

SUBJECT CODE	SUBJECT	PAPER
A-08-03	EARTH SCIENCES (EARTH, ATMOSPHERIC, OCEAN AND PLANETARY SCIENCE)	III
HALL TICKET NUMBER		QUESTION BOOKLET NUMBER
OMR SHEET NUMBER		
DURATION	MAXIMUM MARKS	NUMBER OF PAGES
2 HOUR 30 MINUTES	150	16
		NUMBER OF QUESTIONS
		75

This is to certify that, the entries made in the above portion are correctly written and verified.

Candidate's Signature Name and Signature of Invigilator

Instructions for the Candidates

- Write your Hall Ticket Number in the space provided on the top of this page.
- This paper consists of seventy five multiple-choice type of questions.
- At the commencement of examination, the question booklet will be given to you. In the first 5 minutes, you are requested **to open the booklet and compulsorily examine it as below** :
 - 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 and do not accept an 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 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 Question Booklet will be replaced nor any extra time will be given.**
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- 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: (A) (B) (C) (D)
where (C) is the correct response.
- Your responses to the items are to be indicated in the **OMR Answer Sheet given to you**. If you mark at any place other than in the circle in the Answer Sheet, it will not be evaluated.
- Read instructions given inside carefully.
- Rough Work is to be done in the end of this booklet.
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- The candidate must handover 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. The candidate is allowed to take away the carbon copy of OMR Sheet and used Question paper booklet at the end of the examination.
- Use only Blue/Black Ball point pen.**
- Use of any calculator or log table etc., is prohibited.**
- There is no negative marks for incorrect answers.**

అభ్యర్థులకు సూచనలు

- ఈ పుట పై భాగంలో ఇవ్వబడిన స్థలంలో మీ హాల్ టికెట్ నంబరు రాయండి.
- ఈ ప్రశ్న పత్రము డెభైబిదు బహుళాప్తచిక్ర ప్రశ్నలను కలిగి ఉంది.
- పరీక్ష ప్రారంభమున ఈ ప్రశ్నాపత్రము మీకు ఇవ్వబడుతుంది. మొదటి ఐదు నిమిషములలో ఈ ప్రశ్నాపత్రమును తెరిచి కింద తెలిపిన అంశాలను తప్పనిసరిగా సరిచూసుకోండి.
 - ఈ ప్రశ్న పత్రమును చూడడానికి కుర్రపేజీ అంచును ఉన్న కాగితపు సీలును చించండి. స్టిక్కర్ సీలులేని మరియు ఇదివరకే తెరిచి ఉన్న ప్రశ్నాపత్రమును మీరు అంగీకరించవద్దు.
 - కవరు పేజీ పై ముద్రించిన సమాచారం ప్రకారం ఈ ప్రశ్నపత్రములోని పేజీల సంఖ్యను మరియు ప్రశ్నల సంఖ్యను సరిచూసుకోండి. పేజీల సంఖ్యకు సంబంధించి గానీ లేదా సూచించిన సంఖ్యలో ప్రశ్నలు లేకపోవుట లేదా నిజప్రతి కాకపోవుట లేదా ప్రశ్నలు క్రమపద్ధతిలో లేకపోవుట లేదా ఏదైనా తేడాలు ఉంటుంటే వంటి దోషపూరితమైన ప్రశ్న పత్రాన్ని వెంటనే మొదటి ఐదు నిమిషాల్లో పరీక్షా పర్యవేక్షకునికి తిరిగి ఇచ్చివేసి దానికి బదులుగా సరిగా ఉన్న ప్రశ్నపత్రాన్ని తీసుకోండి. తదనంతరం ప్రశ్నపత్రము మార్చబడదు అడనపు సమయం ఇవ్వబడదు.
 - పై విధంగా సరిచూసుకొన్న తర్వాత ప్రశ్నాపత్రం సంఖ్యను OMR పత్రము పై అదేవిధంగా OMR పత్రము సంఖ్యను ఈ ప్రశ్నాపత్రము పై నిర్దిష్టస్థలంలో రాయవలెను.
- ప్రతి ప్రశ్నకు నాలుగు ప్రత్యామ్నాయ ప్రతిస్పందనలు (A), (B), (C) మరియు (D) లుగా ఇవ్వబడ్డాయి. ప్రతి ప్రశ్నకు సరైన ప్రతిస్పందనను ఎన్నుకొని కింద తెలిపిన విధంగా OMR పత్రములో ప్రతి ప్రశ్నా సంఖ్యకు ఇవ్వబడిన నాలుగు వృత్తాల్లో సరైన ప్రతిస్పందనను సూచించే వృత్తాన్ని బాల్ పాయింట్ పెన్ తో కింద తెలిపిన విధంగా పూరించాలి.
ఉదాహరణ : (A) (B) (C) (D)
(C) సరైన ప్రతిస్పందన అయితే
- ప్రశ్నలకు ప్రతిస్పందనలను ఈ ప్రశ్నపత్రములో ఇవ్వబడిన OMR పత్రము పై సరి ఇవ్వబడిన వృత్తాల్లోనే పూరించి గుర్తించాలి. అలాకాక సమాధాన పత్రంపై వేరొక చోట గుర్తిస్తే మీ ప్రతిస్పందన మూల్యాంకనం చేయబడదు.
- ప్రశ్న పత్రము లోపల ఇచ్చిన సూచనలను జాగ్రత్తగా చదవండి.
- చిత్తుపనిని ప్రశ్నపత్రము చివర ఇచ్చిన ఖాళీస్థలములో చేయాలి.
- OMR పత్రము పై నిర్దిత స్థలంలో సూచించవలసిన వివరాలు తప్పించి ఇతర స్థలంలో మీ గుర్తింపును తెలిపే విధంగా మీ పేరు రాయడం గానీ లేదా ఇతర చిహ్నాలను పెట్టడం గానీ చేసినట్లయితే మీ అనర్హతకు మీరే బాధ్యులవుతారు.
- పరీక్ష పూర్తయిన తర్వాత మీ OMR పత్రాన్ని తప్పనిసరిగా పరీక్ష పర్యవేక్షకుడికి ఇవ్వాలి. వాటిని పరీక్ష గది బయటకు తీసుకువెళ్లకూడదు. పరీక్ష పూర్తయిన తరువాత అభ్యర్థులు ప్రశ్న పత్రాన్ని OMR పత్రం యొక్క కార్బన్ కాపీని తీసుకువెళ్లవచ్చు.
- సీల్/పల్ల రంగు బాల్ పాయింట్ పెన్ మాత్రమే ఉపయోగించాలి.
- లాగిథిమ్ బేబిల్స్, క్యాలిక్యులేటర్లు, ఎలక్ట్రానిక్ పరికరాలు మొదలగునవి పరీక్షగదిలో ఉపయోగించడం నిషేధం.
- తప్పు సమాధానాలకు మార్కుల తగ్గింపు లేదు.



