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Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2023/2024**

- COURSE NAME : APPLIED GEOMATIC
- COURSE CODE : BFG40703
- PROGRAMME CODE : BFF
- EXAMINATION DATE : JANUARY / FEBRUARY 2024
- DURATION : 3 HOURS
- INSTRUCTIONS :
1. ANSWER ALL QUESTIONS
 2. THIS FINAL EXAMINATION IS CONDUCTED VIA
 - Open book
 - Closed book
 3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK

THIS QUESTION PAPER CONSISTS OF FIVE (5) PAGES

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- Q1**
- (a) The choice of a map projection depends on the specific application, and selected projections that minimize the types of distortion to their purposes. Describe only **THREE (3)** common distortions found in map projection. (6 marks)
 - (b) Briefly explain the following coordinates systems:
 - i. RSO (Rectified Skew Orthomorphic) (2 marks)
 - ii. Cassini-Soldner (2 marks)
 - iii. WGS84 (World Geodetic System 1984) (2 marks)
 - (c) Planar, conical, and cylindrical map projections are three common categories of map projections, each with its own characteristics and best-use scenarios. Demonstrate the type of map projection using suitable diagrams. (3 marks)
 - (d) List **FIVE (5)** locations around the globe along with the types of map projections commonly employed to represent their area. (5 marks)
- Q2**
- (a) Spatial and attribute data are the fundamental data types utilized in Geographic Information Systems (GIS) and other fields associated with geography and data analysis. They serve different purposes and contain distinct information. Discuss the differences between these data. (6 marks)
 - (b) Raster and vector are the primary data models used in Geographic Information Systems (GIS) to represent and store geospatial data. Explain the characteristics, advantages, and disadvantages of the raster data model. (6 marks)
 - (c) Civil engineers are using Geographic Information Systems (GIS) to streamline various aspects of construction projects, improve decision-making, and enhance efficiency. List the key applications of GIS for the following projects in civil engineering:
 - i. Environmental impact assessment:
 - ii. Geotechnical engineering: (3 marks)

- (d) In the Geographic Information Systems (GIS), patterns and relationships are the fundamental concepts to understand and analyze geographic data. Elaborate the conditions based on the **Figure Q2.1**.

(5 marks)

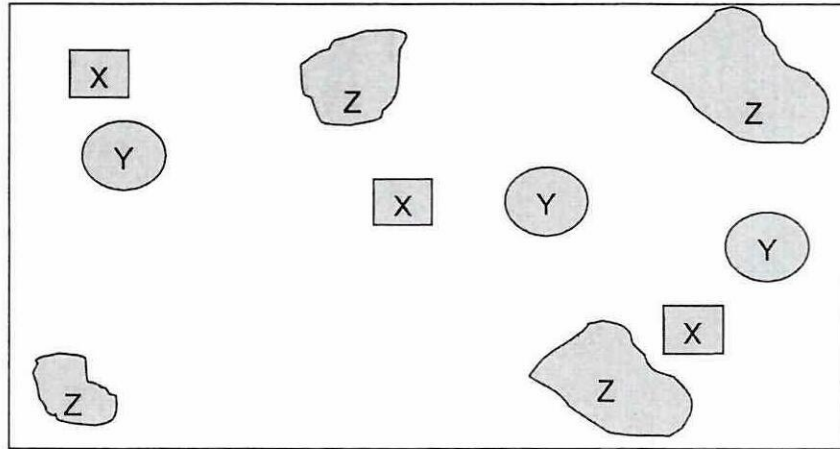


Figure Q2.1 : Patterns and relationships conditions

- Q3** (a) Setting out with curve deflection angle is the one of the methods in surveying specifically those involving curves and offsets. Briefly discuss these methods. (5 marks)
- (b) Based on **Figure Q3.1**, point A1, A2, A3, and A4 are presenting the area for proposed building from architect plan. Point 2 is the control station traverse at the construction area. The coordinates of point 2 (N121.067, E237.097), A1 (N123.060, E246.598), and A2 (N119.713, E248.109) are given. Based on the coordinates, calculate;
- i. bearing and distance from point 2 to point A1 and point A2. (6 marks)
 - ii. distance from point A3 to point A4. (2 marks)
 - iii. area of the building. (2 marks)

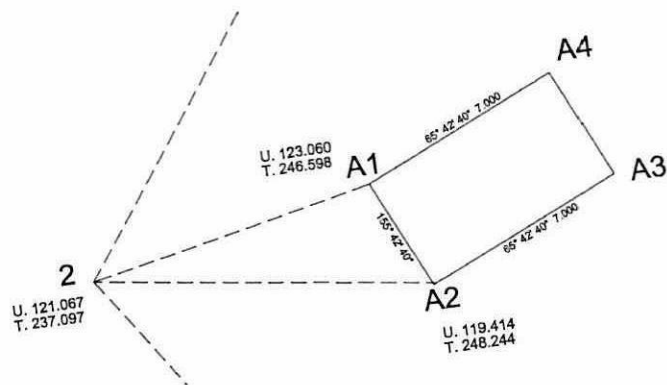


Figure Q3.1 : The setting out building calculation

- (c) In construction, reduction of level's must be transferred during the construction from floor to another floor, particularly when incorporating cast-in situ stairs. Provide a concise explanation of the procedures with appropriate diagrams. (5 marks)

Q4 (a) State the definitions of Unmanned Aerial Vehicles (UAVs), and which fields it is commonly employed?. (4 marks)

- (b) The UAVs are using for mapping and surveying purposes. It comes in various types, and its own capabilities and suitability for different applications. Briefly explain **FOUR (4)** main types of UAVs used for mapping. (8 marks)

(c) The UAVs are equipped with various types of cameras and sensors depending on the specific application and requirements. Briefly explain the following types of cameras and sensors used in UAVs and its applications:

- i. RGB cameras (2 marks)
- ii. Thermal camera (2 marks)
- iii. Multispectral cameras (2 marks)
- iv. LIDAR sensors (2 marks)

- Q5**
- (a) Global Navigation Satellite System (GNSS), which is a system of satellites and ground stations that provide positioning, navigation, and timing information to users worldwide. The most well-known GNSS is the Global Positioning System (GPS), which was developed and is operated by the United States government. List the other **THREE (3)** GNSS systems as well. (3 marks)
- (b) The GNSS is typically divided into three main segments, each of which plays a crucial role in the functioning of the system. Based on the statement, describe for each segment with suitable diagrams for illustration. (9 marks)
- (c) Continuously Operating Reference Stations (CORS) are a network of permanent, ground-based GNSS (Global Navigation Satellite System) receivers and associated infrastructure that provide high-precision positioning and navigation data. CORS are strategically placed at known locations and operate continuously to offer real-time or near-real-time GNSS data and correction information. State **FOUR (4)** primary key features of the CORS. (4 marks)
- (d) Remote sensing plays a crucial role in civil engineering by providing valuable data and information for various applications, from project planning and design to monitoring and maintenance. Briefly explain several applications of remote sensing in civil engineering as details below.
- i. Land used planning and zoning. (2 marks)
 - ii. Slope stability analysis (2 marks)

- END OF QUESTIONS -

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