

271007

COMBINED COMPETITIVE EXAMINATION (MAIN)

GEOLOGY

Paper-I

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 are the sources of energy that drive the plates in plate tectonics?
 - (b) How was sedimentation process used to determine the age of the earth in early years?
 - (c) What is geanticline?
 - (d) What are the endogenic processes that contribute to landform development?
 - (e) What are the conditions required for the development of dendritic drainage?
 - (f) How is a geomorphic scrap formed?
 - (g) What brought about the concept of organic evolution by Charles Darwin?
 - (h) How does petrification of wood fossil occur?
 - (i) What are the characteristics of Glossopteris leaf?
 - (j) What is the basis of classification of lithostratigraphic units?
 - (k) What is Neptunism?
 - (l) What are the characteristic features of Archean-Proterozoic boundary?
2. Answer any *eight* questions from the following : 5×8=40
- (a) Write on the characteristics of the internal structure of the earth.

- (b) What is hotspot and what causes its occurrence?
- (c) Write on the stages of development of a river.
- (d) What is ductile deformation? How is it different from brittle deformation?
- (e) How is strain ellipsoid derived graphically in Fry method?
- (f) Write on the salient features of a miogeosynclinal basin and its sediment characteristics.
- (g) How can gastropods with dextral and sinistral coilings be identified? Name one fossil from each type.
- (h) What are the significant differences of dinosaurs from vertebrates?
- (i) Wherefrom is the name 'Jurassic' derived? Give an outline of the Jurassic rock sequence of the type area.
- (j) Write on the spread of Cretaceous igneous activities in India and explain the cause of this activity.

3. Answer any *five* questions from the following :

8×5=40

- (a) Explain the elastic rebound theory of earthquake. Earthquakes are crustal phenomena and continental crust is on the average 35-40 km thick, but then what causes deep focus earthquakes (focal depth extending up to 700 km depth) in subduction zones?
- (b) What is half-life period of a radioactive element? Between Samarium-Neodymium (Sm-Nd) and Potassium-Argon (K-Ar) radioactive dating methods which one will give the date of the last phase of metamorphic deformation and why?
- (c) Explain through isostasy why mountain rises to a great height, ocean forms depressions and continental area takes intermediate altitudinal position.
- (d) What causes suture lines to form in ammonoids? Elaborate various types of suture lines found in ammonoids.
- (e) Explain the hoof evolution of horses from Eohippus to Miohippus and probable causes of such evolution.
- (f) Write on the difficulties of correlation of Archaean rocks.
- (g) Write on the salient fluvial geomorphic features showing their disposition in a river basin's representative sketch.

4. Answer any *four* questions from the following :

10×4=40

- (a) Write about the volcanic belts of the world. What is ring of fire?
- (b) Write on the types of seismic wave. Which wave is the most destructive and why?

- (c) Write on the landform features of aeolian environment.
- (d) Explain Mohr's stress circle and write about its application in structural geology.
- (e) Write on the mode of preservation of fossils.
- (f) Write on the stratigraphy of the Cuddapah basin.
5. Answer any *two* questions from the following : 20×2=40
- (a) Write on the evolutionary trend of the Trilobites and their distribution.
- (b) What is the basic difference between magnitude and intensity scale of earthquake measurement. Give reason why these two types of scales are necessitated.
- (c) Write on the geometric classification of folds and their significance.
6. Answer any *four* questions from the following : 10×4=40
- (a) Explain any one of the hypotheses of origin of earth.
- (b) Explain the geomorphic cycles.
- (c) Explain how petrographic analysis is carried out in thin section.
- (d) Write about the morphological features of brachiopods.
- (e) Explain how paleogeographic reconstruction is done.
7. Answer any *two* questions from the following : 20×2=40
- (a) Write on the Upper Gondwana plant fossils of India.
- (b) What is geomorphology? How can mankind be benefitted by the knowledge gained through geomorphological study?
- (c) Write, in detail, on the evolution and migration of human.
8. Write on the geology of Arunachal Pradesh. 40
9. Explain the broad tectonic framework of India. 40
10. Write on the stratigraphic code of nomenclature of India. 40