

Test Booklet No.

प्रश्नपत्रिका क्र.

M

Paper-III

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)

AUG-35315

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

- Write your Seat No. and OMR Sheet No. in the space provided on the top of this page.
- 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).
- 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)
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- 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 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.
- परीक्षा सुरु झाल्यावर विद्यार्थ्यांला प्रश्नपत्रिका दिली जाईल. सुरुवातीच्या 5 मिनीटांमध्ये आपण सदर प्रश्नपत्रिका उघडून खालील बाबी अवश्य तपासून घ्याव्यात.
 - 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 घ्यावी. 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.
 - 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/निळा करावा.
उदा. : जर (C) हे योग्य उत्तर असेल तर.

(A)	(B)	(C)	(D)
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- 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 व्यतिरिक्त इतर कोठेही नाव, आसन क्रमांक, फोन नंबर किंवा ओळख पटेल अशी कोणतीही खुण केलेली आढळून आल्यास अथवा असभ्य भाषेचा वापर किंवा इतर गैरमागीचा 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 निळा किंवा काळा बॉल पेनचाच वापर करावा.**
- कॅलक्युलेटर किंवा लॉग टेबल वापरण्यास परवानगी नाही.**
- चुकीच्या उत्तरासाठी गुण कपात केली जाणार नाही.**

AUG-35315-III

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.

<p>1. In a recumbent fold, the axial plane dips nearly at :</p> <p>(A) 90°</p> <p>(B) 45°</p> <p>(C) 25°</p> <p>(D) 0°</p> <p>2. A strike fault is the one in which :</p> <p>(A) The two blocks move parallel to the strike of the fault plane</p> <p>(B) The two blocks move parallel to the strike of the beds</p> <p>(C) The two blocks move perpendicular to the strike of the beds present</p> <p>(D) The two blocks move perpendicular to the strike of the fault plane</p>	<p>3. Which one of the following is <i>not</i> considered as indicator for finding blind ore deposits ?</p> <p>(A) Stratification</p> <p>(B) Gossans</p> <p>(C) Leaching</p> <p>(D) Alteration hollows</p> <p>4. The upper mantle occurs at a depth of :</p> <p>(A) 100 km</p> <p>(B) 410 km</p> <p>(C) 660 km</p> <p>(D) 2900 km</p>
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5. The reservoir rocks of Barmer basin belongs to :
- (A) Fatehgarh Group
 - (B) Akli Formation
 - (C) Dharvi Dongar Formation
 - (D) Barmer Hill Formation
6. The *correct* sequence of terms for isolines joining places of equal barometric pressure, equal sunshine, equal amount of rainfall and equal degree of cloudiness is :
- (A) Isobars—Isoneph—Isohyets—Isohels
 - (B) Isobars—Isomer—Isotherm—Isohels
 - (C) Isobars—Isohels—Isohyets—Isoneph
 - (D) Isallobar—Isohels—Isohyets—Isoneph
7. In the electrical resistivity method the distance between the electrodes is kept same in the following configuration.
- (A) Schlumberger method
 - (B) Wenner method
 - (C) Dipole-Dipole method
 - (D) Self-potential method
8. The experimentally determined measure of the size of an earthquake is called :
- (A) Intensity
 - (B) Magnitude
 - (C) Moment
 - (D) Attenuation

9. The seismic wave velocity layers corresponding to the ophiolitic sequence :

- | | | |
|---------------|-------------------|-------|
| (I) Layer-2 | (a) Pillow Lava | |
| (II) Layer-3 | (b) Sheeted dykes | |
| (III) Layer-4 | (c) Peridotite | |
| (I) | (II) | (III) |
| (A) (b) | (a) | (c) |
| (B) (b) | (c) | (a) |
| (C) (c) | (a) | (b) |
| (D) (a) | (b) | (c) |

10. Through flow is commonly a major component of run off in :

- (A) Densely vegetated regions
- (B) Areas underlain by jointed rocks
- (C) Hilly terrain with steep slopes
- (D) Sparsely vegetated regions

