

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 inclination of a geological plane measured perpendicular to strike is called:
(a) Dip (b) Trend (c) Plunge (d) Pitch **(1 mark)**
2. The vertical difference between successive contour lines is called:
(a) Contour interval (b) Relief displacement (c) Scale factor (d) Datum **(1 mark)**
3. Which landscape can be interpreted from aerial photographs?
(a) Glacial (b) Fluvial (c) Marine (d) All of these **(1 mark)**
4. Image enhancement is performed mainly to:
(a) Improve visual interpretability (b) Change rock age (c) Measure hardness (d) Determine fossil age **(1 mark)**
5. A DEM represents:
(a) Digital elevation of terrain (b) Digital elemental map (c) Deep-earth magnetism (d) Drilling elevation measurement only **(1 mark)**

Q2. Explain geological field mapping and discuss the importance of strike, dip, structural observations and sampling. (5 marks)

Q3. Differentiate raster and vector data. Explain their significance in GIS-based geological studies. (5 marks)

GROUP – B

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

Q4. Explain topographic and geological maps, their scales and components. Discuss reading of toposheets and the use of instruments in geological fieldwork. **(15 marks)**

Q5. Discuss basic field-measurement techniques including bedding, strike and dip, contours, trend, plunge, rake and pitch. Explain stereographic representation of structures. **(15 marks)**

Q6. Describe photogeological interpretation of sedimentary, igneous and metamorphic rocks. Discuss recognition of glacial, fluvial and marine geomorphic features. **(15 marks)**

Q7. Explain remote sensing and digital image processing. Discuss image correction, enhancement, classification, False Colour Composite and image ratioing. **(15 marks)**

Q8. Discuss GIS in geology. Explain coordinate systems, datums, map projections, DEM, spatial analysis and integration of geological datasets. **(15 marks)**

Q9. Give a detailed account of GPS and DGPS, their principles and applications in geological mapping and earth-science investigations. Also discuss recent applications of GIS and remote sensing in geology. **(15 marks)**