

Ph. D. Entrance Test – 2015**Subject: Geology****Paper – I**

Important: Please consult your Admit Card/Roll No. slip before filling your Roll Number on the Test Booklet and Answer Sheet.

Roll No. **In Figure** **In Words**

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O.M.R. Answer Sheet Serial No.

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Signature of Candidate: _____ *Signature of Invigilator:* _____

Time: 60 Minutes Number of Questions: 50 Maximum Marks: 50

DO NOT OPEN THE SEAL ON THE BOOKLET UNTIL ASKED TO DO SO.

INSTRUCTIONS:

- Write your Roll No. on the Questions Booklet and also on the OMR Answer Sheet in the space provided and nowhere else.
- Enter the Question Booklet Serial No. on the OMR Answer Sheet. Darken the corresponding bubbles with **Black Ball Point/Black Gel Pen**.
- Do not make any identification mark on the Answer Sheet or Question Booklet.
- Please check that this Question Booklet contains **50** Questions. In case of any discrepancy, inform the Assistant Superintendent within 10 minutes of the start of Test.
- Each question has four alternative answer (A,B,C,D) of which only one is correct. For each question, darken only one bubble (A or B or C or D), whichever you think is the correct answer, on the Answer Sheet with **Black Ball Point/Black Gel Pen**. **There shall be no negative marking for wrong answers.**
- If you do not want to answer a question, leave all the bubbles corresponding to that question blank in the Answer Booklet. No marks will be deducted in such cases.
- Darken the bubbles in the OMR Answer Sheet according to the Serial No. of the question given in the Question Booklet.
- If you want to change an already marked answer, erase the shade in the darkened bubble completely.
- For rough work only the blank sheet at the end of the Question Booklet be used.
- The Answer Sheet is designed for computer evaluation. Therefore, if you do not follow the instructions given on the Answer Sheet, it may make evaluation by the computer difficult. **Any resultant loss to the candidate on the above account, i.e. not following the instructions completely, shall be of the candidate only.**
- After the test, hand over the Question Booklet and the Answer Sheet to the Assistant Superintendent on duty.
- In no case the Answer Sheet, the Question Booklet, or its part or any material copied/noted from this Booklet is to be taken out of the examination hall. Any candidate found doing so would be expelled from the examination.
- A candidate who creates disturbance of any kind or changes his/her seat or is found in possession of any paper possibly of any assistant or found giving or receiving assistant or found using any other unfair means during the examination will be expelled from the examination by the Centre Superintendent/Observer whose decision shall be final.
- Communication equipment such as mobile phones, pager, wireless set, scanner, camera or any electronic/digital gadget etc., is not permitted inside the examination hall. Use of calculators is not allowed.**
- The candidates will not be allowed to leave the Examination Hall/Room before the expiry of the allotted time.

1. Consider the following statements, which are associated with pyroxene group of minerals:

1. In the orthorhombic pyroxenes, Ca and Na are absent.
2. The clinopyroxene crystallise in monoclinic system.
3. Acicular form is quite common in the pyroxenes.
4. The basal section of the pyroxenes is 6-sided.
5. The pyroxene group belongs to inosilicates.

Which of the above statements are correct ?

- (A) 2,3, and 4
- (B) 1,3, and 4
- (C) 1,2, and 5
- (D) 2,4, and 5

2. When the color of a mineral is due its chemical composition, it is known as

- (A) Idiochromatic
- (B) Allochromatic
- (C) Pseudochromatic
- (D) Isochromatic

3. Consider the following isotropic minerals :

1. Halite
2. Almandine
3. Diamond
4. Fluorite

The correct sequence of these minerals in increasing order of their refractive index is

- (A) 4,1,2,3
- (B) 4,2,1,3
- (C) 1,4,3,2
- (D) 1,3,4,2

4. The Ca-bearing olivine (CaMgSiO_4) is known as

- (A) Fayalite
- (B) Glaucophroite
- (C) Monticellite
- (D) Kirchsteinite

5. Consider the following statements, which are associated with uniaxial minerals:

1. They crystallise with hexagonal , trigonal or tetragonal symmetry .
2. The optical indicatrix of a uniaxial mineral is an ellipsoid of rotation, with the optic axis as an axis of rotation.
3. If the extraordinary ray is slower, the mineral is said to be optically positive.
4. If the extraordinary ray is faster, the mineral is said to be optically negative.

