Question 1

State whether right or wrong (make the required correction for the wrong statements)

1- In a raster model the position of each spatial feature is defined by (a series of) x and y coordinates. Besides the location, the meaning of the feature is given by a code (label).
2- An area defined by its boundary line and by its code is called a line. The code of a polygon defines the contents of the line (e.g. Forest, city, sandstone, etc.).
3- Raster data layers are less suitable for overlay operations than vector data layers.
4- Raster layers are more suitable for high quality output than vector maps.
5- One of the disadvantages of the raster model is that spatial data of different types cannot be overlaid without the need for the complex geometric calculations required for overlaying different maps in the raster model.
6- As the resolution of the image in the raster model decrease, the storage space required in the computer decreases.
7- Through georeferencing we calculate the parameters used in the equation to transform between a coordinate system and cell (pixel) location in the image.
8- Band interleaved by line (BIL) raster data structure is less advantageous than Band sequential (BSQ) raster data structure for operations involving the combination of images.
9- A file in a Run-length encoding takes more storage space than the same file in the full raster structure.
10- Owing telephone company and telephone number are considered spatial data for phone booth spatial object.
Choose the right answer

1- (combination, analysis, spatial query, none of these) is one of the activities of a GIS and is the process of inferring meaning from data.

2- (prediction, spatial query, analysis, none of these) is the ability of GIS to merge spatial datasets from quite different sources.

3- Asking this question (where does a certain characteristic occur?) is an example of (prediction, spatial query, analysis, none of these).

4- Combining a number of data layers indicative of landslides is used to (visualize, organize, predict, none of these) the liability of an area to landslides.

5- The logical organization of data according to a scheme is known as (data model, data visualization, data combination, none of these).

6- (hardware, information, software, none of these) can be defined as verifiable facts.

7- (data, information, database management system, none of these) are characterized by both spatial and non-spatial attributes.

8- (data, information, database management system) is a collection of software for storing, editing, and retrieving data in a database.

9- An example of a raster model is (satellite image, paper map).

10- A point is represented in the raster model by (three pixels, two pixels, more than three pixels, none of these).

11- As the resolution of an image in the raster model gets higher the size of the pixel gets (smaller, larger).

12- A satellite image “A” covers a square area of 10 km² by 1000 pixels. Another satellite image “B” covers a square area of 9 km² by 900 pixels. Which image has the higher resolution (A, B, they are the same)?

13- The number of pixels needed to cover a rectangular area “80m * 80m” in the ground with an image of 10m resolution is (16, 8, 32, 64, none of these)

14- If the XY coordinates of the upper left corner (row 1, column 1) of a satellite image with a pixel size of 30m is (1000,1000), then the coordinates of the pixel in the row 4 and column 4 is ([1200,1200], [1090,1090], [1150,1150], [1180,1180])

15- A forest is represented in the vector model as (segment, point, polygon)

16- In the (BSQ, BIL, BIP) as a full raster structure, the values of a single band or attribute are arranged in row order with the second band starts after the first one finishes.

17- In the (BSQ, BIL, BIP) as a full raster structure, each row of pixels is repeated m times where m is the number of bands, before moving to the next row.
18- In the (BSQ, BIL, BIP) as a full raster structure, the band values for each pixel are stored together, so for a 7 band image the first 7 values refer to the first pixel.

19- The straight parts of a line between two consecutive vertices or end nodes are called (vertex, polygon, segments).

20- The two end nodes and zero or more internal nodes or vertices define (a point, a line, a vertex).
Question 3 (5 marks)

For the following image layers, construct the shape of the file for the Band Interleaved by Line (BIL), and Band Interleaved by Pixel (BIP) full raster structures organizations.

<table>
<thead>
<tr>
<th>Landuse</th>
<th>soil</th>
<th>geology</th>
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<tr>
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