

Ph.D ENTRANCE EXAMINATION, APRIL 2022

GEOLOGY

Time : Two Hours

Maximum : 50 Marks

Section A

*Answer all questions.
Each question carries 1 mark.*

1. Mercury is closer to Sun than Venus. Yet, Venus is hotter because it has :
 - (a) A dominant CO_2 atmosphere.
 - (b) A dominant methane atmosphere.
 - (c) Sulphuric acid clouds
 - (d) An atmosphere devoid of oxygen.
2. Ramu is a geologist. One day he started his journey from his tent. At first he walked northward for 125 m, then changed his path towards $\text{N}270^\circ$ and walked 700 m. Then he turned towards right and walked 575 m. Ramu then went back to his tent in the shortest route (a straight line). To which direction Ramu has to walk to approach his tent.
 - (a) $\text{N}90^\circ$.
 - (b) $\text{N}135^\circ$.
 - (c) $\text{N}270^\circ$.
 - (d) $\text{N}180^\circ$.
3. Coesite, a high pressure polymorph of quartz, is found in rocks exposed on Earth's surface because :
 - (a) Stable at low temperature.
 - (b) A high density mineral.
 - (c) Lowest free energy.
 - (d) not favored for weathering.
4. The first continent(s) that got separated from Gondwanaland.
 - (a) Australia.
 - (b) India.
 - (c) Antarctica.
 - (d) South America-Africa.
5. Limestone are generally formed in shallow shelf region along coastlines that has :
 - (a) Cold water, rich in nutrients and abundant detrital input.
 - (b) Cold water, rich in nutrients and less detrital input.
 - (c) Warm water, rich nutrient supply and less detrital input.
 - (d) Warm water, rich in nutrients and less detrital input.

Turn over

6. The only hypervelocity meteorite impact crater on a basaltic terrain in India.

- (a) Dhala.
- (b) Lonar.
- (c) Luna.
- (d) Ramgarh.

7. Lines connecting points of equal depths underwater.

- (a) Contour.
- (b) Isoseismal.
- (c) Isohyets.
- (d) Isobaths.

8. Match the following :

- | | |
|--------------------------------|--------------------------------|
| A. Cudappah | i. Charnockite. |
| B. Vindhyan | ii. Chert. |
| C. Siwaliks | iii. Bhandar. |
| D. Southern Granulite Block | iv. Pinjor. |
| (a) A-ii ; B-iv ; C-i ; D-iii. | (b) A-ii ; B-iii ; C-iv ; D-i. |
| (c) A-iv ; B-ii ; C-i ; D-iii. | (d) A-ii ; B-i ; C-iv ; D-iii. |

9. Given below are two statements marked as Assertion (A) and Reason (R). Read both the statements carefully and choose the correct alternative from the following Assertion (A) : Pyroxene is a characteristic mineral of charnockite Reason (R) : CO_2 pressure is responsible for the formation of pyroxene.

- (a) Both A and R are true and R is the correct explanation of A
- (b) Both A and R are true and but R is not the correct explanation of A
- (c) A is true, but R is false.
- (d) A is false, but R is true.

10. A rock found in ductile shear zone is :

- (a) Breccia.
- (b) Mylonite.
- (c) Trachyte.
- (d) Melt-rock.

11. A fossil with limited stratigraphic range :

- (a) Zone fossil.
- (b) Leaked fossil.
- (c) Index fossil.
- (d) Transported fossil.

12. The stratigraphy of Tertiary sequence of Kerala is :
(a) Vaikom-Quilon-Warkalli. (b) Warkalli-Quilon-Vaikom.
(c) Quilon-Warkalli-Vaikom. (d) Warkalli-Vaikom-Quilon.
13. Which mineral is found unstable in Eclogite facies ?
(a) Kyanite. (b) Plagioclase.
(c) Rutile (d) Phengite
14. CaSO_4 is the chemical composition of which mineral ?
(a) Anhydrite. (b) Gypsum.
(c) Calcite. (d) Dolomite.
15. Segments of oceanic crust between island arcs or between island arc and continent :
(a) Accretionary prism. (b) Subduction zone.
(c) Fore arc basin. (d) Back-arc basin.
16. Highest density mineral among the following is :
(a) Perovskite. (b) Quartz.
(c) Talc. (d) Biotite.
17. Bouma sequence is characterized by :
(a) 2 layers. (b) 3 layers.
(c) 4 Layers. (d) 5 layers.
18. The process of alteration of pyroxene to amphibole is :
(a) Charnockitization. (b) Sericitization.
(c) Uralitization. (d) Saussuritization.
19. I am Mars Orbiter Mission. During my mission to Mars, I studied two of its satellites. Who are they :
(a) Vesta and Ceres. (b) Hailey and Hale-Bopp.
(c) Deimos and Phobos. (d) Juno and Sylvia.
20. Which among the following is not a metamorphic facies for mafic rocks ?
(a) Greenschist. (b) Blueschist.
(c) Amphibolite. (d) Biotite.

21. Types of BIF are :
- (a) Algoma and Superior.
 - (b) Algoma and Stratabound.
 - (c) Superior and stratabound
 - (d) Stratabound and Placer.
22. Oil-bearing beds of Cauvery Basin are :
- (a) Dalmiapuram.
 - (b) Niniyur.
 - (c) Sivaganga.
 - (d) Uttatur.
23. An area of older rocks surrounded by younger rocks.
- (a) Outlier.
 - (b) Inlier.
 - (c) Unconformity.
 - (d) Disconformity.
24. The type of coal containing the highest amount of carbon.
- (a) Anthracite.
 - (b) Bituminous.
 - (c) Lignite.
 - (d) Peat.
25. Which one is not a vertex of Bermuda Triangle ?
- (a) Miami.
 - (b) San Juan.
 - (c) Bermuda.
 - (d) Florida.

(25 × 1 = 25 marks)

Section B (Paragraph Questions)

Answer any five questions.

Answer for a question should not exceed 20 sentences.

- 26. Textures of igneous rocks and its significance.
- 27. GPS and its applications.
- 28. Lineation: type, classification and origin.
- 29. Ultra High Temperature (UHT) and Ultra High Pressure (UHP) metamorphism.
- 30. Environmental Impact Assessment: Principles and procedures.
- 31. Bouger anomaly, correction methods and interpretation.
- 32. Metallogenic provinces and epochs.
- 33. Evolution of humans.

(5 × 5 = 25 marks)