Which of the above statements is/are correct?

- (A) All the above
- (B) 2 and 3
- (C) 3 and 4
- (D) 1 alone

6. Consider the following statements, which are associated with biaxial minerals:

1. They crystallise with orthorhombic, monoclinic or triclinic symmetry.
2. The acute angle between the optic axes is called optic axial angle, and is designated as $2V$.
3. The principal vibration direction that bisects the optic axial angle is known as the obtuse bisectrix (Bxo).

Which of the above statements is/ are correct?

- a) All of the above
- (B) 2 and 3
- (C) 1 and 2
- (D) 3 alone

7. Match List 1 with List 2 and select the correct answers using the codes given below the lists:

LIST 1

- A. Muscovite
- B. Paragonite
- C. Phlogopite
- D. Biotite

LIST 2

1. $\text{NaAl}_2(\text{Si}_3\text{Al})\text{O}_{20}(\text{OH})_2$
2. $\text{K}(\text{Mg}, \text{Fe}^{2+})_3(\text{Si}_3\text{Al})\text{O}_{20}(\text{OH})_2$
3. $\text{KAl}_2(\text{Si}_3\text{Al})\text{O}_{20}(\text{OH})_2$
4. $\text{KMg}_3(\text{Si}_3\text{Al})\text{O}_{20}(\text{OH})_2$

Codes:

- | | | | | |
|-----|---|---|---|---|
| (A) | A | B | C | D |
| | 4 | 1 | 3 | 2 |
| (B) | A | B | C | D |
| | 4 | 1 | 2 | 3 |
| (C) | A | B | C | D |
| | 3 | 1 | 4 | 2 |
| (D) | A | B | C | D |
| | 3 | 1 | 2 | 4 |

8. Consider the following statements:

Specific gravity of the minerals depends on:

1. Mass of the atoms.
2. Bonding strength of the atoms.
3. Packing of the atoms.

Which of the above statements is/are correct?

- a) All of the above
- (B) 1 alone
- (C) 1 and 2
- (D) 3 alone

9. Consider the following minerals :

1. Fluorite
2. Magnetite
3. Monazite
4. Galena

The correct sequence of these minerals in increasing order of their hardness is :

- (A) 1,4,2,3
- (B) 1,3,4,2
- (C) 4,3,2,1
- (D) 4,1,3,2

10. Match List 1 (Mineral) with List 2 (Si:O), and select the correct answers using the codes given below the lists:

LIST 1

- A. Garnet
- B. Melilite
- C. Bentonite
- D. Talc

LIST 2

- 1. 1:3
- 2. 1:4
- 3. 2:5
- 4. 2:7

Codes:

- | | | | | |
|-----|---|---|---|---|
| (A) | A | B | C | D |
| | 2 | 4 | 1 | 3 |
| (B) | A | B | C | D |
| | 2 | 3 | 1 | 4 |
| (C) | A | B | C | D |
| | 1 | 4 | 2 | 3 |
| (D) | A | B | C | D |
| | 1 | 3 | 1 | 4 |

11. Which one of the following is in the correct sequence of formation of alkali-feldspar with decreasing temperature?

- (A) Sanidine - Anorthoclase - Microcline - Adularia
- (B) Sanidine - Microcline - Anorthoclase - Adularia
- (C) Sanidine - Microcline - Adularia - Anorthoclase
- (D) Microcline - Adularia - Anorthoclase - Sanidine.

