

**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 angle that a geological bed makes with the horizontal plane is called:  
(a) Strike (b) Dip (c) Trend (d) Plunge **(1 mark)**
2. A Brunton compass is commonly used to measure:  
(a) Strike and dip (b) Rainfall (c) Magnetic intensity only (d) Rock density **(1 mark)**
3. A photograph taken from an aircraft for geological interpretation is called:  
(a) Aerial photograph (b) Satellite image (c) Toposheet (d) DEM **(1 mark)**
4. FCC in digital image processing commonly stands for:  
(a) False Colour Composite (b) Field Colour Correction (c) Frequency Colour Code (d) False Contour Classification **(1 mark)**
5. GPS determines position mainly using signals from:  
(a) Satellites (b) Boreholes (c) Toposheets (d) Seismic waves **(1 mark)**

**Q2.** Define a topographic map (toposheet). Explain its scale, contour lines and important components used in geological interpretation. (5 marks)

**Q3.** Explain strike, dip, trend, plunge, rake and pitch. Mention their importance in geological field mapping. (5 marks)

**GROUP – B**

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

**Q4.** Describe the use of clinometer and Brunton compass in geological fieldwork. Explain methods of measuring strike and dip and recording field observations. **(15 marks)**

**Q5.** Explain geological mapping of igneous, sedimentary and metamorphic terrains. Discuss sampling, oriented samples and the significance of field structures and rock textures. **(15 marks)**

**Q6.** Describe photogeology. Discuss types and acquisition of aerial photographs, scale and relief displacement, elements of photo-interpretation and identification of geological and geomorphological features. **(15 marks)**

**Q7.** Explain the principles of remote sensing. Discuss sensors, scanners, satellites, data formats and the fundamentals of digital image processing including correction, enhancement and image classification. **(15 marks)**

**Q8.** Explain GIS, datum, coordinate systems and map projection systems. Discuss DEM, GIS analysis and integration of geological data with suitable Indian examples. **(15 marks)**

**Q9.** Explain GPS and DGPS and their principles. Discuss their applications in geological mapping, surveying, mineral exploration and other earth-science studies. **(15 marks)**