

KATHMANDU UNIVERSITY
End Semester Examination [C]
July, 2017

Marks scored:

Level : B. E.
Year : IV

Course : GEOM 402
Semester : I

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date : JUL 06 2017

SECTION "A"
[20 Q. × 0.5 = 10 marks]

Multiple choice question. Tick the most appropriate answer.

1. A scattering mechanism indifferent to particle size and spectral wavelength is known as
 - a. Rayleigh
 - b. Mie scattering
 - c. Non-selective scattering
 - d. Absorption of all the radiation by shadows
2. A pushbroom scanning system
 - a. Scans earth in direction perpendicular to the view angle
 - b. Scans earth in direction parallel to the to the view angle
 - c. Scans earth in parallel direction to the scan angle
 - d. Scans earth in perpendicular direction to the scan angle
3. Multispectral ratios is a transformation approach which changes image in the
 - a. Spectral domain of image
 - b. Both the spatial and spectral domain
 - c. Works on sensors radiometric range
 - d. Spatial domain
4. Linear contrast enhancement is affected largely by
 - a. Presence of mixed pixel values
 - b. Presence on random noise
 - c. Presence of atmospheric scattering
 - d. Presence of sensor error
5. Saturation contrast enhancement technique relies primarily on
 - a. User interest on feature enhancement
 - b. The most frequent image DN values
 - c. Minimum and Maximum values
 - d. Does not has any implication
6. A morphological filters can be used in one of the following
 - a. Reduce the salt and pepper effect in supervised classification
 - b. Reduce the effect of radiance in images
 - c. Increase the area of feature represented
 - d. To isolates periodic noise
7. A minimum distance classifier uses
 - a. Minimum ground distance
 - b. Minimum image distance
 - c. Least standard deviation to assign class
 - d. Minimum feature space distance
8. Landsat MSS has higher cross-track sampling rate in order to
 - a. Avoid overlapping GIFOVs
 - b. Decrease signal to noise ratio
 - c. Increase the data quality to some aspect
 - d. Reduce the object size
9. Dark object subtraction method removes noise from the image based on
 - a. The value of the darkest object
 - b. Smallest value of individual bands
 - c. Smallest value of NIR band
 - d. Smallest value of all bands

10. Automatic technique for destriping uses
 - a. High pass filter and threshold to isolate noise spectrum
 - b. Low pass filter to isolate noise spectrum
 - c. Band pass filter
 - d. Low pass filter followed by high pass filter
11. A sample scene phase is a condition,
 - a. Where the contrast between the feature and surrounding is high
 - b. When the GIFOV is similar than the object size
 - c. When the relative position target pixel and object makes difference in feature representation
 - d. The position of pixels does not matter much in feature representation
12. Which morphological filter consist of a local minimum filter
 - a. Opening
 - b. Closing
 - c. high boost
 - d. high pass
13. Surface roughness in radar sensing system is
 - a. Speckles that are inherent to radar systems
 - b. Terrain property that most strongly influences the strength of the radar backscatter
 - c. Radar property that changes with change in system characteristics
 - d. Geometric distortions that are present in radar images
14. Radar backscatter coefficient depends on
 - a. Surface roughness
 - b. Moisture content
 - c. Frequency of waveform
 - d. All of above
15. When the surface micro-relief is larger than the wavelength of radar system, the backscatter is
 - a. Specular-no return
 - b. Diffuse return-strong return
 - c. Diffuse return-moderate return
 - d. Specular-strong return
16. Pattern recognition principle used by classification algorithms is true, when
 - a. Spectral pattern variation in different wavelength is used
 - b. Spatial and spectral pattern present in the image is used
 - c. Spatial pattern variation recognition in various time is used
 - d. Both the approach described in b and c
17. A mixed pixel is a condition where,
 - a. Pixel disintegrates energy from the surface features
 - b. Pixel are independent unit and can be used for a single or multiple feature
 - c. Energy from earth feature in a pixel is integrated when it covers two features
 - d. Mixed pixel happens only in coarse spatial resolution sensors
18. A map with kappa statistics of 0.9 shows that
 - a. The map agrees by 90% with the field data
 - b. The map is accurate enough for design of hydropower plant
 - c. The map is 90% better than chance
 - d. It cannot be used to infer about the agreement
19. Increasing the window size in high pass filter
 - a. Increases sharpness of image
 - b. Decreases smoothness of image
 - c. Decreases sharpness of image
 - d. Increases smoothness of image
20. A pixel contains data in the following dimension
 - a. Spatial and spectral
 - b. Spectral pattern variation in different wavelength
 - c. Spatial, spectral, temporal and radiometric
 - d. Temporal

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Time : 2 hrs. 30 mins.

Course : GEOM 402
Semester : I
F. M. : 40

SECTION "B"
[8Q × 5 = 40 marks]

Attempt *ANY EIGHT* questions.

1. Differentiate object based versus pixel based approach of image classification. Describe steps in object based classification. [2+3]
2. What is point spread function? Describe the role of PSF in determining GIFOV. What happens while increasing ground sampling interval (GSI) or ground instantaneous field of view (GIFOV)? [1+2+2]
3. What is black body radiation? How does blackbody radiation laws govern remote sensing principle, discuss. [2+3]
4. Derive equation describing total at-sensor radiance for solar reflective region of electromagnetic spectrum with contribution from different components. [5]
5. What do you understand by Lambertian surface? Discuss atmospheric scattering process and its effect in remote sensing. How empirical approach corrects the effect of atmosphere from images? [1+2+2]
6. Discuss the importance of correction and calibration of remote sensing images. Discuss noise types and its reduction approaches. [2+3]
7. What is surface roughness in RADAR imaging system? Discuss on radar image distortions. [2+3]
8. Why is image transformation necessary in remote sensing? Explain. [5]
9. Write short notes (*ANY TWO*) [2.5+2.5]
 - a. Histogram matching
 - b. Range resolution
 - c. Multi-sensor formation flying
 - d. Sampling and quantization