12. Pratt's theory of isostasy proposes:

- (A) density variation between adjacent blocks and also within the block
- (B) density variation between different blocks, each with uniform density
- (C) same density of different blocks, but in each block density varies
- (D) same and uniform density for each block

13. Which one of the following landforms has the dip slope as a characteristic feature?

- (A) Mesa
- (B) Cuesta
- (C) Barchan
- (D) Butte

14. Horizontal Triassic beds lie over horizontal Cambrian beds with a horizontal contact. The contact represents:

- (A) not an unconformity
- (B) a nonconformity
- (C) a disconformity
- (D) a paraconformity

15. Slickenside is an example of :

- (A) penetrative foliation
- (B) penetrative lineation
- (C) non-penetrative foliation
- (D) non-penetrative lineation

16. Folds formed by layer-parallel deformation are called:

- (A) buckle fold
- (B) bending fold
- (C) parallel fold
- (D) similar fold

17. The crystal system having three unequal axes at right angles constitutes:
 (A) Cubic
 (B) Hexagonal
 (C) Orthorhombic
 (D) Tetragonal
18. Zircon type may be designated as having:
 (A) 3 planes, 5 axes, and centre
 (B) 5 planes, 5 axes, and centre
 (C) 5 planes, 3 axes and centre
 (D) 5 planes, 5 axes and no centre
19. Manganese ore deposits in India are largely found in:
 (A) M.P.
 (B) Rajasthan
 (C) Bihar
 (D) Haryana
20. Uranium deposits of Jaduguda are of _____ Origin:
 (A) Hydrothermal
 (B) Magmatic
 (C) Metamorphic
 (D) Sedimentary
21. In the Leucite-Silica binary system, incongruently melting intermediate compound is:
 (A) $KA1Si_3O_8$
 (B) $KA1Si_2O_6$
 (C) $NaA1Si_3O_8$
 (D) $KA1SiO_4$
22. Which one of the following pairs is correctly matched.
 (A) Consolidated layers of ash : Scoria
 (B) Accumulation of ejecta : Tephra
 (C) Lavas with glassy smooth and ropey surfaces : Aa
 (D) Lavas with rough and fragmented surfaces : Pahoehoe
23. Development of foliations and lineations in metamorphic rocks is mainly a function of:
 (A) fluids and temperature
 (B) fluids and pressure
 (C) nonlithostatic stress and temperature
 (D) lithostatic stress and temperature
24. The pyrope+omphacite assemblage represents:
 (A) low temperature and high pressure metamorphism
 (B) low temperature and intermediate pressure metamorphism
 (C) high temperature and low pressure metamorphism
 (D) high temperature and high pressure metamorphism
25. Which one of the following represents typical mineral assemblage of high pressure-low temperature metamorphic facies developed in a **subduction**-related environment?
 (A) Glaucophane-jadeite-pyrope-kyanite
 (B) Glaucophane-jadeite-pumpellyite-lawsonite
 (C) Glaucophane-pumpellyite-pyrope-kyanite
 (D) Glaucophane-pumpellyite-pyrope-lawsonite
26. Which one of the following mineral assemblages is NOT possible in a contact metamorphic rock?
 (A) Andalusite and Cordierite
 (B) Diopside and Kyanite
 (C) Cordierite and Sillimanite
 (D) Andalusite and Sillimanite

