

KATHMANDU UNIVERSITY
End Semester Examination
February/March, 2019

Marks Scored:

Level : B.E.

Year : III

Exam Roll No. :

Registration No. :

Time : 30 mins.

Course : CIEG 302

Semester : I

F. M. : 10

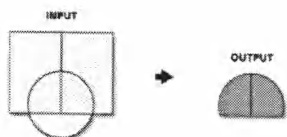
Date FEB 22 2019

SECTION "A"

[20 Q × 0.5 = 10 marks]

Multiple choice questions.

1. The first aerial photograph was taken in
 - a. 1826, from a kite
 - b. 1858, from a balloon
 - c. 1903, from the Wright Brothers glider
 - d. 1914, from a German plane in WWI
2. Which of the following is not a type of image resolution that is very important in image analysis?
 - a. spectral
 - b. spatial
 - c. energy
 - d. temporal
3. For interpolation of satellite data used for monitoring dynamic changes that occur on the earth surface, the most suitable orbit for the satellite is:
 - a. Sun-synchronous orbit
 - b. Elliptical orbit
 - c. Near polar orbit
 - d. Circular orbit
4. Remote Sensing process is based on
 - a. convection
 - b. conduction
 - c. reflection of light
 - d. radiation
5. Pick up the incorrect statement from the following:
 - a. The three elements of topology are adjacency, containment and connectivity
 - b. Topological characteristics of an object are independent of scale measurement
 - c. Topology describes the geometric characteristics of objects which do not change under transformations and are independent of any coordinate systems
 - d. Topological characteristics of an object are dependent of scale measurement
6. Gamma rays have greatest similarity with
 - a. α -rays
 - b. γ -rays
 - c. X-rays
 - d. UV rays
7. The arrangement of terrain features which provides attributes: the shape, size and texture of objects is called
 - a. Spectral variation
 - b. Spatial variation
 - c. Temporal variation
 - d. Temporal and spatial variation
8. Which of the following is false?
 - a. 'Fields' are geographic phenomena that occur everywhere in study area.
 - b. 'Objects' are geographic phenomena that occur 'densely' in study area.
 - c. Fields can be continuous or discrete.
 - d. Objects can be classified based on location, shape, size and orientation.
9. The instruments which provide electromagnetic radiation of specified wavelength of a band of wavelengths to illuminate the earth surface, are called
 - a. sensors
 - b. active sensors
 - c. passive sensors
 - d. DEM

10. A sensor's ability to determine fine differences in a band of energy measurements is a sensor's
- Spectral resolution
 - Spatial resolution
 - Radiometric resolution
 - Temporal resolution
11. A sensor that will be measuring only one wide band of wavelength is which type of sensor?
- Panchromatic sensor
 - Multispectral sensor
 - Hyperspectral sensor
 - Radiometric sensor
12. Environmental GIS describes the use of
- Data on atmospheric absorption of radiation
 - Electromagnetic energy in very specific regions
 - Location based data management tools to assist in the decision making processes
 - Electromagnetic energy in wide regions
13. Spatial relationship can best be defined as
- Associations of technology and exploration on geography.
 - The relationship between things that are far apart
 - Recurring patterns of things in connection with other things
 - The relationship between things in one specific area
14. Pick up the incorrect statement from the following:
- Point features have no spatial dimension
 - Point features have real shape
 - Point features can be used to model features such as wall, buildings, etc.
 - Other name for points are vertices, nodes, 0 cell
15. Remote Sensing includes gathering of
- image
 - changes
 - movements
 - sounds
16. Deforestation is occurring in many countries and it is therefore difficult to detect the ongoing damage. Which of the following types of remote sensing would be best suited for locating deforestation?
- Thermal infrared
 - Colour infrared
 - microwave
 - gamma rays
17. The entire range of electromagnetic spectrum spans a large spectrum of wavelengths varying from
- 10^{-10} to 10^6
 - 10^{-8} to 10^6
 - 10^{-10} to 10^{10}
 - 10^{-8} to 10^8
18. Name the overlay operation shown in the figure below:
- Intersection
 - Merge
 - Mask
 - Clip
- 
19. Which of the following helps to identify the objects on the earth surface?
- Atmospheric window
 - Signature
 - Radiometric error
 - Temporal resolution
20. Pick up the correct statement from the following
- An increase of phytoplankton increases the backscattering in the green region
 - An increase of phytoplankton decreases the backscattering in the green region
 - Phytoplankton contains photo synthetically active pigment
 - An increase of phytoplankton absorbs the blue region rapidly

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Time : 2 hrs. 30 mins.

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F. M. : 40

SECTION "B"

Attempt *ALL* questions.

1. a. Describe how the effects of atmospheric scattering on remote sensing data can be accounted for. [3]
b. Briefly outline the pre-processing stages of radiometric calibration and geometric correction that are typically applied to remotely sensed data in converting from raw DN to at-sensor radiance. [3]
c. Explain role of remote sensing to monitor land use changes. [3]
2. a. What are your strategies for selecting train data for supervised land cover classification? Explain. [2]
b. Name the two data structures in GIS that have the capacity to hold Spatial data Explain the main components of GIS? [1+3]
c. All photographs are images but not all images are photographs. Justify it. Suppose a raster image of map of Nepal is to be used in one of the hydropower project. How will we be able to use this map? [2+2]
3. a. The greyscale image is given in the matrix form. Each element is a pixel of an image and values of elements represent intensities of pixels. The intensity of pixel varies between 1 to 8. Perform the histogram equalization on this image and scale the intensity to 1 to 10. [3]

$$\begin{bmatrix} 7 & 7 & 5 & 4 \\ 6 & 5 & 3 & 1 \\ 5 & 4 & 4 & 3 \\ 4 & 3 & 2 & 1 \end{bmatrix}$$

- b. Describe different types of coordinate system. In case of Nepal we have special type of coordinate system. Explain. [3+2]
- c. Write about the history of Remote Sensing. [3]
4. a. What is geostationary orbit and what is the typical height of geostationary satellite? What does it mean that a satellite has a sun-synchronous orbit? [4]
b. Explain interactions between EMR and atmosphere and what are the main reasons for various colors of the sky and clouds? [3]
c. The traditional way to delineate the watershed is by using the topo map. As a GIS expert, how will you replace this tradition and how will you perform it? Explain step by step. [3]

