KATHMANDU UNIVERSITY
End Semester Examination
February/March, 2018

Marks Scored:

Level : B.E.
Year : IV

Course : GEOM 402
Semester: I

Exam.Roll No:

Time: 30 mins

F.M. : 10

Registration No.:

Date : MAR 0 4 2018

SECTION "A"
[20 Q.×0.5=10 marks]

Multiple Choice Question (Tick the most appropriate answer)

1. The smallest difference in energy that can be measured by the sensor is called
   a. dynamic range
   b. spectral resolution
   c. radiometric resolution
   d. spectral sensitivity

2. What is the main component which contribute to optical depth?
   a. Water vapor absorption
   b. Molecular scattering
   c. Aerosol scattering
   d. CO2 absorption

3. What part of spectral regions are windows for terrestrial research?
   a. 0.8-0.9 μm b. 1000-1100 nm c. Visible region d. 1900 nm

4. What contrast enhancement method is suitable for multi-date comparison?
   a. Histogram equalization
   b. Contrast Enhancement
   c. Empirical line approach
   d. Histogram Matching

5. For DOS, what surface can be treated as a dark object
   a. Green vegetation b. Ice c. Brown vegetation d. clean water

6. Context in visual image interpretation helps in
   a. Image enhancement
   b. Visualize object extraction
   c. Detail reduction and object identification
   d. Error correction procedures

7. In the Lambertian world, for the same plant, greenness measured from different angles are
   a. constant
   b. Is unpredictable
   c. varies with angle
   d. All of above

8. A remote sensing sensor with higher GSI than GIFOV will have
   a. Equal GIFOV to GSI
   b. Overlapping GIFOV's
   c. Data loss for such system
   d. Gap in subsequent GIFOV's

9. Select the most correct answer from the following statement
   a. A sensor with narrow spectral band has higher radiometric resolution
   b. A bigger pixel size results in higher spatial resolution
   c. A sensor with wider spectral bands has higher spatial resolution
   d. The revisit time is not equal to the repeat cycle

10. Which of the following is true in image enhancement
    a. The effect of applying an average filter is that the resulting image looks smoother
    b. Stretching images of different years with histogram equalization results in images that are easy to compare for change detection
    c. High pass filter provides the mean value of the kernel
    d. Image enhancement is qualitative

11. A high boost filter
    a. Reinforces the low-frequency components of the original image
    b. Reinforces the mean-frequency components of the original image
    c. Reinforces the high-frequency components of the original image
    d. Both statements a and b is true

12. Pattern recognition principle used by computer algorithms is true in one of the following
    a. Uses spatial and spectral pattern present in the image
    b. Uses spectral pattern variation in different wavelength
    c. Uses spatial pattern variation recognition in various time
    d. Both the approach described in b and c

13. In relative classification approach class centers are determined from
    a. GPS data signals
    b. Samples from the images
    c. Spectral libraries from field
    d. Class center note required

14. The irradiance at the surface is maximum when the
    a. surface if perpendicular to the incident angle
    b. surface is horizontal to the incident angle
    c. incident angle is least
    d. reflectance is greater than incident energy

15. Histogram contains
    a. Spatial information of each image pixels
    b. Number of landcover classes in image
    c. Spatial variation of each pixels
    d. Distribution of pixels at each DN

16. Weight in the Tasseled Cap Transformation matrix
    a. Are fixed for given sensor and independent of scene
    b. Are fixed for a given sensor and scene dependent
    c. Are fixed for given sensor and vegetation
    d. Vary within sensor and is dependent on scene

17. A classification approach that results in unclassified class is
    a. Minimum distance
    b. Random forest
    c. Maximum likelihood
    d. Parallelepiped

18. A process known as opening in morphological filtering can be achieved by operating
    a. Dilation followed by erosion
    b. Erosion followed by erosion
    c. Erosion followed by dilation
    d. Only dilation

19. Which of the following factor is most important in size of segmentation
    a. Scale of segmentation
    b. Contextual information
    c. weight of colour and shape
    d. Thematic information

20. Mixed pixels in image occurs due to
    a. More than one pixel representing a feature
    b. More than one feature present in a pixel
    c. Mixing of spectral and spatial information
    d. Spectral, Spatial, Contextual and Thematic information mixing

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SECTION B

Attempt any *EIGHT* questions.

1. Explain spatial, spectral and temporal characteristics of a sensor. Describe the tradeoff between the above mentioned characteristics. What is the limitation of delineating tree canopy area from a hyper-spatial image? [3+2]

2. Remote sensors measure the radiance of a ground target. Define the term radiance and explain why remote measurements of radiance only partially capture ground reflectance characteristics. [5]

3. What are atmospheric windows and why are they important to remote sensing? Explain the term "signal-to-noise ratio" and explain why it is important. Explain method to destrip the stripping error present in image. [1+2+2]

4. Explain the limitation of confusion matrix in accuracy assessment. Explain user accuracy, and producer accuracy. Is it possible for a classification to have a high producer accuracy but a low user accuracy and vice versa? Explain your answer [2+1+2]

5. What is contrast enhancement? What are the advantage of histogram equalization contrast enhancement over simple contrast stretch? [2+3]

6. Explain the sampling characteristics needed in supervised classification. Why isn't classification 100% accurate? [2+3]

7. Explain the necessity of object based classification. Describe different approach of image segmentation. [2+3]

8. Image filtering (please compute the values of gray pixels only) [5]
   a. What are the gray pixel values after applying a 3 x 1 low pass filter
   b. What are the gray pixel values after applying a 3 x 1 high pass filter
   c. What are the gray pixel values after applying a 3 x 1 maximum filter
   d. What are the gray pixel values after applying a 3 x 1 minimum filter
   e. What are the gray pixel values after applying a 3 x 1 median filter

12	3	15	33
15	21	12	9
18	15	9	21
15	21	0	15

9. Write short notes –attempt any *TWO* [2.5+2.5]
   a. Azimuth resolution
   b. Object based classification
   c. Range resolution
   d. Radiometric correction