27. Elongation of grains in a sedimentary rock tends to be in the direction of:
 (A) cleavage
 (B) parting
 (C) a-axis
 (D) c-axis
28. Which one of the following designates fragments of generally weakly cemented sediments that has been broken up and redeposited in a new framework?
 (A) Pellets
 (B) Micrite
 (C) Grapestone
 (D) Intraclast
29. Which type of environment is indicated by a shale with fossils?
 (A) Glacial
 (B) Dunes
 (C) Swamp
 (D) Coral reef
30. Fossil pollens are good indicators of ;
 (A) palaeoecology
 (B) palaeoclimate
 (C) palaeobiogeography
 (D) all of the above
31. Tree ring dating is also known as:
 (A) Geochronology
 (B) Radiochronology
 (C) Dendrochronology
 (D) Isotope chronology
32. Rewa and Bhandar belongs to the:
 (A) Dharwars
 (B) Gondwanas
 (C) Vindhyan
 (D) Siwaliks
33. Acme Biozone is the:
 (A) Time between first and last appearance of a taxa
 (B) Time when a taxa is most abundant
 (C) Time when several taxa occur together
 (D) None of the above
34. Limestone in the higher Himalayas were formed in the:
 (A) Ocean
 (B) Caves
 (C) Rivers
 (D) Glaciers
35. The half - life of ^{238}U is:
 (A) much greater than the age of earth
 (B) almost similar to the age of moon
 (C) almost similar to the age of earth
 (D) much greater than the age of moon
36. Development of badland topography takes place over :
 (A) clay in sub-humid region
 (B) shale in arid region
 (C) calcareous rock in humid region
 (D) calcareous rock in arid region

37. Which one of the following is the incorrect statement?
 (A) The ideal reason for taking aerial photograph for geological purpose is early spring
 (B) The ideal time for taking aerial photographs of sand dunes is early morning
 (C) Scale of an aerial photograph is not related to the flight height
 (D) Infra-red photographs can be taken during night
38. The general symbol of hexagonal crystal is designated as (hkil). The sum of the first three axes $h+k+i$ is :
 (A) 90 degree (B) 120 degree
 (C) between 90 and 120 degree (D) Zero
39. Regular arrangement of carbonaceous impurities after forming a cruciform pattern is characteristic of:
 (A) Sillimanite (B) Kyanite
 (C) Andalusite (D) Topaz
40. Which one of the following represents a correct magmatic fractionation trend?
 (A) Basalt – Dacite – Trachyte – Rhyolite
 (B) Basalt – Andesite – Trachyte – Rhyolite
 (C) Basalt – Dacite – Andesite – Trachyte
 (D) Basalt – Andesite – Dacite – Trachyte
41. In a binary magmatic crystallisation, eutectic point is defined as:
 (A) The temperature at which one of the phase begin to crystallise
 (B) The phase whose freezing temperature is higher than the other phase
 (C) The phase whose freezing temperature is lower than the other phase
 (D) The temperature at which both phases crystallise simultaneously with a definite proportion
42. Spinifex textures in ultramafic lavas are characterised by longer slender needles of olivine or pyroxene. In which one of the following is this texture is typically found?
 (A) Kimberlite (B) Komatite
 (C) Peridotite (D) Pyroxenite
43. An alkaline rock consisting of Augite – Plagioclase – Nepheline is known as :
 (A) Theralite (B) Teschenite
 (C) Essexite (D) Ijolite
44. What is the correct sequence of appearance of minerals with increasing grade of Barrovian type metamorphism?
 (A) Staurolite – Kyanite – Annite – Fibrolite (B) Staurolite – Kyanite – Fibrolite – Annite
 (C) Annite – Staurolite – Fibrolite – Kyanite (D) Annite – Staurolite – Kyanite – Fibrolite
45. Which sedimentary rock listed below has a biochemical origin ?
 (A) Coquina (B) Travertine
 (C) Shale (D) Sandstone

46. Which one of the following are the lower and upper limits of sand size grade?
(A) 0.0625 mm and 1.0 mm (B) 0.625mm and 2.0 mm
(C) 0.0625 mm and 2.0 mm (D) 0.625 mm 1.0 mm
47. Fundamental lithostratigraphic unit is :
(A) Stage (B) Bed
(C) Formation (D) Group
48. What stable (end-product) element, besides lead, is formed when ^{235}U and ^{238}U decay?
(A) Helium (B) Potassium
(C) Samarium (D) Thorium
49. Flysch is
(A) Pre - Orogenic
(B) Post - Orogenic
(C) Synorogenic
(D) None of the above
50. Which of the following is an example of layered igneous complex?
(A) Amba Dongar Complex
(B) Mundwara Complex
(C) Sittamundi Complex
(D) Gilmar Complex

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