

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

**CLASS:** M.Sc  
**BRANCH:** Geoinformatics

**SEMESTER :** III  
**SESSION:**MO-2023

**SUBJECT:** GI602 ADVANCED GEOSPATIAL MODELLING AND DECISION SUPPORT SYSTEM  
**TIME:** **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.

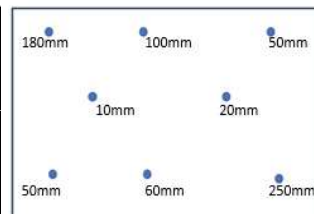
- Q.1(a) Write short notes on any two of the following: [5]  
 i) Single layer Vs Multilayer Spatial analysis techniques, ii) Slope determination from an elevation raster, iii) Network Analysis, iv) Cost-Distance Calculation [CO1, BL3]
- Q.1(b) On the given agriculture land two types of crops (Cr1 & Cr2, Fig1) can grow on two different soil types (S1 and S2, Fig 2). S1 is more suitable for crop Cr1 while S2 is more suitable Cr2. More irrigation is required if Cr1 is grown in S2. This particular piece of land is sensed by the remote sensor in 16 pixels having spatial resolution of 500m. Find out the total cultivable area for which extra irrigation facilities is required. [5]

Cr1	Cr1	Cr2	Cr2
Cr1	Cr1	Cr1	Cr1
Cr1	Cr2	Cr1	Cr2
Cr2	Cr2	Cr2	Cr2

**Fig. 1**

S1	S1	S2	S2
S2	S1	S1	S2
S2	S2	S1	S1
S2	S2	S1	S1

**Fig. 2**



**Fig. 3**

[CO1, BL3]

	C1	C2	C3	C4
C1	1	3	1/5	1/3
C2	3	1	3	5
C3	5	1/3	1	1/3
C4	7	1/5	3	1

**Fig. 4**

- Q.2(a) Create a Thiessen based Rainfall Map from the given Rainfall observation (use Fig. 3) for the month of June. [4]  
 [CO2, BL3]
- Q.2(b) If the rainfall values for the month of July (for the same points given in Figure 3) is provided to you, Will the Thiessen Polygon Boundaries will change? Explain Why!. [CO2, BL5] [3]
- Q.2(c) What is the use of Variogram in Geostatistics?. Draw a Variogram with Experimental and Modelled Variance Values and mark all the components. [CO2, BL6] [3]
- Q.3(a) Define DSS and explain its advantages and components in brief. [CO3, BL2] [5]
- Q.3(b) Mention any 5 real world DSS and their class as per Alter's classification. [CO3, BL1,2] [5]
- Q.4(a) What do you mean by Multi-Criteria Decision Making (MCDM)? How MODM and MADM, which are different subclass of MCDM, are different from each other? Explain relevance of MCDM in solving real world spatial problem. [CO4, BL3] [5]
- Q.4(b) Explain relevance of MCDM in solving real world spatial problem? Identify spatial problem of your city and explain the step-by-step process to solve it by MADM technique. [CO4, BL3-4] [5]
- Q.5(a) Draw an Analytical Hierarchical Diagram for purchasing a House using 5 Criteria and 3 Alternatives. [CO4, BL3] [2]
- Q.5(b) Create an example Effect Table for Purchasing a House using 5 Criteria and 3 Alternatives [CO4, BL3] [3]
- Q.5(c) In the given Pairwise Comparison Matrix (use Fig. 4), Find out whether there exists any logical inconsistency or not. If exists, then how many errors are there. Rectify the Errors and make the Correct Pairwise Comparison Matrix. [CO4, BL5] [5]

:::23/11/2023 E:::