KATHMANDU UNIVERSITY
End Semester Examination
February/March, 2018

Marks Scored:

Level : B.E.
Year : III
Course : CIEG 302
Semester: I

Exam Roll No.: Time: 30 mins. F.M. : 10

Registration No.: Date : MAR 1 8 2018

SECTION "A"
[20 Q.×0.5=10 marks]

Select the most appropriate answer.

1. The instruments which provide electromagnetic radiation of specified wavelength or a band of wavelengths to illuminate the earth surface, are called:
   a. Passive sensors b. Active sensors c. Sensors d. Flash gun

2. Landsat program began in
   a. 1972 b. 2003 c. 1973 d. 1937

3. The part of radiation due to scattered/diffused radiation entering the field of view of a remote sensor other than that from the required target,
   a. Reduces the contrast but increases the sharpness
   b. Increases the contrast of the image but reduces the sharpness
   c. Increases both the contrast and sharpness
   d. Reduces the contrast but increases the sharpness.

4. 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

5. Pick up the incorrect statement from the followings:
   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. The altitude distance of geostationary satellite from the earth is about:
   a. 30,000 km b. 44,000 km c. 36,000 km d. 26,000 km

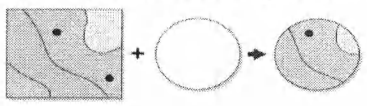
7. For interpolation of satellite data used for monitoring dynamic changes that occur on the earth surface, the most suitable orbit for the satellite is:
   a. Sun-synchronous orbit b. Elliptical orbit
   c. Near polar orbit d. Circular orbit

8. TIN stands for
   a. Traffic Internet Network
   b. Triangulated Irregular Network
   c. Temporal Interest Network
   d. Temperature Interface Node

9. Pick up the correct statement from the following
   a. An increase of phytoplankton increases the backscattering in the green region
   b. An increase of phytoplankton decreases the backscattering in the green region
   c. Phytoplankton contains photo synthetically active pigment
   d. An increase of phytoplankton absorbs the blue region rapidly

10. The differences of a certain tone throughout an aerial image refers to
    a. Pattern b. Size c. Association d. Texture

11. Name the overlay operation shown in the figure below:



    a. Buffer b. Merge c. Mask d. Clip

12. 11 – bit sensors can measure how many levels?
    a. 11 b. 121 c. 256 d. 2048

13. Spatial relationship can best be defined as
    a. Associations of technology and exploration on geography.
    b. The relationship between things that are far apart
    c. Recurring patterns of things in connection with other things
    d. The relationship between things in one specific area

14. Which is the first fundamental step in image processing?
    a. filtration
    b. image acquisition
    c. image enhancement
    d. image restoration

15. Middle infra-red light is used in
    a. Vegetation discrimination
    b. Water penetration
    c. Mineral mapping
    d. Soil moisture

16. Pick up the incorrect statement from the followings:
    a. Point features have no spatial dimension
    b. Point features have real shape
    c. Point features can be used to modal features such as wall, buildings, etc.
    d. Other name for points are vertices, nodes, 0 cell

17. A sensor that will be measuring only one wide band of wavelength is which type of sensor?
    a. Panchromatic sensor
    b. Multispectral sensor
    c. Hyperspectral sensor
    d. Radiometric sensor

18. A geostationary satellite
    a. Completes an orbit around the earth every 12 hours.
    b. Rotates at the same speed as the earth
    c. Takes 16 days to complete its orbital path.
    d. Takes exactly two days to complete a single orbit.

19. A sensor's ability to determine fine differences in a band of energy measurements is a sensor's
    a. Spectral resolution
    b. Spatial resolution
    c. Radiometric resolution
    d. Temporal resolution

20. The key of interpretation which gives an idea of the profile and relative height of an object :
    a. Shape
    b. tone
    c. pattern
    d. shadow

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SECTION "B"

Attempt ***ALL*** questions

1. Define Spectral Reflectance Curve. The figure below shows the forest area having coniferous and deciduous trees. How will you differentiate between two trees? Explain. [3+2]

2. What is DEM and how many types of DEM's are available? The DEM of Eastern Nepal is shown in the figure below. As a Civil Engineer, you are required to find the catchment area from DEM. Explain how will you perform this operation defining different overlay as well. [2+3]

3. What is histogram equalization? 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 20. [2+3]

$$\begin{bmatrix} 2 & 3 & 4 & 6 & 7 & 8 \\ 1 & 8 & 5 & 4 & 2 & 3 \\ 2 & 3 & 7 & 6 & 8 & 5 \\ 5 & 6 & 8 & 4 & 2 & 1 \\ 5 & 6 & 5 & 2 & 3 & 7 \\ 1 & 8 & 4 & 4 & 1 & 2 \end{bmatrix}$$

4. What do you understand by Raster and Vector data? Compare it. Explain different vector data formats. [3+2]

5. Define digital image processing. Also differentiate between Visual and Digital interpretation procedure. Explain analog to digital signal conversion process. [2+3]

6. All photographs are images but not all images are photographs. Justify it. Explain two different approaches of scanning. [2+3]

7. What is electromagnetic radiation? Support your answer with Electromagnetic Spectrum with neat sketch. [2.5+2.5]

8. Write short notes on any *TWO*. [2×2.5=5]
   a. Geographic Coordinate System
   b. Visual image interpretation
   c. Atmospheric Window
   d. Minimum-Maximum stretch.