

Section A.

a) 30 Multiple choice questions of one mark each (30marks)

- Q1. The most abundant element on Earth is a) silicon, b) water, c) aluminum, d) iron, e) oxygen.
- Q2. Any substance where the atoms are arranged in a regular geometric pattern is a) a naturally occurring solid, b) a mineral, c) a substance formed through inorganic processes, d) a crystalline substance, e) a compound.
- Q3. All matter in the Universe is composed of a) molecules, b) atoms, c) crystals, d) minerals, e) substances.
- Q4. The physical characteristic of some minerals whereby they fracture along preferred planes related to the crystalline structure of the mineral is known as a) cleavage, b) fracture, c) breakage, d) planarity, e) all of these.
- Q5. Which of the following is a physical property of minerals? a) breakage, b) tint and hue, c) luster, d) roughness, e) roundness.
- Q6. An example of a sheet silicate mineral is a) olivine, b) quartz, c) Muscovite, d) hornblende, e) none of these.
- Q7. In the single-chain silicates, the silica tetrahedra are bound to each other at a) two corners, b) three corners, c) four corners, d) one corner, e) not bounded to each other.
- Q8. The color of a powdered mineral is a) the same as the color of the mineral specimen, b) its streak, c) determined by the types of impurities in the mineral, d) is not a reliable physical property, e) none of these.
- Q9. Which of the following minerals are arranged in order of increasing hardness? a) Talc, apatite, corundum, diamond, b) topaz, quartz, fluorite, corundum, c) talc, quartz, calcite, diamond, d) quartz, topaz, diamond, fluorite, e) fluorite, calcite, gypsum, talc.
- Q10. What type of silicate is Biotite? a) isolated tetrahedra, b) single chain, c) double chain, d) sheet, e) framework.

- Q11. Rocks of the continents are enriched in the elements a) silicon and iron, b) iron and magnesium, c) silicon and aluminum, d) magnesium and aluminum, e) magnesium and silicon.
- Q12. Rocks of the ocean basins are enriched in the elements a) silicon and iron, b) iron and magnesium, c) silicon and aluminum, d) magnesium and aluminum, e) magnesium and silicon.
- Q13. Geologic processes that resulted in the formation of continents and ocean basins a) were only active during Earth's early history, b) are still active today, c) cannot be observed by scientists, d) have occurred on the other terrestrial planets, e) all of these.
- Q14. "Sima" is a general term used to refer to a) rocks of the ocean basins, b) rocks of the continents, c) all rocks that compose Earth's crust, d) rocks that compose the crust of terrestrial planets, e) none of these.
- Q15. "Sial" is a) found only on Earth, b) found in the crust of all other terrestrial planets, c) found only in the ocean basins of Earth, d) found only in rocks of the Moon, e) none of these.
- Q16. The hardness of the mineral "Quartz" is a) 8, b) 7, c) 3, e) none of these.
- Q17. The chemical composition of the mineral "Calcite" is a) Fe_2O_3 , b) SiO_2 , c) CaCO_3 , d) R_2O_3 e) none of these.
- Q18. Which of the following atmospheric gases cause rainwater to be acidic?
- a. CO_2
 - b. SO_2
 - c. NO_2
 - d. NH_3
 - e. three of the above
 - f. two of the above
 - g. none of the above
- Q19. Which of the following is a renewable energy source?
- a) Bitumen b) Solar Energy c) Coal d) Natural Gas
- Q20. Which of the following layers in the Earth is completely molten:

- A. Lower Mantle
- B. Crust
- C. Inner Core
- D. Outer Core
- E. Transition Zone
- F. None of the above

Q21. Which chemical element has the symbol Th:

- A. Thulium
- B. Thallium
- C. Sulphur
- D. Thorium
- E. Thoron
- F. None of the above

Q22. The voids in a volcanic rock that were once occupied by volcanic gas are called:

- A. Ventricles
- B. Vesicles
- C. Pumice
- D. Vestibules
- E. Phenocrysts
- F. None of the above

Q23. Which of the following is an ancient "super continent" composed of all the present major continental landmasses and formed approximately 400 Ma:

- A. Avalonia
- B. Tethys
- C. Pangaea
- D. Iapetus
- E. Eurasia
- F. None of the above

Q24. Which of the following is an intrusive igneous rock?

- A. Basalt
- B. Granite
- C. Dacite
- D. Sandstone
- E. Andesite
- F. None of the above

Q25. Which of these geological Periods is the oldest?

- A. Permian
- B. Carboniferous
- C. Jurassic
- D. Silurian
- E. Devonian
- F. Cambrian

Q26. What determines whether a rock deforms in a brittle fashion versus a ductile fashion:

- A. Mineralogy
- B. Temperature
- C. Pressure
- D. Chemical diffusivity
- E. Grain size
- F. All of the above

Q27. Sandstone is a) Metamorphic rocks, b) Igneous rocks; c) Sedimentary rocks d) none of these.

Q28. The chief raw materials used for production of cement are a) Dolomite, b) Gypsum, c) Limestone, d) Quartzite, e) none of the above.

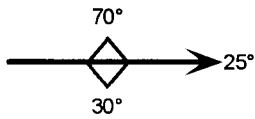
Q29. SiO_2 is a Chemical formula for the mineral a) Talc, b) Gypsum, c) Quartz, d) Feldspar, e) Olivine.

Q30. The term "bedding" is applied to a) Igneous rock, b) Metamorphic rock, c) volcanic rock, d) Sedimentary rock, e) none of these.

b) 4 short answer questions of fives mark each (20marks)

Q1. Give a brief explanation of the terms Fault Breccia and Conglomerate. Show answer with diagrammatic sketch.

Q2. Draw a diagrammatic sketch of a fold structure based on the measured field data shown below.



- Q3. Give a brief explanation of the term foliation.
- Q4. How would you distinguish between a sequence of sedimentary rocks deposited in a lake, or in a river and Metamorphic rocks? List the three most important distinguishing features.

Section B:

Attempt any one of the following two Questions. Marks 50%.

Q1. Write a case study on the limestone investigation carried out by a consortium of mineral investigation company. The limestone is located 10km N50°W of Phuntsoling town, in Buxa formation. The study report should be submitted with the following contents:

Executive Summary

Introduction:

General
Scope of work
Location
Communication
Climate
Flora and fauna
Agriculture
Habitation
Geomorphology
Seismicity
Previous Work
Acknowledgement
Geology:
Regional Geology
Regional Structure
Geology of the deposit areas
Tentative reserve of the deposit.
Conclusion and Recommendation, with justification whether to proceed with the next phase of geological investigation work or to abandon the areas.

Q2. Write a case study report on the geological investigation of Gongkhola Copper investigation, carried out by the Geological Survey of India in 1974. The study report should be submitted with the contents as mentioned in Q1.