DO NOT WRITE HERE



EARTH SCIENCES
(Earth, Atmospheric, Ocean and Planetary Science)
Paper – III

1. The relationship of the ionic radii and strength of the ionic bond is
 - (A) Smaller the ionic radii weaker the bond
 - (B) Greater the ionic radii weaker the bond
 - (C) Greater the ionic radii stronger the bond
 - (D) Ionic radii not related to bond strength
2. Transformation from Quartz to Cristobalite is
 - (A) Reconstructive
 - (B) Displacive
 - (C) Crystallization
 - (D) Compositional change
3. **Assertion (A)** : Mafic lava flows rapidly spread a long distance and Felsic lavas are too sticky.

Reason (R) : Mafic lava flows have low viscosity while felsic lava flows have high viscosity.
 - (A) Both A and R true and R is the correct explanation of A
 - (B) Both A and R true but R is not correct explanation of A
 - (C) A is true but R is false
 - (D) A is false but R is true
4. When 1 mole of Cristobalite melts reversibly at 1713°C the heat absorbed is 2035 cal ? Calculate the change of entropy.
 - (A) 1.02 Cal/deg.mol.
 - (B) 0.9759 Cal/deg.mol
 - (C) 2.02 Cal/deg.mol
 - (D) 4042 K.Cal/deg.mol.
5. Stalactites and stalagmites in caves are composed of
 - (A) Quartz
 - (B) Alkali feldspar
 - (C) Halite
 - (D) Calcite
6. Small portion of material to represent a rock type or an ore body in the qualitative sense is called
 - (A) A specimen
 - (B) A sample
 - (C) Population
 - (D) An Index



