

SEMESTER VI
MAJOR COURSE – MJ 14
GEOLOGICAL MAPPING AND IMAGE PROCESSING TECHNIQUES

Full Marks: 75 Time: 3 Hours

GROUP – A

Q1. Choose the correct answer:

1. The horizontal direction of a geological line on a map is called:
(a) Strike (b) Dip (c) Plunge (d) Rake **(1 mark)**
2. A contour line joins points of equal:
(a) Elevation (b) Dip (c) Rock age (d) Magnetic intensity **(1 mark)**
3. A stereo pair of aerial photographs is used mainly for:
(a) Three-dimensional viewing (b) Measuring rainfall (c) Chemical analysis (d) Determining mineral hardness **(1 mark)**
4. Raster data in GIS are represented as:
(a) Grid cells/pixels (b) Only points (c) Only lines (d) Only polygons **(1 mark)**
5. DGPS is used mainly to obtain:
(a) Higher positional accuracy (b) Rock colour (c) Water quality (d) Photographic scale **(1 mark)**

Q2. What are contours? Explain contour interval, relief and the use of contours in understanding topography. (5 marks)

Q3. What is a stereo plot? Explain its use in the interpretation of linear and planar geological structures. (5 marks)

GROUP – B

Answer any four questions. (4 × 15 = 60)

Q4. Explain the components of a geological map and the principles of geological fieldwork. Discuss the use of clinometer and Brunton compass in field measurements. **(15 marks)**

Q5. Discuss bedding, foliation, lineation, joints and other planar and linear structures. Explain their measurement and representation by stereographic plots. **(15 marks)**

Q6. Explain the types of aerial photographs and their acquisition. Discuss photo scale, relief displacement and the identification of sedimentary, igneous and metamorphic rocks from aerial photographs. **(15 marks)**

Q7. Discuss remote-sensing sensors and scanners, satellite characteristics and raster/vector data. Explain image correction, enhancement, classification, FCC and image ratioing. **(15 marks)**

Q8. Describe the basic concepts of GIS. Explain datum, coordinate and projection systems, DEM, GIS analysis and integration, with case studies from India. **(15 marks)**

Q9. Explain the principles and applications of GPS and DGPS. Discuss their role in geological surveying, mapping, navigation and earth-system sciences. **(15 marks)**