11. The shape of a grain as per Zingg's classification is prolate (rod shaped)

when :

- (A) $\frac{b}{a}$ is $< \frac{2}{3}$ and $\frac{c}{b}$ is $< \frac{2}{3}$
- (B) $\frac{b}{a}$ is $< \frac{2}{3}$ and $\frac{c}{b}$ is $> \frac{2}{3}$
- (C) $\frac{b}{a}$ is $> \frac{2}{3}$ and $\frac{c}{b}$ is $< \frac{2}{3}$
- (D) $\frac{b}{a}$ is $> \frac{2}{3}$ and $\frac{c}{b}$ is $> \frac{2}{3}$

(where a = length; b = width, c = thickness)

12. Which are characterise the grain supported limestone ?

- (A) Wackstone
- (B) Packstone
- (C) Boundstone
- (D) Dolostone

13. The values of vitrinite reflectance (R_0) for crude oil generation varies between :

- (A) 0.1 to 0.5
- (B) 0.6 to 1.5
- (C) 1.6 to 2.5
- (D) above 2.5

14. Which of the following is irregular echinoid genus ?

- (A) Micraster
- (B) Cidaris
- (C) Hemicidaris
- (D) Clypeaster

15. Which of the following series of sedimentary rock progressively low-energy of deposition ?

- (A) Shale, sandstone, conglomerate
- (B) Conglomerate, Sandstone, Shale
- (C) Conglomerate, Shale, Sandstone
- (D) Sandstone, Shale, Conglomerate

16. In the thermodynamics, the activity of the gases is referred to as :

- (A) Phase rule
- (B) Eutectic
- (C) Fugacity
- (D) Molality

17. Star-dune are associated with :

- (A) Bi-directional wind and restricted sediment supply
- (B) Uni-directional wind and restricted sediment supply
- (C) Multi-directional wind and abundant wind supply
- (D) Multi-directional wind and limited wind supply

18. One of the following statements about suspended sediment load is correct. Choose the *correct* answer.

- (A) Suspended sediment load decreases with increase in discharge
- (B) Suspended sediment load decreases with increase in catchment area
- (C) Suspended sediment load increases with increase in catchment area and discharge
- (D) Suspended sediment load increases with catchment area but decreases with an increase in discharge

19. The most characteristic features of Archean greenstone sequences is :
- (A) Abundant lamprophyres
 - (B) Abundant ophiolites
 - (C) Abundant Komatite-basalts
 - (D) Abundant boninites
20. Randomly oriented plagioclase feldspar laths nearly enclosed in pyroxene grain where laths are not bigger than enclosing grain exhibit :
- (A) Poiklitic texture
 - (B) Porphyritic texture
 - (C) Ophitic texture
 - (D) Idiomorphic texture
21. Ductile shear zones have characteristic rock type known as :
- (A) Mylonites
 - (B) Non-foliated conglomerates
 - (C) Non-foliated granites
 - (D) Non-foliated sandstones
22. Which of the following is *not* a remote sensing satellite ?
- (A) IRS 1A
 - (B) Cartosat
 - (C) Resource sat
 - (D) IRNSS

23. Basalts containing more than 5% normative nepheline are termed as :

- (A) Nephelinite
- (B) Melanephelinite
- (C) Basanite
- (D) Phonolite

24. Match the morphological features in List-I with the corresponding fossils in List-II :

List-I	List-II
(a) Pedicle opening	(1) Trilobita
(b) Thorax	(2) Echinoidea
(c) Periproct	(3) Brachiopoda
(d) Cardinal fossula	(4) Anthozoa
(A) (a-3) (b-2) (c-1) (d-4)	
(B) (a-4) (b-2) (c-1) (d-3)	
(C) (a-3) (b-1) (c-2) (d-4)	
(D) (a-4) (b-1) (c-2) (d-3)	