7. A mass will move downslope when the component of its weight along the slope exceeds the
- (A) Pore pressure
 - (B) Weight of down slope barriers
 - (C) Roughness of the slope
 - (D) Frictional resistance
8. Hard water contains large amounts of
- (A) Lead
 - (B) Sodium
 - (C) Calcium
 - (D) Silicon
9. Estimate of ore reserves based mainly on general and broad observations of a qualitative nature is called
- (A) Indicated ore
 - (B) Measured ore
 - (C) Inferred ore
 - (D) Confirmed ore
10. Due to perturbation in the orbit, satellite orbit parameters are frequently updated on measurement called by its
- (A) Six ground station
 - (B) Five ground station
 - (C) Four ground station
 - (D) Three ground station
11. Relationship between formation density and electron density depends upon
- (A) Soil type
 - (B) Moisture content
 - (C) Porosity of material
 - (D) Permeability of material
12. Haematite is an example of
- (A) Ferromagnetic mineral
 - (B) Antiferromagnetic mineral
 - (C) Ferrimagnetic mineral
 - (D) Diamagnetic mineral
13. The moment magnitude of an earthquake does not depend on the
- (A) Area of the fault break
 - (B) Rigidity of fault
 - (C) Slip of the fault
 - (D) Type of the fault
14. Match List – I giving resistivities of various layers with List – II giving type of curve over three layered earth
- | List – I | List – II |
|------------------------|-----------|
| E. $P_1 < P_2 < P_3$ | 1. K-type |
| F. $P_1 > P_2 > P_3$ | 2. H-type |
| G. $P_1 < P_2 > P_3$ | 3. A-type |
| H. $P_1 > P_2 < P_3$ | 4. Q-type |
| (A) E-1, F-2, G-3, H-4 | |
| (B) E-2, F-3, G-4, H-1 | |
| (C) E-3, F-4, G-1, H-2 | |
| (D) E-4, F-1, G-2, H-3 | |



15. Which one of the following corrections is not applied to field gravity data obtained on the surface of earth ?
- (A) Drift Correction
 - (B) Bouguer Correction
 - (C) Eotvos Correction
 - (D) Terrain Correction
16. Calculate Discrete Fourier Transform of $x(n) = \{1, 0, 1, 0\}$
- (A) $x(k) = \{2, 0, 2, 0\}$
 - (B) $x(k) = \{1, 0, 1, 0\}$
 - (C) $x(k) = \{2, 0, 1, 0\}$
 - (D) $x(k) = \{2, 2, 0, 0\}$
17. The modern horse that first appeared in upper Pliocene is known as
- (A) Equus
 - (B) Meshippus
 - (C) Eohippus
 - (D) Hipparion
18. The variations or the evolutionary changes that occur along certain defined lines is known as
- (A) Continuity theory
 - (B) Isolation theory
 - (C) Synthetic theory
 - (D) Orthogenesis theory
19. A shell which shows complete coiling and the whorls are in contact with each other is referred as
- (A) Cyrtoceracone
 - (B) Tarphyceracone
 - (C) Orthoceracone
 - (D) Trochoceracone
20. Very few strong, thick and grooved teeth appear to diverge from the umbo towards inside of the valve. This type of dentition is known as
- (A) Taxodont
 - (B) Isodont
 - (C) Schigodont
 - (D) Dysodont
21. If the coiling of the foraminiferal test is in one plane, it is referred to as
- (A) Trochospiral coiling
 - (B) Planispiral coiling
 - (C) Evolute coiling
 - (D) Involute coiling
22. Forsterite forms earlier than fayalite during fractional crystallization of magma
- (A) Mg^{2+} ion is smaller than Fe^{2+}
 - (B) Mg^{2+} ion is larger than Fe^{2+}
 - (C) Mg^{2+} ion has affinity for Si^{4+}
 - (D) Mg^{2+} ion has no affinity for Fe^{2+}



23. The sequence of rock types in mantle with increasing depth is
- (A) Plagioclase Iherzolite – Spinel Iherzolite – Garnet Iherzolite
 - (B) Plagioclase Iherzolite – Garnet Iherzolite – Spinel Iherzolite
 - (C) Spinel Iherzolite – Plagioclase Iherzolite – Garnet Iherzolite
 - (D) Garnet Iherzolite – Spinel Iherzolite – Plagioclase Iherzolite
24. For many chemical reactions in secondary geochemical environment, the oxidation potential (Eh) decrease rapidly with the increase of
- (A) pH
 - (B) Depth
 - (C) Pressure
 - (D) Isotopic signatures
25. The energy elements in biosphere are
- i. C and H
 - ii. Si
 - iii. O
 - iv. N
- (A) i only
 - (B) i, ii and iii
 - (C) ii and iii
 - (D) i, iii and iv
26. If P and T are the two 'variables' in a geological 'system', then the Gibb's phase rule may be expressed as
- (A) $P = F$
 - (B) $P = C$
 - (C) $F = C$
 - (D) A, B and C are correct
27. The by-products of Bauxite are
- I. Titanium
 - II. Vanadium
 - III. Silver
 - IV. Columbium
- (A) I III IV
 - (B) I II IV
 - (C) II I III
 - (D) II III IV
28. Lapsa Buru in Jharkhand state is known for
- (A) Sillimanite
 - (B) Kyanite
 - (C) Diamond
 - (D) Graphite



