272006

COMBINED COMPETITIVE EXAMINATION (MAIN)

GEOLOGY

Paper–II

Time : 3 Hours *Full Marks* : 200

Note : *(1) The figures in the right-hand margin indicate full marks for the questions.*

*(2) Attempt **five** questions in all.*

(3) Question No. **1** *is compulsory.*

1. Answer any ***ten*** questions from the following : 4×10=40

(a) What is Bravais lattice?

(b) Explain Bragg's law.

(c) What is interference colour and how is the interference colour observed under petrological microscope?

(d) Write the definition of polymorphism and name two polymorphs of silica.

(e) Write the difference between ionic bond and covalent bond.

(f) Define the porphyritic texture of igneous rocks.

(g) What is a batholith?

(h) Define cataclastic metamorphism.

(i) What is marl?

(j) What is water table?

(k) Define gangue and tenor of ores.

2. Answer any ***eight*** questions from the following : 5×8=40

(a) Describe the configuration of crystallographic axes in triclinic crystal system.

(b) What is double refraction and how is it observed?

(c) Describe the method of determination of extinction angle in minerals.

(d) Distinguish between nesosilicate and sorosilicate minerals.

(e) Define porphyritic texture and write its petrogenetic significance.

(f) Distinguish between metamorphism and metasomatism.

(g) Write the definition of sedimentary facies.

(h) Define soil profile.

(i) What are chalcophile and lithophile elements?

3. Answer any ***five*** questions from the following : 8×5=40

(a) Define twinning. Write briefly about the types of twinning that are usually shown by the feldspar group of minerals.

(b) State the general formula and write briefly about nomenclature of the pyroxene group of minerals.

(c) Write briefly about the causes of magmatic differentiation.

(d) Distinguish between plutonic and volcanic rocks and state their salient characters.

(e) Write briefly about physico-chemical properties of hydrothermal solutions.

(f) Write briefly about metallogenic epochs.

(g) Discuss the importance of pathfinder elements in geochemical prospecting.

4. Answer any ***four*** questions from the following : 10×4=40

(a) What are biaxial minerals and how are these minerals identified under petrological microscope?

(b) Write an account of Bowen's reaction series and its role in evolution of magmas.

(c) Write briefly about classification of continental sedimentary environments and their common sedimentary rock types.

(d) What is solid solution? Describe the binary solid solution system of plagioclase feldspars with neat diagram.

(e) Write an account on the geology and genesis of copper deposits associated with the Singhbhum shear zone of Jharkhand.

5. Answer any ***two*** questions from the following : 20×2=40

(a) Write about different types of crystallographic defect that are found in natural crystals. Use suitable diagrams wherever necessary.

(b) Write an account on mineralogical and textural classification of igneous rocks.

(c) What is Barrovian type metamorphism? Describe the progressive zones of Barrovian metamorphism of pelitic rocks.

(d) Write briefly about different sampling methods.

6. Answer any ***four*** questions from the following : 10×4=40

(a) Define metamorphic facies. Describe the PT conditions and mineral assemblages of the chlorite and granulite facies of metamorphism.

(b) Write about construction of ACK and AKF ternary plots and their applications in metamorphic petrology.

(c) Write about distribution, mode of occurrence and genesis of the East Coast Bauxite deposits of India.

(d) What is meant by aquifer? Write briefly about different types of aquifer that occur underground.

(e) Write an account on the use of aerial photographs in geomorphological studies.

7. Answer any ***two*** questions from the following : 20×2=40

(a) Write an account on structural and chemical controls of ore localization.

(b) Describe the working principles of different methods of electrical prospecting.

(c) Write an account on stratigraphy, structure and the petroleum system of the Digboi oilfield of Assam.

8. Write an account on the geology and genesis of uranium deposits of India. 40

9. Write an essay on geological investigations for selection of a dam site. 40

10. Describe the underground mining methods and state their advantages and disadvantages. 40

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