that ultimately reaches the water table
  - Precipitation that flows a overland flow
  - Precipitation that is stored in water reservoir
  - Precipitation that ultimately reaches the river channel
17. The deposition of suspended and dissolved material in a soil profile is referred as :
- Eluviation
  - Illuviation
  - Humus
  - Leaching
18. The observed relationship between stream length and basin area in Indian river basins those drain directly into Arabian Sea or Bay of Bengal is :
- $L = 1.22 A^{0.575}$
  - $L = 2.732 A^{0.5}$
  - $L = 1.4 A^{0.6}$
  - $L = 1.344 A^{0.232}$
19. Wadis are :
- Hilly mounds found in granitic terrains
  - Channels formed during rains in desert areas
  - A type of effluent river
  - Channels found in tropical humid areas
20. The relation between wave length and water depth for a translatory sea wave is expressed as :
- $v = \sqrt{h}$
  - $v = \sqrt{gh}$
  - $v = gh$
  - $v = \sqrt{g/h}$
21. Clapotis is a :
- Diffacted wave
  - Translatory wave
  - Standing wave
  - None of the above
22. In alluvial Ganga plain the term 'Khadar' refers to :
- Interfluve highlands
  - Yazoo streams
  - Meander bends
  - Close new alluvium close to modern channels
23. If CL and VL represents channel length and valley length of a stream then the sinuosity of the streams is expressed by :
- $CL + VL$
  - $CL \times VL$
  - $CL / VL$
  - $VL - CL$
24. Nunatak is a :
- Fluvial landform
  - Eolian landform
  - Glacial landform
  - Oceanic landform

25. The zone of sharp change of seawater density between 200 m and 1000 m water depth is known as :
- Pycnocline
  - Isotherm
  - Thermocline
  - None of the above
26. Barbed drainage pattern forms :
- When tributaries flow in opposite direction to their master streams
  - In a narrow valley flanked by steep ranges
  - In mountaineous areas where broad valleys are flanked by parallel ridges
  - When differential erosion occurs in hard and soft rock beds
27. In western Coastal plains of India we observe :
- Dendritic drainage pattern
  - Trellis drainage pattern
  - Pinnate drainage pattern
  - Parallel drainage pattern
28. The highest plateau of the world is :
- Bolivia & Peru plateau
  - Mexican plateau
  - Tibetan plateau
  - Colorado plateau
29. Bhangar represents :
- Alluvial deposits in the riverine tract
  - Extensive erosion surface of concave slope
  - Older alluvium of relatively higher land
  - Plain formed by deposition of fine glacial materials
30. Tran lakes form by
- Meandering of river
  - Damming of river
  - Lake formed in limestone country
  - Lakes formed due to collection of melt water in cirques
31. If radius of the Earth is R and height of a measurement station above sea level is h and value of gravity at sea level is  $g_0$  then the elevation correction needed in the gravity data can be expressed as :
- $hg_0 / r$
  - $2 hg_0 / R$
  - $hg_0^2 / R$
  - $- 2hg_0 / R$
32. Worden gravity meter is a gravimeter of
- Unstable type
  - Stable type
  - Oscillatory type
  - None of the above
33. Resistivity is expressed as :
- Ohm
  - ohm-cm
  - ohm-m
  - ohm/m
34. The unit of magnetic intensity 'gamma' is equivalent to
- 1 gauss
  - 10 gauss
  - 10 oersted
  - $10^5$  oersted

35. The magnetic declination 'D' is :
- The angle between horizontal component of total field vector and north
  - The angle between the total field vector and its horizontal component
  - The angle between horizontal and vertical components of total field vector
  - The angle between geographic and magnetic pole of the Earth
36. Magnetic field strength H due to a pole of strength P at a distance 'r' is expressed as :
- $H = P / r$
  - $H = p \times r$
  - $H = p / \mu r$
  - $H = P / \mu r^2$
37. The unit of magnetic flux density 'tesla' is equivalent to
- 10 Oe
  - $10^4$  Oe
  - 1 gamma
  - 10 gamma
38. Neutron log is used to know :
- Rock density
  - Radioactivity in rock
  - Porosity in rock
  - Permeability in rock
39. Acoustic Impedance of a rock is related to :
- Its viscosity
  - Its hardness
  - Its density
  - None of the above
40. The relationship between annual frequency (N) and magnitude ( $M_s$ ) of earthquake is expressed as :
- $\log N = a + bM_s$
  - $\log N = a - bM_s$
  - $N = a \times M_s$
  - $N = a \times bM_s$
41. The equivalent in optics for the law of refraction of plane seismic wave is :
- Huygen's principle
  - Fermat's principle
  - Snell's law
  - Bragg's law
42. P-wave velocity below Mohorovicic discontinuity is :
- 7.6 Km/S
  - 6.5 Km/S
  - 10.6 Km/S
  - 3.8 Km/S
43. Low velocity layer (LVL) within the Earth coincides with depth range of :
- 50-100 Km
  - 300-350 Km
  - 600-750 Km
  - 100-200 Km
44. Electromagnetic (EM) surveys are carried out at frequencies :
- Above 100 kHz
  - Below 50 kHz
  - Between 100-150 kHz
  - Below 20 kHz