29. Match the items in the List – I with List – II and select the correct answers using the code given below :

List – I

- I. Zinc
- II. Uranium
- III. Manganese
- IV. Nickel

List – II

- 1. Pitchblende
- 2. Smithsonite
- 3. Violarite
- 4. Hollandite

	I	II	III	IV
(A)	2	1	4	3
(B)	1	2	3	4
(C)	2	1	3	4
(D)	3	4	1	2

30. The host rocks of Khetri copper belt are

- (A) Granitoids
- (B) Calcareous rocks
- (C) Shales and sandstones
- (D) Phyllites, schists and slaty rocks

31. Porphyry copper deposits are related to

- (A) Mid oceanic ridges
- (B) Subduction zones
- (C) Island arcs
- (D) Flood basalts

32. A graywacke is

- (A) Sandstone with > 30% matrix
- (B) Sandstone with < 10% matrix
- (C) Sandstone without matrix
- (D) Sandstone with > 90% quartz

33. Bentonites are

- (A) Clays formed by alteration of volcanic ash
- (B) Siltstones
- (C) Clays formed by alteration of granite rocks
- (D) Clays not formed by chemical reaction

34. The well-sorted sedimentary rock is

- (A) Conglomerate
- (B) Sandstone
- (C) Graywacke
- (D) Shelly Limestone

35. Graded bedding is characterized by

- (A) Fineness at the top
- (B) Coarseness at the top
- (C) Fineness at the bottom
- (D) Medium grains at the bottom



36. Which is the chronostratigraphic unit ?

- (A) System
- (B) Period
- (C) Bed
- (D) Era

37. Match the following

List – I

List – II

- | | |
|------------------------|--------------------------------|
| a. Pelagic sediments | 1. Oxidizing environment |
| b. Swampy environment | 2. Abyssal plains |
| c. Fining upward cycle | 3. Delta progradation sequence |
| d. Marshy environment | 4. Reducing environment |

- | | a | b | c | d |
|-----|----------|----------|----------|----------|
| (A) | 3 | 2 | 1 | 4 |
| (B) | 4 | 3 | 2 | 1 |
| (C) | 1 | 2 | 3 | 4 |
| (D) | 2 | 4 | 3 | 1 |

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

- (A) Sea level changes play a role in distribution pattern of fluvial sediments at river mouth
- (B) Progradation of deltas have influence on sea level changes
- (C) Sea level changes give wave cut terraces
- (D) Sea caves, Natural bridges are not formed by sea level changes

39. Match the following

- | | |
|-----------------|-------------------------|
| a. Point Bar | 1. Off the river mouth |
| b. Barrier Bar | 2. Active river channel |
| c. Channel Bar | 3. At the river mouth |
| d. Offshore Bar | 4. At the meanders |

- | | a | b | c | d |
|-----|----------|----------|----------|----------|
| (A) | 3 | 4 | 2 | 1 |
| (B) | 4 | 3 | 2 | 1 |
| (C) | 1 | 2 | 3 | 4 |
| (D) | 2 | 3 | 4 | 1 |



40. What are controlling factors for geometry of sand bodies in wave dominated deltas

1. Wave energy
2. Rate of sediment input
3. Rate of change of sea level
4. Rate of progradation

(A) 1, 2 and 3 only

(B) 1, 2, 3 and 4

(C) 1, 3 and 4 only

(D) 1, 2 and 4 only

41. Offshore bars parallel to coast because

(A) Marine energy is more than fluvial energy

(B) Fluvial energy is dominant over marine energy

(C) Marine and fluvial energies are equal

(D) There is no relation between orientation of offshore bars and energy of systems

42. The contacts between granulite terrains and cratonic regions are separated by

(A) Fault zones

(B) Shear zones

(C) Fermor's line

(D) A, B and C are correct

43. **Assertion (A)** : The grade of metamorphism increases from North to South in Southern India

Reason (R) : In Southern India, the Northern block underwent amphibolite facies of metamorphism and the Southern block suffered granulite facies of metamorphism

(A) Both A and R are true, and R is the correct explanation for A.

