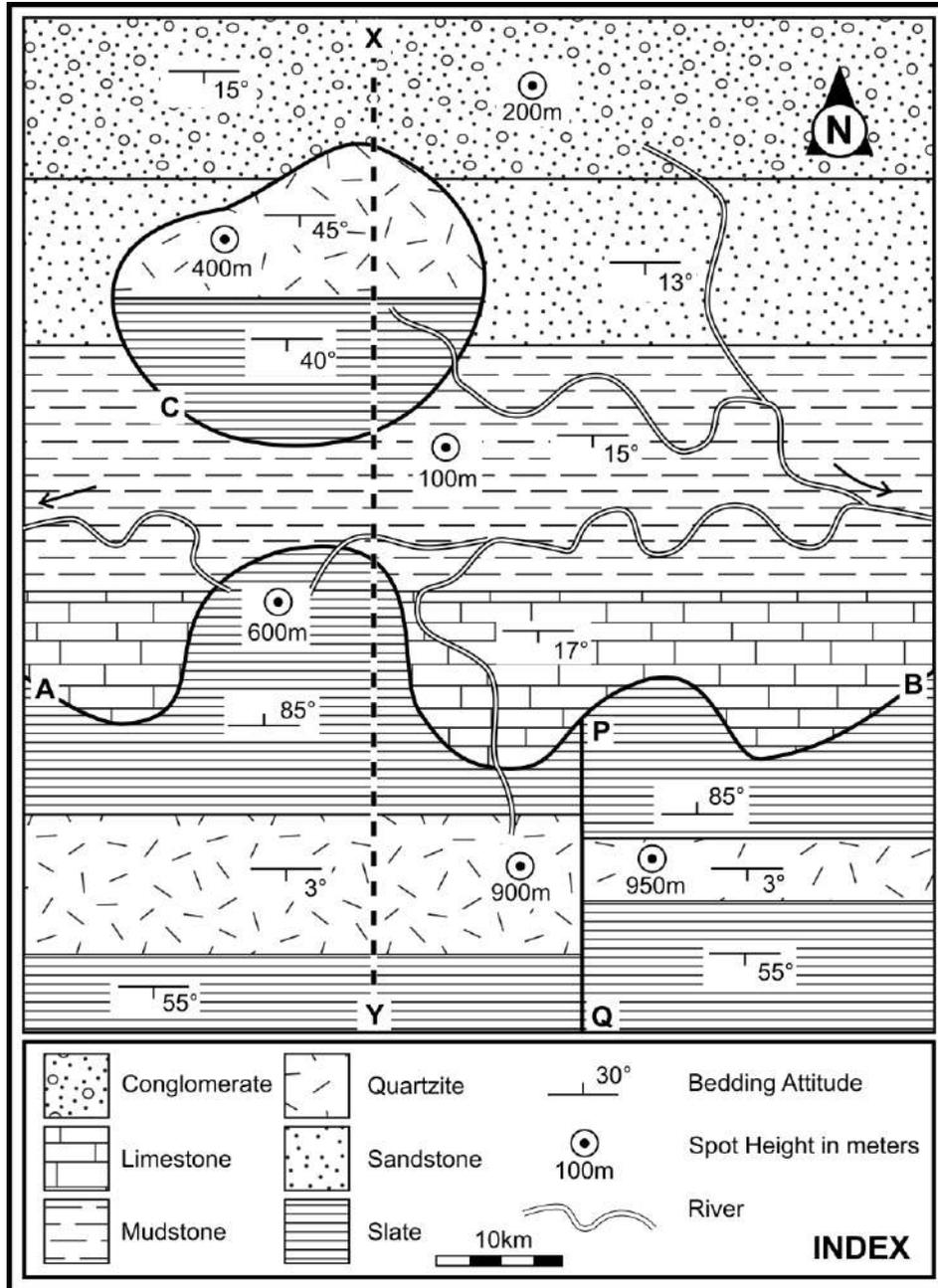


## PART I

(One question, twenty five marks)



- 1 (A). Identify the specific type of the two geological features represented by the curved lines A-B & C and the straight-line P-Q. Among the three features (A-B, C & P-Q) which one you think is the youngest one? Justify your answers.

[5 + 5 + 5]

- 1 (B). Draw a geological cross-section along the line X-Y. You are allowed to construct an imaginary profile of the topographic surface, but it should grossly conform to the given point heights and geomorphological features.

[10]

## PART II

*(Five questions, eight marks each)*

1. In a schematic pressure – temperature diagram, draw in order the following metamorphic facies: Granulite, Hornfels, Prehnite – Pumpellyite, Zeolite, Eclogite, Blueschist, Amphibolite and Greenschist.

[8]
2. Define atmophile, lithophile, siderophile and chalcophile elements and give at least one example for each.