25. The daughter crystals from fluid inclusions help to know the.....of mineral media.

- (A) Pressure
- (B) Temperature
- (C) Salinity
- (D) Viscosity

26. Which one of the following is *not* a step of exploration of ore deposits ?

- (A) Feasibility study
- (B) Blending
- (C) Mine-development
- (D) Smelting

27. The only productive gold mine in

India is located at :

(A) Hutti

(B) Kolar

(C) Ramagiri

(D) Ajjanahalli

28. The composition of Sapphire is :

(A) Al_2O_3

(B) CaTiO_3

(C) Al_2SiO_5

(D) $\text{Al}_2(\text{OH})\text{Si}_2\text{O}_7$

29. Iron ore deposits of India were formed during :

(A) Cenozoic

(B) Mesozoic

(C) Precambrian

(D) Hadean

30. Ophiolites represent :

(A) abducted slices of deep sea sediments, oceanic crust and upper mantle in orogenic belts

(B) basaltic eruptions in island arcs

(C) Ultramafic intrusions in continental shield areas

(D) Alkaline rocks in oceanic islands

31. Which one of the following statements about geostationary satellite is *not* true ?
- (A) They are located at about 36000 km
 - (B) They are particularly useful for communication
 - (C) They do not revolve round the earth
 - (D) They are at a fixed location and not moving
32. Translation of locational information in numeric format is called as :
- (A) Geocoding
 - (B) Geo-referencing
 - (C) Degitization
 - (D) Digitation
33. If the quantification level of a sensor is 128, how many colour shades can be generated using three basic additive colours ?
- (A) $(2^7)^3$
 - (B) $(2^6)^3$
 - (C) $(2^8)^3$
 - (D) $(2^9)^3$
34. The ore deposits irrespective of their morphology, restricted to a fairly limited stratigraphical range within the strata of a particular region are called :
- (A) Stratiform
 - (B) Podiform
 - (C) Strata-bound
 - (D) Porphyry

35. The rock consisting of milimeter size grains of quartz and feldspar with allotriomorphic granular texture are called :
- (A) Pegmatites
 - (B) Trachyte
 - (C) Andesite
 - (D) Aplite
36. If the ratio of plagioclase and clinopyroxene crystals per unit volume of rock is less than 1, the texture is :
- (A) Intergranular
 - (B) ophitic
 - (C) Subophitic
 - (D) Protogranular
37. The stromatolitic phosphorites of Rajasthan belong to :
- (A) Udaipur formation
 - (B) Sirohi formation
 - (C) Jhamarkotra formation
 - (D) Champaner Group
38. The direction of Ekman transport which is confined to top 10 to 100 m of the ocean is :
- (A) 90°
 - (B) 30°
 - (C) 45°
 - (D) 60°
- to the right of the wind direction in the Northern Hemisphere.

39. Gulf Stream is the :

- (A) Largest of the Western boundary currents
- (B) Largest of the Eastern boundary currents
- (C) Trade wind driven North Equatorial Currents
- (D) Trade wind driven South Equatorial Currents

40. The Quasi-Biennial Oscillation (QBO) is a quasi-periodic oscillation of the equatorial zonal wind between Easterlies and Westerlies with a mean period of 28 to 29 months occurring in the :

- (A) Tropical Mesosphere
- (B) Tropical Ionosphere
- (C) Tropical Stratosphere
- (D) Tropical Boundary Layer

41. Inter-Tropical Convergence Zone (ITCZ) is in the tropical latitudes where :

- (A) Ocean currents from Southern and Northern hemisphere converge
- (B) Easterly and Westerly winds converge
- (C) South-easterly and North-easterly winds converge
- (D) Arabian Sea, Bay of Bengal and Indian Ocean currents converge

42. Virtual temperature is the temperature that the dry air must have in order to :

- (A) Have the same density as that of moist air at the same pressure
- (B) Have the same pressure as that of moist air at the same density
- (C) Have the same acceleration due to gravity as that of moist air at the same density
- (D) Have the same acceleration due to gravity as that of moist air at the same pressure