(B) Both A and R are true but R is not the correct explanation for A

(C) A is true but R is false

(D) A is false and R is true

44. The Western margin of the Eastern Ghats mobile belt is marked by emplacement of

(A) Alkaline rocks

(B) Anorthosites

(C) Both A and B

(D) Basalts



45. Ingladhah formation belongs to
- (A) Sargur Group
 - (B) Chitradurga Group
 - (C) Bababudan Group
 - (D) Sandur Group
46. In the Cuddapah basin, stromatolites are found in
- (A) Tadipatri shale
 - (B) Srisailam quartzite
 - (C) Koilakuntla limestone
 - (D) Vempalle limestone
47. Which of the following statements is not correct about thermohaline circulation of ocean waters
- (A) Confined to deeper layers of oceans
 - (B) Confined to surface layers of oceans
 - (C) Influenced by density differences
 - (D) Influenced by topography of ocean floor
48. Halmyrolysis is
- (A) Reaction between solution and solid material of sea bottom sediment
 - (B) Reaction between atmosphere and sea water
 - (C) Reaction between volcanic vent gases and sea water
 - (D) Reaction between atmospheric gases and solution
49. What are sedimentary structures in tide dominated deltas ?
- 1. Herringbone structure
 - 2. Lenticular structure
 - 3. Graded bedding
 - 4. Flaser bedding
- (A) 1 and 3
 - (B) 1 and 2
 - (C) 3 and 4
 - (D) 1, 2 and 4
50. The factors that affect the increase of salinity of the oceans are
- 1. Inflow of fresh water from land
 - 2. Evaporation
 - 3. Advection of more saline water
 - 4. Mixing with more saline deep water
- (A) 2, 3 and 4 only
 - (B) 3 and 4 only
 - (C) 2 and 3 only
 - (D) 1 and 2 only



51. Assertion (A) : Gravity waves either shallow or deep water waves and which are restoring forces of gravity

Reason (R) : The generating forces for gravity waves are storms and earthquakes

- (A) Both A and R are true and R is the correct explanation for A
- (B) Both A and R are true and R is not correct explanation for A
- (C) A is true but R is false
- (D) A is false but R is true

52. Match the following

- | | |
|------------------|----------------------------------|
| a. Sessile forms | 1. Float |
| b. Nektons | 2. Locomotive type and Burrowing |
| c. Vagrants | 3. Fixed to sea bottom |
| d. Planktons | 4. Active Swimmers |

- | | a | b | c | d |
|-----|----------|----------|----------|----------|
| (A) | 3 | 4 | 2 | 1 |
| (B) | 1 | 2 | 3 | 4 |
| (C) | 2 | 3 | 4 | 1 |
| (D) | 4 | 1 | 2 | 3 |

53. Kharif and Rabi are

- (A) Minerals found in India
- (B) Crop seasons in India
- (C) Deserts
- (D) Active volcanoes

54. Hypogene process is called

- (A) Glaciers
- (B) Diastrophism
- (C) Degradation
- (D) Infall of meteorites

55. Which one of the following are formed by extraterrestrial agents ?

- (A) Alluvial fans
- (B) Ox-bow Lakes
- (C) Valleys
- (D) Impact craters

56. Strong wind blowing from west to east at high altitude is

- (A) Cyclone
- (B) Tsunami
- (C) Jet stream
- (D) Whirlwind



57. An earthquake on the ocean bed causes
- (A) Hurricane
 - (B) Seismogram
 - (C) Snowfall
 - (D) Tsunami
58. Kanha National Park is in
- (A) Rajasthan
 - (B) Madhya Pradesh
 - (C) Kerala
 - (D) Telangana
59. A number of saddle reefs may occur all along the _____ region of a fold system.
- (A) Anticlinal
 - (B) Synclinal
 - (C) Limbs
 - (D) Fold axis
60. The three types of convergent boundaries are
- (A) Convergent, divergent and volcanic
 - (B) Ocean-ocean, Ocean-continent and Continent-continent
 - (C) Subduction, divergent and shearing
 - (D) Island arc, volcanic chains and ring dykes

