


Name:			
Enrolment No:			
<b>UPES</b> <b>End Semester Examination, May 2023</b>			
<b>Course: Remote Sensing &amp; GIS</b> <b>Semester: VI</b> <b>Program: B.Sc Geology (Hons.)</b> <b>Course Code: PEGS 3034</b> <b>Instructions: Answer ANY TWO questions in Section C</b>		<b>Time : 03 hrs.</b> <b>Max. Marks: 100</b>	
<b>SECTION A</b> <b>(5Qx4M=20Marks)</b>			
S. No.		Marks	CO
Q 1	a) Which part of the spectrum is maximally reflected /scattered by green vegetation?	2	CO3
	b) What does an Image histogram represent?	2	CO3
Q 2	The color of turbid water appears brownish red in an optical satellite image while clear water appears dark-bluish. Explain why this is so in terms of spectral reflectance curve.	4	CO3
Q 3	Evaluate the advantage of displaying various wavelength ranges or channels, in combination as color images as opposed to examining each of the images individually?	4	CO3
Q 4	Explain the following terms: 1) AND & OR binary operator 2) Proximity Analysis	4	CO2
Q 5	Differentiate between a large-scale map and a small-scale map with examples? Out of the two what scale would you prefer for urban planning?	4	CO1
<b>SECTION B</b> <b>(4Qx10M= 40 Marks)</b>			
Q 6	a) Explain NDVI and enumerate the key information derived from it.	4	CO4
	b) Describe what type of resolution is this and what particular character is the sensor measuring in each case? i) Resolution of Thematic Mapper sensor on Landsat 7 is 30m ii) Resolution of Landsat Thematic Mapper is 16 days. iii) Resolution of Landsat Thematic Mapper is 8 bits.	2 X 3 =6	CO3
Q 7	Define the process of raster data resampling and describe the different methods employed for resampling? OR List and explain the major analytical tools for surface analysis in GIS.	10	CO2

Q 8	Explain the advantages and disadvantages of raster data and vector data?	10	CO1																																																																						
Q 9	Describe the full path of remote sensing data acquisition and data processing along with the interactions between EMR and atmosphere, if using the Sun as energy source for satellite-based remote sensing. Draw relevant diagram.	10	CO3																																																																						
<b>SECTION-C (Answer ANY TWO questions) (2Qx20M=40 Marks)</b>																																																																									
Q 10	<p>a) Delhi Municipal Corporation wishes to identify areas suitable for a waste disposal site and to notify all residents within two kilometers of the selected sites, by ordinary letter post that they are close to a selected site.</p> <p>The criteria for selection are:</p> <ol style="list-style-type: none"> <li>i. An impervious rock type underlying a site,</li> <li>ii. A slope over a site of less than five degrees,</li> <li>iii. No permanent water body (stream or lake) within a site,</li> <li>iv. Road access not more than 500 meters away from a site,</li> <li>v. A site to be not more than 10 kilometers from the city boundary.</li> </ol> <p>ANSWER the following questions to create a GIS for the scenario, and draw a <u>flowchart</u> depicting your methodology.</p> <ol style="list-style-type: none"> <li>i) What map layers would you create?</li> <li>ii) Which attributes would you put into data tables?</li> <li>iii) Which analysis technique would you use to find areas 'within two kilometers of', 'not more than 500 meters from' and 'not more than 10 kilometers from'?</li> </ol>	10	CO1																																																																						
	b) Comment on the usage of Raster Map Algebra and summarize the different Boolean operators used in Raster algebra by giving practical application example of each.	10																																																																							
Q 11	<p>a) Given below is a Contingency table for different classes.</p> <ol style="list-style-type: none"> <li>i. Calculate the Producers Accuracy for Forest.</li> <li>ii. Calculate the User's Accuracy for Corn.</li> <li>iii. Calculate the Overall Accuracy.</li> </ol> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Classified Data</th> <th colspan="6">Reference Data</th> <th rowspan="2">Row Total</th> </tr> <tr> <th>Water</th> <th>Sand</th> <th>Forest</th> <th>Urban</th> <th>Corn</th> <th>Hay</th> </tr> </thead> <tbody> <tr> <td>Water</td> <td>480</td> <td>0</td> <td>5</td> <td>0</td> <td>0</td> <td>0</td> <td>485</td> </tr> <tr> <td>Sand</td> <td>0</td> <td>52</td> <td>0</td> <td>20</td> <td>0</td> <td>0</td> <td>72</td> </tr> <tr> <td>Forest</td> <td>0</td> <td>0</td> <td>313</td> <td>40</td> <td>0</td> <td>0</td> <td>353</td> </tr> <tr> <td>Urban</td> <td>0</td> <td>16</td> <td>0</td> <td>126</td> <td>0</td> <td>0</td> <td>142</td> </tr> <tr> <td>Corn</td> <td>0</td> <td>0</td> <td>0</td> <td>38</td> <td>342</td> <td>79</td> <td>459</td> </tr> <tr> <td>Hay</td> <td>0</td> <td>0</td> <td>38</td> <td>24</td> <td>60</td> <td>359</td> <td>481</td> </tr> <tr> <td>Col Total</td> <td>480</td> <td>68</td> <td>356</td> <td>248</td> <td>402</td> <td>438</td> <td>1992</td> </tr> </tbody> </table>	Classified Data	Reference Data						Row Total	Water	Sand	Forest	Urban	Corn	Hay	Water	480	0	5	0	0	0	485	Sand	0	52	0	20	0	0	72	Forest	0	0	313	40	0	0	353	Urban	0	16	0	126	0	0	142	Corn	0	0	0	38	342	79	459	Hay	0	0	38	24	60	359	481	Col Total	480	68	356	248	402	438	1992	10	CO4
Classified Data	Reference Data						Row Total																																																																		
	Water	Sand	Forest	Urban	Corn	Hay																																																																			
Water	480	0	5	0	0	0	485																																																																		
Sand	0	52	0	20	0	0	72																																																																		
Forest	0	0	313	40	0	0	353																																																																		
Urban	0	16	0	126	0	0	142																																																																		
Corn	0	0	0	38	342	79	459																																																																		
Hay	0	0	38	24	60	359	481																																																																		
Col Total	480	68	356	248	402	438	1992																																																																		
	b) List and explain the causes of radiometric and geometric distortions in satellite imagery.	10																																																																							

Q 12	a) Define spatial filtering and describe the image convolution process with suitable diagrams.	10	CO4
	b) Differentiate between supervised and unsupervised classification by summarizing the classification steps using a flow diagram.	10	