45. In resistivity survey the best configuration for the lateral profiling is :
- (A) Schlumberger configuration
  - (B) Dipole-dipole configuration
  - (C) Wenner configuration
  - (D) None of the above
46. Which of the following sequence is correct in order of abundance in the atmosphere :
- (A) Nitrogen, Oxygen, Argon, Carbon dioxide
  - (B) Oxygen, Nitrogen, Argon, Carbon dioxide
  - (C) Nitrogen, Carbon dioxide, Argon, Oxygen
  - (D) Nitrogen, Argon, Oxygen, Carbon dioxide
47. Which of the following sequence is correct according to the amount of stored Carbon ?
- (A) Sedimentary Rocks-Ocean-Atmosphere
  - (B) Ocean-Sedimentary Rocks-Atmosphere
  - (C) Atmosphere-Sedimentary Rocks-Ocean
  - (D) Sedimentary Rocks-Atmosphere-Ocean
48. The concentration of the Carbon dioxide in the atmosphere today has gone up to :
- (A) 280ppm
  - (B) 1280ppm
  - (C) 11280ppm
  - (D) 390ppm
49. The lowest layer of the atmosphere is known as :
- (A) Stratosphere
  - (B) Mesosphere
  - (C) Troposphere
  - (D) Thermosphere
50. Ozone layer is a part of :
- (A) Troposphere
  - (B) Stratosphere
  - (C) Mesosphere
  - (D) Thermosphere
51. The cyclone system spins :
- (A) Counter clockwise in the northern hemisphere
  - (B) Counter clockwise in the southern hemisphere
  - (C) Clockwise in the northern hemisphere
  - (D) Clockwise in the both hemisphere
52. Jet streams are :
- (A) Slow currents in the western Pacific
  - (B) Fast currents in the stratosphere
  - (C) Fast currents of air in the upper troposphere
  - (D) Fast moving rivers.
53. If a parcel of air rises (or sinks) quickly enough that it does not have enough time to exchange any energy with surrounding air, it is said to have :
- (A) Isobaric motion
  - (B) Isothermal motion
  - (C) Adiabatic motion
  - (D) Isostatic motion

54. The air circulation between equator and 30° North and South latitudes is largely convective as vertical motions within it are driven solely by heat energy. The convective circulation is called :
- (A) Walker circulation  
 (B) Hadley circulation  
 (C) Ferrell circulation  
 (D) Thermohaline circulation
55. The Earth's atmosphere is divided into layers based on the vertical profile of :
- (A) Air pressure  
 (B) Air temperature  
 (C) Air density  
 (D) Wind speed
56. The rate at which temperature decreases with increasing altitude is known as the :
- (A) Temperature slope  
 (B) Lapse rate  
 (C) Sounding  
 (D) Thermocline
57. The horizontal transport of any atmosphere property by the wind is called :
- (A) Advection  
 (B) Radiation  
 (C) Conduction  
 (D) Reflection
58. Heat transferred outward from the surface of the moon can take place by :
- (A) Convection  
 (B) Conduction  
 (C) Latent Heat  
 (D) Radiation
59. In meteorology, the world insolation refers to :
- (A) Well-constructed energy efficient home  
 (B) The solar constant  
 (C) Incoming solar radiation  
 (D) An increased solar output
60. The density of the water vapor in a given parcel of air is expressed by the
- (A) absolute humidity  
 (B) relative humidity  
 (C) Mixing ratio  
 (D) specific humidity
61. Which of the following factor affects movement of inter tropical convergence zone ?
- (A) Ocean currents  
 (B) Rotation of Earth  
 (C) Solar insolation  
 (D) None of the above
62. Effect of Coriolis force becomes zero at which place ?
- (A) Near the north pole  
 (B) At the horse latitude  
 (C) At the equator  
 (D) Near the south pole

63. Which of the following has oldest crust ?
- (A) Pacific Ocean
  - (B) Indian ocean
  - (C) Atlantic ocean
  - (D) Bay of Bengal
64. Which of the following microfossils inhabited all aquatic environments ?
- (A) Ostracoda
  - (B) Foraminifera
  - (C) Radiolaria
  - (D) Conodonts
65. Thermocline in the ocean is :
- (A) Zone of maximum salinity
  - (B) Zone of maximum temperature
  - (C) Zone of maximum temperature gradient
  - (D) Zone of maximum density
66. Gulf stream is a :
- (A) Western boundary current
  - (B) Eastern boundary current
  - (C) Cold water current
  - (D) None of the above
67. The layer of rapid salinity change in the ocean is known as :
- (A) Halocline
  - (B) Thermocline
  - (C) Salicline
  - (D) None of the above
68. Oxygen isotopic composition of which of the following microfossils will be helpful to know glacial-interglacial events of the past ?
- (A) Benthic foraminifera
  - (B) Planktic foraminifera
  - (C) Ostracoda
  - (D) Pteropoda
69. Subduction zones are associated with which of the following sediments ?
- (A) Radiolarian oozes
  - (B) Foraminiferal oozes
  - (C) Pteropod ooze
  - (D) Nano-foram ooze
70. During El Nino event the depth of thermocline in the Western Pacific warm pool :
- (A) Decreases
  - (B) Increases
  - (C) Remains unchanged
  - (D) Fluctuates
71. Which of the following areas of the oceans will have generally low sea surface temperature associated with high productivity ?
- (A) Zone of convergence
  - (B) Zone of upwelling
  - (C) Enclosed seas
  - (D) Doldrums

72. Well stratified ocean water column in the western Arabian Sea is present during months of :
- (A) Summer monsoon
  - (B) Winter monsoon
  - (C) Post summer monsoon
  - (D) None of the above
73. Within Holocene warm period, the cold, rhythmic events are known as :
- (A) D-O events
  - (B) Bond events
  - (C) Interglacial events
  - (D) Interstadial Events
74. Which of the following is an upwelling indicator species ?
- (A) *Globigerina bulloides*
  - (B) *Globorotalia menardii*
  - (C) *Globorotalia truncatulinoides*
  - (D) *Globigerina woodi*
75. Antarctic ice sheet formed permanently after :
- (A) Pliocene
  - (B) Middle Miocene
  - (C) Cretaceous
  - (D) Holocene

**ROUGH WORK**

## ROUGH WORK