

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

**CLASS: M.Sc
BRANCH: GEOINFORMATICS**

**SEMESTER : II
SESSION : SP/2025**

SUBJECT: GI509R1 DIGITAL SATELLITE IMAGE PROCESSING

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.
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Q.1(a)	An area comprises paddy crop fields of different sizes with varying stages of their growth. Describe the role of different types of image resolution in mapping the crop fields and determining the varying stages of growth of paddy crops on satellite images.	[6] 1	5
Q.1(b)	Describe tangential scale distortion with the help of a suitable diagram.	[4] 2	3
Q.2(a)	Describe any linear radiometric enhancement technique with proper example.	[4] 3	2
Q.2(b)	Spatial enhancement technique is applied on Sentinel-2 image containing square urban patch (separated in many equal parts with road having a width of 1pixel including the outer boundary) to highlight the linear features. Identify the technique and find out the total number of pixels in highlighted single pixel outer boundary if the spatial extent of the urban patch is 4Km ² .	[6] 3	4
Q.3(a)	Describe band ratioing and its advantages and disadvantages with the help of suitable diagram(s).	[5] 3	4
Q.3(b)	Describe Change Vector Analysis (CVA) with the help of a suitable example and diagram.	[5] 3	5
Q.4(a)	Describe k-means and ISODATA unsupervised clustering techniques.	[6] 4	3
Q.4(b)	Write the minimum number of spectral bands required to perform Parallelepiped and Maximum Likelihood Classifiers, respectively. Give suitable justifications.	[4] 4	5
Q.5(a)	Differentiate optical and microwave sensors.	[5] 5	3
Q.5(b)	Draw spectral response curves for healthy vegetation using multispectral and hyperspectral sensors.	[2] 5	3
Q.5(c)	Give an example of one airborne and one spaceborne hyperspectral sensor with specific characteristics.	[3] 5	2

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