61. The elastic rebound theory describes
- (A) How seismic waves pass through earth's interior
 - (B) How folding in the crust reduces earthquake magnitude
 - (C) The behavior of faulting crust
 - (D) Was first defined by Archimedes
62. In which of the structures, the lengthening of competent bed is observed
- (A) Mullions
 - (B) Boudins
 - (C) Rods
 - (D) Fold

63. Match the following :

List – I	List – II
I. Distortion	1. Change in size
II. Dilation	2. Slickensides
III. Shear fracture	3. No granulation
IV. Tensional fracture	4. Change in shape

Code :

	I	II	III	IV
(A)	3	2	1	4
(B)	4	1	2	3
(C)	2	3	4	1
(D)	1	4	3	2



64. The lower Paleolithic human culture during the II glacial, II interglacial and III glacial periods is of

- (A) Lower Pleistocene age
- (B) Pliocene age
- (C) Middle Pleistocene age
- (D) Upper Pleistocene age

65. Which of the following is not correct for establishing stratigraphic record ?

- (A) Fossil Assemblage
- (B) Heavy mineral suite
- (C) Isotopic ratios
- (D) Degree of weathering

66. Match the following

- | | |
|-----------------------|--------------------------|
| a. River cut terraces | 1. Fluvial environment |
| b. Tillites | 2. Aeolian environment |
| c. Barchan Dunes | 3. New tectonic activity |
| d. Flood plains | 4. Glacial environment |

- | | a | b | c | d |
|-----|---|---|---|---|
| (A) | 1 | 2 | 3 | 4 |
| (B) | 3 | 4 | 2 | 1 |
| (C) | 3 | 2 | 1 | 4 |
| (D) | 2 | 3 | 4 | 1 |

67. Which of the following statement is not correct ?

- (A) Degree of chemical decomposition indicates climatic conditions
- (B) Parallel stratification indicates absence of waves at depositional site
- (C) Thickness of the current bedding is not indicated energy conditions of deposition
- (D) Grain size and shapes are used to infer the proximity of source areas

68. Match the following

- | | |
|--------------------------|------------------|
| a. Angular grains | 1. Alluvial fans |
| b. Striations on pebbles | 2. Fluvial |
| c. Well sorted grains | 3. Glacial |
| d. Assorted Material | 4. Aeolian |

- | | a | b | c | d |
|-----|---|---|---|---|
| (A) | 1 | 2 | 3 | 4 |
| (B) | 2 | 3 | 4 | 1 |
| (C) | 4 | 3 | 2 | 1 |
| (D) | 3 | 2 | 1 | 4 |

69. The hottest atmospheric layer is

- (A) Stratosphere
- (B) Mesosphere
- (C) Thermosphere
- (D) Troposphere



70. For each trace of CDP gather, static correction is applied for

- (A) Source only
- (B) Receiver only
- (C) Either source or receiver
- (D) Both source and receiver

71. Which of the following is not a method of energy scattering in the atmosphere

- (A) Amalgamated scattering
- (B) Rayleigh scattering
- (C) Mie scattering
- (D) Non-selective scattering

72. **Assertion (A)** : The underground water that occurs within the zone of aeration

Reason (R) : All the pores in the zone of aeration are filled with water molecules

- (A) Both A and R are true, and R is the correct explanation for 'A'
- (B) Both A and R are true, and R is not the correct explanation for 'A'
- (C) A is true, but R is false
- (D) A is false, but R is true

73. **Assertion (A)** : Muscovite breaks down in the presence of quartz to produce K-feldspar, andalusite and water

Reason (R) : Muscovite and K-feldspar have K. Andalusite draws requisite Al and Si from muscovite and quartz and OH ions is expelled as water

- (A) Both A and R are true and R is correct explanation for A
- (B) Both A and R are true but R is not the correct explanation for A
- (C) A is true but R is false
- (D) A is false but R is true

74. The layer is a fluid where there is a force balance between pressure gradient force, Coriolis force and turbulent drag

- (A) Boundary layer
- (B) Ekman layer
- (C) Surface layer
- (D) Sub-surface layer

75. A general circulation model (GCM) is based on

- (A) Navier-Stokes equation
- (B) Madden-Julian oscillation (MJO)
- (C) Quasi-Biennial oscillation
- (D) El Nino-Southern oscillation



Space for Rough Work



Space for Rough Work