43. Stepped leader and return stroke are associated with :

- (A) Intracloud lightning Discharges
- (B) Cloud to Ground Lightning Discharges
- (C) Air Discharges
- (D) Upward Lightning Discharges

44. Bergeron-Findeisen process depends on the fact that in mixed phase clouds :

- (A) Air is supersaturated with respect to water and subsaturated with ice at the same temperature
- (B) The saturation vapor pressure over water is less as compared to that over ice at the same temperature
- (C) The saturation vapor pressure over water is more as compared to that over ice at the same temperature
- (D) Water drops grow at the expense of ice crystals

45. Available potential energy is :

- (A) The amount of energy that can be converted into kinetic energy
- (B) The difference between internal energy and potential energy
- (C) The difference between internal energy and kinetic energy
- (D) The difference between solar energy and potential energy

46. A satellite in a geostationary orbit will be approximately at a distance of :

- (A) 360 km
 - (B) 860 km
 - (C) 8,600 km
 - (D) 36,000 km
- above mean sea level.

47. Match the following Tropical Weather Systems :

- | | | |
|---------------------|-----|-------------|
| (a) Low Pressure | (1) | 34-47 knots |
| | | Area |
| (b) Depression | (2) | 28-33 knots |
| (c) Deep Depression | (3) | 17-27 knots |
| (d) Cyclonic Storm | (4) | Less than |
| | | 17 knots |

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

48. The mineral assemblage quartz-sapphirine is characteristic of :

- (A) Amphibolite facies
- (B) Eclogite facies
- (C) Blue schist facies
- (D) Ultra-High Temperature (UHT) metamorphism

49. Ocean Island Basalts (OIB) derived from :

- (A) Lower crust
- (B) Depleted mantle
- (C) Subcontinental mantle
- (D) Primitive mantle

50. Peridotite containing olivine and orthopyroxene as essential minerals

is known as :

- (A) Wherlite
- (B) Harzburgite
- (C) Lherzolite
- (D) Limburgite

51. Which one of the following refers to Darcy's law ?

- (A) $Q = KA(H/L)$
- (B) $Q = TiA$
- (C) $Q = KnA$
- (D) $Q = ViA$

52. Aerial photography does *not* cover the wavelength of :
- (A) UV
 - (B) Visible par
 - (C) Near I.R.
 - (D) Far I.R.
53. Positive Ce anomalies in sediments indicate :
- (A) Reducing environments
 - (B) Oxidizing environments
 - (C) Low pH conditions
 - (D) High pH conditions
54. Radioactive decay of ^{235}U gives rise to stable daughter product of :
- (A) ^{204}Pb
 - (B) ^{206}Pb
 - (C) ^{208}Pb
 - (D) ^{207}Pb
55. The age of the oldest rocks in Dharwar craton is :
- (A) 1500-2000 Ma
 - (B) 2000-2500 Ma
 - (C) 2500-3000 Ma
 - (D) > 3000 Ma

56. In the lithostratigraphic subdivision of Cuddapah supergroup, the bottom most unit is :
- (A) Nallamalai Group
 (B) Chitravati Group
 (C) Papaghni Group
 (D) Krishna Group
57. High rates of crystal growth during Archean caused by :
- (A) High geothermal gradients and rapid movement of oceanic plates
 (B) High geothermal gradients and slow movement of plates
 (C) Low geothermal gradients and slow movement of plates
 (D) Colder Archean mantle and larger rigid oceanic plates
58. With increase in temperature above 800°C Garnet-Cordierite breaks down to :
- (A) Sillimanite—Quartz
 (B) Plagioclase—Orthopyroxene
 (C) Quartz—Orthopyroxene
 (D) Orthopyroxene—Sillimanite
59. Which one of the following elements substitutes Rb in feldspar ?
- (A) Ca
 (B) Na
 (C) Si
 (D) K

