

If the questions attempted are in excess of the prescribed number, only the questions attempted first up to the prescribed number shall be valued and the remaining ones ignored.

Answers may be given either in English or in Bengali but all answers must be in one and same language.

GROUP-A

Answer any THREE of the following Questions.

1. a) Describe procedure for determination of Hermann-Mauguin Symmetry notation. What would be Hermann-Mauguin Symmetry notation for following crystal classes
- i) A crystal class with one hexad axis and six mirror planes.
  - ii) A crystal class with one inversion tetrad axis, two mirror (Vertical) planes at right angle and two diad axes at  $45^\circ$  with mirror plane.
  - iii) A crystal class with three tetrad axes, four triad axes, six diad axes and nine mirror planes.

14+2+2+2

- b) What do you mean by isotropic and anisotropic minerals, uniaxial and biaxial minerals? Write with suitable examples.

Describe optical indicatrix of uniaxial and biaxial minerals.

4+4+6+6

2. a) State and derive 'Phase rule' for a system containing 'P' number of phases, 'C' number of components present in all 'P' phases. The degree of freedom of the system is denoted by 'F'.

Calculate degrees of freedom for a liquid at eutectic point, on liquidus curve, in all liquid field — given that the system is a two component solid-liquid equilibrium system studied under constant Pressure.

6+4+4+6

- b) Give IUGS classification of Ultramafic rock. Describe their petrography and add a note on Origin of Ultramafic rocks.

6+8+6

3. a) Discuss roles of temperature, pressure and chemically active fluids in metamorphic Processes.

8+6+6

- b) Describe mineralogical and textural changes in impure carbonate rock during contact metamorphism. Give at least four equations related to transformation and origin of minerals during these processes.

16+4

4. a) State with suitable diagrams the classification of sandstone.

20

- b) What is 'provenance'? How does a terrigenous clastic sedimentary rock form.

5. a) Describe briefly different Ore forming processes with suitable examples. 20
- b) Write a note on mode of occurrence, mineralogy and different views on the origin of Pb-Zn deposits of Rajasthan. 20

GROUP-B

Answer any TWO of the following Questions.

6. Write notes on any four of the following :
- i) Different types of silicate structures found in minerals.
  - ii) Types of metamorphic reactions.
  - iii) Common structures of plutonic igneous rocks.
  - iv) Diagenesis and lithification.
  - v) Causes of landslides.
7. a) What are the raw materials used in Cement industry ? Describe briefly geology of Cement grade limestone deposits in India. 10x4
- b) Discuss various aspects of water pollution and its effect on human being. 6+14
8. a) Describe briefly the process of formation, migration and entrapment of petroleum. 12+8
- b) Describe the 'Bowen's Reaction Series'. How does the Bowen's Reaction series help to explain magmatic differentiation ? 5+5+10
- 6+14

For guidance of WBCS Prelims , Main Exam and Interview by WBCS Gr A Officers/ Toppers, WBCS Prelims and Main Mock Test (Classroom & Online), Optional Subjects, Studymaterials, Correspondence Course etc.Call WBCSMadeEasy™ at 9674493673 or mail us at [mailus@wbcsmadeeasy.in](mailto:mailus@wbcsmadeeasy.in)