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#### MANICALAND STATE UNIVERSITY OF APPLIED SCIENCES

FACULTY OF ENGINEERING, APPLIED SCIENCES AND TECHNOLOGY

**DEPARTMENT: MINING AND MINERAL PROCESSING ENGINEERING**

**MODULE: MINE SURVEY AND GIS**

**CODE: ENGP 222**

### SESSIONAL EXAMINATIONS

**DECEMBER 2023**

**DURATION: 3 HOURS**

**EXAMINER: H. CHIBAYA**

## INSTRUCTIONS

1. *This paper contains two sections and* ***six*** *questions in total.*
2. *Answer any* ***two*** *questions in* ***Section A****.*
3. *Answer any* ***two*** *questions in* ***Section B****.*
4. *Start a new question on a fresh page*
5. *Total marks 100*

***Additional materials:*** *calculator*

***SECTION A***

**QUESTION 1**

1. Describe the differences between vector and raster data [**5]**
2. What is georeferencing? Beriefly describe how maps are georeferenced. [**5]**
3. State and explain the **five** components of a GIS [**15]**

**TOTAL** [**25]**

**QUESTION 2**

1. What is the difference between data and information [**4]**
2. Explain the **five** major functions of a GIS [**10]**
3. Discuss the concept of attribute data in GIS. How is it stored and organized, and how does it relate to spatial data? [**11]**

**TOTAL** [**25]**

**QUESTION 3**

1. Name the **three** and describe key elements of a spatial thematic map [**6]**
2. Discuss how vector data representation can vary according to scale [**9]**
3. Explain the process of digitizing a paper map into a digital format

**[10]**

**TOTAL** [**25]**

***SECTION B***

**QUESTION 4**

1. Discuss the different methods used in underground mine surveying. [**8]**
2. Explain the concept of vertical control in mine surveying and discuss its significance. [**7]**
3. Describe the procedure for conducting an accurate mine survey using total station instruments. [**10]**

**TOTAL** [**25]**

**QUESTION 5**

1. Discuss the types of errors that can occur in mine survey measurements and how they can be minimized. [**7]**
2. What is the purpose of creating mine plans and maps? Explain the key elements that should be included in these documents. [**10]**
3. A tunnel is being excavated in an underground mine. The horizontal distance between two survey points is 200 meters. The vertical difference in elevation between the two points is 75 meters. Calculate the slope distance between the two survey points. [**8]**

**QUESTION 6**

1. Explain the process of setting out an underground tunnel using mine survey techniques. [**10]**
2. A mine surveyor establishes a control point by measuring the horizontal distance from the point to two known reference points. The measurements are as follows: Point A = 250 meters, Point B = 300 meters. Calculate the coordinates (x, y) of the control point using the method of traverse calculation. [**8]**
3. In a triangulation survey, the measured distances between three survey stations are as follows: AB = 100 meters, BC = 85 meters, and AC = 120 meters. Calculate the lengths of the missing sides of the triangle, assuming it is a right-angled triangle discuss the types of errors that can occur in mine survey measurements and how they can be minimized. [**7]**

**END OF EXAMINATION**