60. The characteristic mineral that marks the onset of granulite facies metamorphism is :
- (A) Garnet
 - (B) Orthopyroxene
 - (C) Cordierite
 - (D) Staurolite
61. Which of the following minerals is a ring silicate ?
- (A) Pyrophyllite
 - (B) Enstatite
 - (C) Forsterite
 - (D) Tourmaline
62. The characteristic mineral of blue-schist facies is :
- (A) Lawsonite
 - (B) Omphacite
 - (C) Glaucophane
 - (D) Albite
63. Which of the following engineering properties are applicable to rocks used as aggregates ?
- (A) Jack test, crushing strength and tensile strength
 - (B) Tensile strength, density and hardness
 - (C) Hardness, hydrophobic and binding properties
 - (D) Binding property, shear strength and durability

64. The first primitive mammals appeared during :
- (A) Traissic
 - (B) Palaeocene
 - (C) Carboniferous
 - (D) Permian
65. Crustal shortening takes place due to :
- (A) Normal faulting
 - (B) Folding and Thrusting
 - (C) Strike-slip faulting
 - (D) Only folding
66. Which of the following sub-divisions of the Himalaya is constituted of crystalline metamorphic rocks only ?
- (A) Lesser Himalaya
 - (B) Tethys Himalaya
 - (C) Outer Himalaya
 - (D) Greater Himalaya
67. A sample collected from a depth of 11 cm from the surface was subjected to lead isotopic studies indicated its concentration reduct to half. If the half life of lead-210 is 22 years, what will be the rate of sediment accumulation ?
- (A) 2 cm / year
 - (B) 1 cm / year
 - (C) .5 cm / year
 - (D) .25 cm / year

68. Stand up time is a term in Engineering Geology is associated with :

- (A) Dams
- (B) Bridges
- (C) Tunnels
- (D) Landslides

69. The movement of water parallel to the shore within the surf zone is termed as :

- (A) Tidal current
- (B) Longshore current
- (C) Salinity current
- (D) Rip current

70. Choose the *correct* statement :

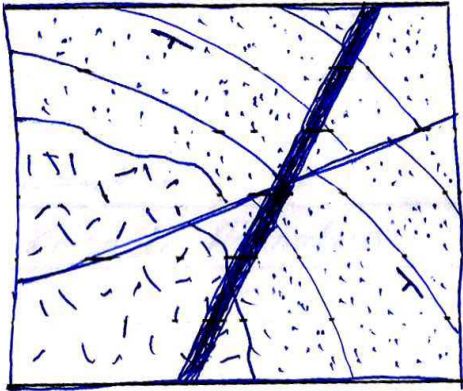
- (I) The lameta beds occurring below Deccan traps is of Eocene age
- (II) The lameta beds are deposited in fluvial and estuarine environment
- (III) Intertropical beds formed during the interval between successive eruption are essentially marine
- (IV) Deccan trap volcanism started during early Eocene of these

- (A) (I) and (II) are correct
- (B) (III) and (IV) are correct
- (C) Only (II) is correct
- (D) (I), (II) and (IV) are correct

71. Which one of the following marks the boundary between the continental crust and oceanic crust ?

- (A) Continental slope
- (B) Continental rise
- (C) Continental shelf
- (D) Abyssal plain

72. Based on the cross-cutting relationships which one of the following statements is *correct* ?



- (A) Crystalline basement—
Deposition of sedimentary
sequence—faulting—intrusion
- (B) Crystalline basement—
deposition of sedimentary
sequence—intrusion—faulting
- (C) Faulting—intrusion—
crystalline basement—
deposition of sedimentary
sequence
- (D) Deposition of sedimentary
sequence—crystalline basement—
intrusion—faulting

73. The nummulitis bearing limestones of Simla Hills belongs to :

- (A) Dogshai Formation
- (B) Krol Formation
- (C) Kasauli Formation
- (D) Subathu Formation

74. Active remote sensors are dependent wholly on the energy received from :

- (A) Moon
- (B) Earth
- (C) Sun
- (D) Mars

75. The Lingeroid ripples face :

- (A) The direction of the current flow
- (B) The direction opposite to that of the current flow
- (C) The direction perpendicular to that of the current flow
- (D) The direction transverse to that of the current flow

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