

Total No. of printed pages = 4

MCA 18250 E 41

Roll No. of candidate

--	--	--	--	--	--	--	--	--	--	--

14/11/2021

M.C.A. 5th Semester End-Term Examination

Elective - IV REMOTE SENSING AND GIS

(New Regulation & New Syllabus (w.e.f 2018-19))

Full Marks - 70

Time - Three hours

The figures in the margin indicate full marks
for the questions.

Answer question No. 1 and any *four* from the rest.

1. Write the correct answer:

(10 × 1 = 10)

- (i) The instruments which provide electromagnetic radiation of specified wave length or a band of wave lengths to illuminate the earth surface are called
- (a) Passive sensors
 - (b) Active Sensors
 - (c) Scanner
 - (d) None of these
- (ii) In remote sensing recording of energy is done by the
- (a) Sensor
 - (b) Sun
 - (c) Earth
 - (d) Satellite
- (iii) GIS, Remote Sensing and GPS technologies are:
- (a) Manual, spatial and digital
 - (b) Analogue, manual and spatial
 - (c) Generic, digital and spatial
 - (d) Generic, analogue and spatial

[Turn over

- (iv) Which one of the following helps to identify the objects on the earth surface?
- (a) Atmospheric window
 - (b) Signature
 - (c) Radiometric error
 - (d) None of these
- (v) The basic requirement of any sensor system, is:
- (a) Radiometric resolution
 - (b) Spatial resolution
 - (c) Spectral resolution
 - (d) Temporal resolution
 - (e) All of these
- (vi) Which type of orbit is used by near-polar orbiting remote sensing satellites?
- (a) Circular orbit
 - (b) Sun-synchronous orbit
 - (c) Geo-synchronous
 - (d) Geostationary
- (vii) By itself, the term "digital image" usually refers to:
- (a) Vector image
 - (b) Triangulated irregular network image
 - (c) Faster image
 - (d) Raster image
- (viii) RADAR system is an example of:
- (a) Passive remote sensor
 - (b) Active remote sensor
 - (c) Thermal sensor
 - (d) None of Above
- (ix) Which among the following is true
- (a) Raster data represents discrete data
 - (b) Vector data require large storage space
 - (c) Raster data has a simple data structure
 - (d) Vector data represents continuous data

BINA CHOWDHURY CENTRAL LIBRARY
JALM & IPS
APTE HALL, WAPARA,
KOLKATA-700017

(x) Which one of the following relationship between the wave length (λ), and frequency and the speed (C) of the electromagnetic wave is correct?

- (a) $C = v + \lambda$
- (b) $C = \lambda / v$
- (c) $C = v\lambda$
- (d) $C = 1/(v\lambda)$

BINA CHOWDHURY CENTRAL LIBRARY
 (M.T. & TIPS)
 1/11, Halki Bapara,
 Beliawa - 751017

Answer any four questions:

(4 × 15 = 60)

2. (a) Define supervised classification and write the three stages involved in this approach. Draw a flow diagram of data in a supervised classification approach. Discuss the Decision tree classifier strategy for image classification. (5+5+5=15)
- (b) Briefly explain Vector and raster data. Give their advantages and disadvantages. Also differentiate between these two data types. (3+6+6=15)
- (c) What is accuracy assessment of digital image classification? What are the different types of errors occurred during classification?

During accuracy assessment of a classified image a classification error matrix is formed for the evaluation of classification errors with the following data.

		Reference Data					
		Water	Sand	Forest	Urban	Corn	Hay
Classified Data	water	480	0	5	0	0	0
	Sand	0	52	0	20	0	0
	Forest	0	0	313	40	0	0
	Urban	0	16	0	126	0	0
	Corn	0	0	0	38	342	79
	Hay	0	0	38	24	60	359

Determine the commission error, omission error, producer's accuracy, user's accuracy of each class of objects and also overall accuracy of the data.

(2+3+10=15)

- (d) Define azimuth and range resolutions of radar images (both RAR and SAR). A SLAR system has a 5 millirad antenna beam width. Calculate the azimuth resolution of the system at the ranges of 15 km and 20 km. If the system sends pulses at an interval of $0.2 \mu\text{s}$, then what will be the slant-range and ground-range resolutions at a depression angle of 60° ?
(4+6+5=15)
- (e) Derive the equation for determining the orbital period of a satellite. Calculate the orbital period for satellite which is orbiting the earth at an altitude of 917 km from the earth's surface. Consider the earth's radius = 6.38×10^6 m, universal gravitation constant = $6.67 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$, and mass of the earth = 5.98×10^{24} kg.
Calculate the altitude of the orbit of a geostationary satellite.
(5+5+5=15)
- (f) Answer the following (3 × 5 = 15)
- (i) Flow diagram of clustering algorithm for unsupervised classification.
 - (ii) BSQ, BIL and BIP layout of digital products
 - (iii) Database query in GIS.