

**Q1/ Choose the correct answer for the following statements? (3 marks)**

1. In which band combination the land/water interface is very clear. Good for soil and vegetation study.  
(A) (4,5,3) (B) (7,5,4) (C) (5,4,1)
2. Which band of Landsat ETM+ is used for computing temperature?  
(A) band 3 (B) band 6 (C) band 4
3. It is a type of aerial photo which shows the surface, the horizon and a portion of sky  
(A) Low oblique (B) Vertical (C) High oblique
4. Which band ratio uniquely defines the distinguishing different types of vegetation?  
(A) (5/7) (B) (4/3) (C) (3/4)
5. In which wavelength range vegetation has maximum spectral reflectance  
(A) Blue (B) Green (C) near Infrared
6. Spectral reflectance of soil increase when grain size of the soil is  
(A) Fine (B) Course (C) not related to the grain size
7. At least how much side overlapping requires to use stereo-pairs in 3D  
(A) 25 (B) 60 (C) 40
8. The "Nature-like" band combination. Sand, soil and minerals show in multitude of colour. Fires would appear in Red. (A) (4,5,3) (B) (7,4,2) (C) (5,4,1)
9. Which band ratio enhanced turbid water, but could not enhance the clear water.  
(A) (7/2) (B) (3/5) (C) (7/5)
10. How many pair/s of aerial photographs are required for interpreting features in 3D vision by using stereoscope. (A) 1 (B) 2 (C) 3
11. A band ratio which Enhances the hydrothermal alteration and red iron oxides  
(A) (5/2) (B) (4/2) (C) (3/1)
12. The label on aerial photo represents distance between the film used and lens of camera.  
(A) Fiducal mark (B) Focal length (C) Altimeter

**Q2/ Answer the following questions? (2 marks)**

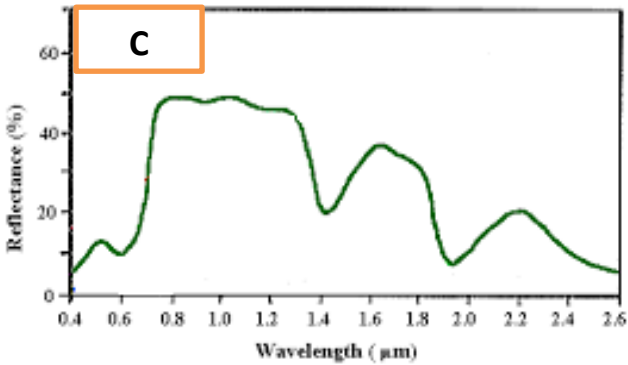
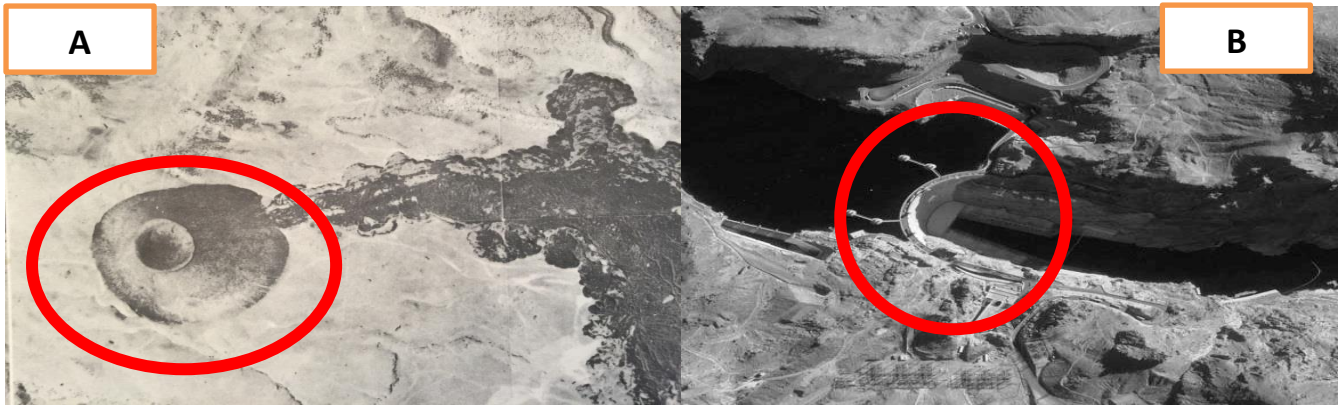
**Q2/A/** ENVI software is the leading, high-performance product for ..... and ..... (0.5 Marks)

**Q2/B/** What are the factors affecting spectral reflectance curve of Soil, only two? (0.5 marks)

1. ....
2. ....

**Q2/C/** Calculate the NDWI for land cover, if it is known that the land cover reflects 10 % in near-infrared band, and reflects 70 % in green band? And give your comment on the results? (1 marks)

Q3/ Answer the following questions? (1marks)



- i. Name the feature that circled in the aerial photograph A, and which element has been used for identifying the feature?
- ii. Name the feature that circled in the aerial photograph B, and which element has been used for identifying the feature?
- iii. Name land cover which represented by the Spectral reflectance curve in graph C.

Q1/Choose the correct answer for the following statements? (30 marks)

1- A band combination which is good for agricultural studies. Healthy vegetation shows in bright green colour.