[4 + 4]
3. Are P and T axes identical to principal stress axes? –Discuss with suitable figures. Describe the following seismic waves with suitable figures: PKIKPPKIKP, sSP, PKJKP and PKiKP.

[4 + 4]
4. What do you understand by the term “non-renewable sources of energy”? Can they can be replaced by “renewable energy sources”? Give a brief idea.

[2 + 2 + 4]
5. Define the following:
  - a) Assemblage zone.
  - b) Angular unconformity.
  - c) Time transgressive lithological unit.
  - d) Relative dating of rock strata.

[2 + 2 + 2 +2]

### PART III

*(Choose the correct answer from the given alternatives and justify. Five questions, four marks each)*

1. Ionization energy becomes greater
  - a) down and to the left of the periodic table.
  - b) up and to the left of the periodic table.
  - c) down and to the right of the periodic table.
  - d) up and to the right of the periodic table.
  
2. In Mohr's space Shear fracture is restricted in
  - a) Griffith criterion.
  - b) Coulomb criterion.
  - c) Von Misses criterion.
  - d) Griffith- Coulomb criterion.
  
3. Glassy textures are more common in rhyolite than in basalt due to
  - a) difference in cooling rate.
  - b) difference in rate of elemental diffusion in the melt.
  - c) cooling rate and rate of element diffusion in the melt
  - d) cooling rate, rate of element diffusion in the melt and presence of compatible elements.
  
4. Which of the following techniques one should be using for dating peat layers?
  - a) Paleomagnetic reversal identification method.
  - b) U-Pb radogenic isotope method.
  - c) C<sup>14</sup> method.
  - d) Thermoluminescence method.

5. Very slow cooling (small degrees undercooling) and very fast cooling (high degrees of undercooling) of magma will produce the following igneous textures
- a) Phaneritic and Holohyaline texture.
  - b) Holohyaline and Antiperthite texture.
  - c) Ophitic and Phaneritic texture.
  - d) Phaneritic and Perthitic texture.

#### **Part IV**

*(Choose the correct answer from the given alternatives. No justification is required. Fifteen questions, one mark each)*

1. Both strength and plasticity of a rock increase with the
- a) increase in temperature.
  - b) decrease in strain rate.
  - c) increase in confining pressure.
  - d) increase in pore fluid pressure.
2. Type – I interference folding results
- a) hook shaped outcrop pattern.
  - b) crescent shaped outcrop pattern.
  - c) dome basin outcrop.
  - d) both a) & c).
3. In Ramsay's classification of folds, dip isogons are parallel to axial plane trace for
- a) Class 1 folds.
  - b) Class 2 folds.
  - c) Class 3 folds.
  - d) Class 1B folds.

4. Cardinal tooth is related to
- a) Bivalvia.
  - b) Dinosauria.
  - c) Mammalia.
  - d) Gastropoda.
5. Crystal system of Pyrite or Halite is
- a) cubic.
  - b) orthorhombic.
  - c) hexagonal/trigonal.
  - d) monoclinic.
6. The Kota Formation is:
- a) Jurassic in age.
  - b) Triassic in age.
  - c) Eocene in age.
  - d) Permian in age.
7. In Dunham classification a micrite-free limestone containing sand-sized ooides, in contact with each other and cemented by sparite is called a:
- a) Wackestone.
  - b) Mudstone.
  - c) Framestone.
  - d) Grainstone.
8. The term 'Cephalon' is related to
- a) Porifera.
  - b) Cnidaria.
  - c) Echinodermata.
  - d) Arthropoda.

9. *Glossopteris* is a
- a) lower Gondwana flora.
  - b) middle Gondwana flora.
  - c) upper Gondwana flora.
  - d) flora that occurs both in lower and upper Gondwanas.
10. Which of the following is the high temperature- high pressure polymorph of  $\text{SiO}_2$ ?
- a) Opal C-T.
  - b) Tridymite.
  - c) Cristobalite.
  - d) Stishovite.
11. Whales are thought to be originated from
- a) Indian subcontinent.
  - b) South Africa.
  - c) North America.
  - d) Australia.
12. The term 'radula' is related to
- a) Brachiopoda.
  - b) Foraminifera.
  - c) Mammalia.
  - d) Gastropoda.
13. Kinematic vorticity number is maximum for
- a) pure shear.
  - b) sub-simple shear.
  - c) simple shear.
  - d) general shear.

14. Salt domes are the best examples of:

- a) Diapiric fold
- b) Reclined fold
- c) Drag fold
- d) Pericline fold

15. Myrmekite describes a vermicular, or wormy, intergrowth of

- a) quartz in plagioclase.
- b) quartz in biotite
- c) plagioclase in muscovite
- d) quartz in calcite