

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(END SEMESTER EXAMINATION)**

**CLASS: I MSc / PRE-PHD  
BRANCH: GEOINFOMATICS**

**SEMESTER : I  
SESSION : MO/2025**

**SUBJECT: GI502 GEOGRAPHIC INFORMATION SYSTEM**

**TIME: 3 Hours**

**FULL MARKS: 50**

**INSTRUCTIONS:**

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) i) Define GIS and give the names of subjects which are major contributors for GIS?	[2]	CO1	BL1
ii) Describe different components of GIS.	[3]	CO1	BL2
Q.1(b) i) Differentiate vector and raster.	[3]	CO1	BL2
ii) Define scale? What are the different types of scale?	[2]	CO1	BL2
Q.2(a) i) Explain the relevance of connectivity property of topology for vector data model.	[4]	CO2	BL3
Q.2(b) ii) Write two topological and two non-topological vector file formats.	[2]	CO2	BL2
Q.3(a) What is 1 <sup>st</sup> order polynomial transformation? How does number of GCP depend on order of polynomial transformation in the process of georeferencing?	[4]	CO3	BL3
Q.3(b) i) Municipal Corporation of Dhanbad city is planning to use GIS for transport planning and for monitoring urban congestion. For this road network analog map (scale, 1:5,000) of Dhanbad city was scanned at 300dpi and georeferenced with RMS error of 6m. Comment on the spatial accuracy of the georeferenced output.	[3]	CO3	BL4
ii) Differentiate accuracy and precision.	[3]	CO3	BL3
Q.4(a) i) Give a comparative analysis of 3 different types of Geodatabases.	[5]	CO3	BL2
Q.4(b) i) Explain the relevance of Object-Oriented DBMS in context of Geodatabase.	[3]	CO3	BL3
ii) Give examples of application areas of linking spatial and non-spatial data.	[2]	CO3	BL2
Q.5(a) If you are given Map A and B. Can you carry out below Operations and derive outputs.	[4]	CO5	BL4

(i)  $[(A+B) / (A-B)]$       (ii)  $(A * 10 + B*20)/5$

(iii)  $(A*A + B*B) / (A+B)$     (iv)  $(A-B)*20 - 10$

Map A	Map B
5 5 2 2	4 4 8 8
5 5 5 2	4 4 4 8
6 2 2 2	1 1 1 8
6 6 6 6	1 1 8 8

Q.5(b) i) Describe local raster analysis technique in brief.	[4]	CO5	BL4
ii) What is the difference in 2.5 D and 3D visualization?	[2]	CO4	BL2