A. A.(4,5,3) B. (7,5,4) C. (5,4,1)

2. The band ratio which is useful for observing differences in water turbidity.

A. A.(3/7) B. (3/1) C. (5/7)

3. Which band of Landsat ETM+ is used for computing temperature?

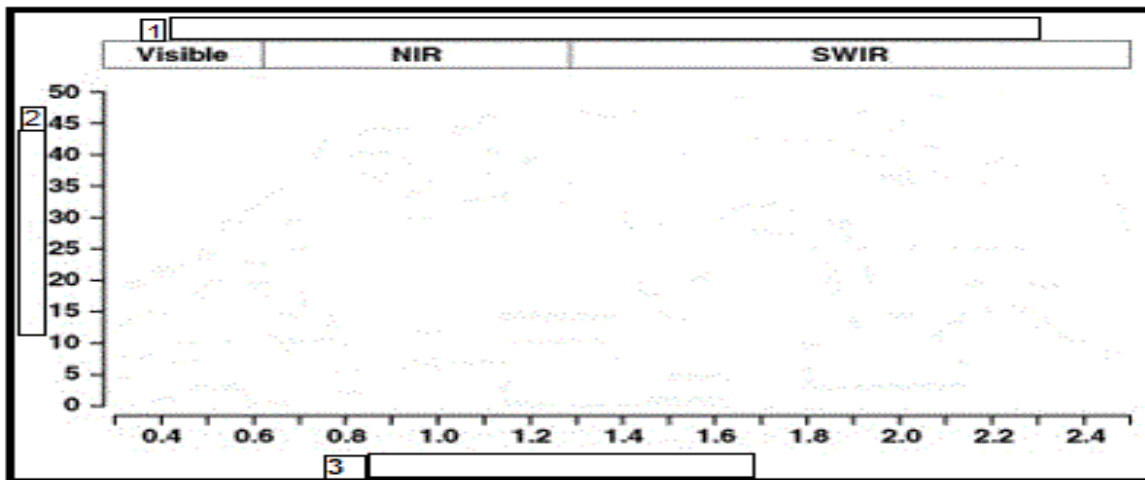
A. A. band 3 B. band 6 C. band 4

(N Note: all band ratios and combinations have been done on landsat7 (ETM+))

Q2/A/ What are the main accuracy problems in GPS? (15 marks)

- 1.
- 2.
- 3.
- 4.
- 5.

Q2/B/ Draw the spectral reflectance curve of Vegetation OR Soil and Fill blanks by name of the curve, Y and X axes? (15 marks)



Q3/ Calculate the NDVI and NDWI for both types of land covers respectively, If it is known that **type A** reflects 6 % in in red band, and reflects 60 % in near- infrared band, while **type B** reflects 10 % in near- infrared band, and ct reflects 70 % in green band? And give your comment on the results? (20 marks)

Q4/ Answer the following questions? (20 marks)



I. Name the feature which is circled in the aerial photograph **A**, and which element has been used for identifying the feature?

Q1/ Choose the correct answer for the following statements? (40 marks)

1. It is a standard "false colour" combination. Vegetation shows in Red.
2. The spectral reflectance of vegetation is the highest in which band.
3. A band ratio which enhances the clay-rich rocks.
4. Digital elevation model (DEM) data from USGS represents by which type of data.
5. At least how much end overlapping requires to using stereo-pairs in 3D.
6. In which band combination, the land/water interface is very clear. Good for soil and vegetation study.
7. River in geological map (scale= 1:50 000) is represented by which type of vector data.
8. A band ratio uniquely defines the distinguishing different types of vegetation.
9. It shows the flight height above the mean sea level.
10. Polygon vector data has how many Pair of coordinates, at least?
11. In which band combination, Rocks may appear in variety of colour. Good for the geological study.
12. Optical remote sensing is an application of which range of wavelength.
13. A band ratio which is useful for identifying water bodies and wetlands.
14. Spectral reflectance of water is higher in ..... Wavelength compare to other.

15. It is a fully image processing software which has been used in practical sessions.
16. 3D impression can be obtained from aerial photos by using .....
17. Oil well in geological map (scale= 1:50 000) is represented by which type of vector data.
18. Turbid water has a ..... reflectance than clear water.
19. Which data describes the location (where)?
20. Soil moisture content (wet soil) has ..... spectral reflectance than dry soil.

(Green, higher, (4/3), Spatial data, Polygon, (5,4,3), Vector, Red, (4,5,3), GIS software, Altimeter, 60%, Focal length, 1, (7/5), Line, (3/7), visible, 25%, lower, (7,4,2), Point, Blue, (3,2,1), visible and NIR, 2 or more, (7,3,1), 3 or more, Near infrared, (3/5), Rater, ENVI software, (4,3,2), Stereoscope (5/2), attribute data, microwave range, NDVI).

**Q2/A/ ENVI software is the leading, high-performance product for ..... and ..... . (5marks)**

**Q2/B/ / land covers such as minerals and rocks can have unique spectral reflectance shape (curve) based on their ..... and ..... . (5 marks)**

**Q2/C/ Calculate the wavelength in centimeters of radar energy at a frequency of 10GHz. (Speed of light is  $3 \times 10^8$  m s<sup>-1</sup>). (15 marks)**

**Q3/B/ If you have a satellite image; the image contains many features. And the elements which are used to recognize or identify each the mentioned features have been given? Match each feature to more suitable element (10 marks)**

No	Features	Sy.	Recognition element
1	It is used for distinguishing <a href="#">120 road from Airport road</a> in Erbil City	A	Pattern
2	<a href="#">Meandering of Greater Zab River</a> can be identified by	B	Size
3	It is used for distinguishing trees from cement in <a href="#">Sami Abdullrahman park</a>	C	Texture
4	<a href="#">Height of Mudhafaria Minaret</a> in Erbil is identified by	D	Shape
5	The element is used for identifying <a href="#">Drainage pattern of Zraraty area</a>	E	Shadow

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