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Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2021/2022**

COURSE NAME : GEOMATIC ENGINEERING

COURSE CODE : BFC 20703

PROGRAMME CODE : BFF

EXAMINATION DATE : JULY 2022

DURATION : 3 HOURS

INSTRUCTION

1. ANSWERS ALL QUESTIONS
2. THIS FINAL EXAMINATION IS CONDUCTED VIA **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 **SIX (6)** PAGES

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- Q1** (a) Briefly describe **THREE (3)** phases in a survey work process. (6 marks)
- (b) Investigate **TWO (2)** types of measures and technologies that contribute to sustainable and environmental development in a concise manner.
- (i) Hydrographic survey
 - (ii) Geographical Information System
 - (iii) Global Navigation Positioning System
 - (iv) Remote Sensing
- (14 marks)
- Q2** (a) To prevent flood, the drainage system is planned to be laid from TBM A to TBM B, **Figure Q2(a)**. At the same time the height of underside of bridge should be taken with respect to ground. The reduced levels at TBM A and are 20.974m and 19.325m respectively.
- (i) Calculate reduced level at point P1, TP1, P2, and P3, and P3 using height of collimation method with **THREE (3)** decimals. (10 marks)
 - (ii) Determine the slope of point A to B if the distance AB is 20m. (4 marks)
- (b) **Figure Q2(b)** shows elevation of point A that computed from route 1 is 43.698m and the distance between BM1 and point A is 10 km. Elevation of point A that computed from route 2 is 43.691m and the distance between BM2 and point A is 2 km. Elevation of point A that computed from route 3 is 43.696m and distance BM3 and point A is 6 km. Calculate the reduced level of point A. (6 marks)
- Q3** (a) **Table Q3** shows the adjusted latitude and departure for traverse line station 1 to 2, 2 to 3, 3 to 4, 4 to 5 and 5 to 1.
- (i) Determine the latitude and departure on line 5 to 1 and coordinates for station 2,3,4 and 5. (6 marks)
 - (ii) Calculate the areas of the traverse station coordinates. (4 marks)

- (b) The purpose of lot parcel demarcation is to verify the position of the boundaries. Traverse measurement might result in less controversy if the reference datum is determined correctly. Briefly organizing how the datums for traverse may be performed using an appropriate diagram. (10 marks)
- Q4** (a) Tacheometry survey is a method conducted to observe topographic details. Two commonly used techniques are stadia system and electronic tacheometry. Explain **THREE (3)** advantages and **THREE (3)** disadvantages of these two techniques. (6 marks)
- (b) Explain in detail and with appropriate diagrams what preparations (survey) need to be done first before the tacheometry survey can be carried out. (8 marks)
- (c) Observations using stadia tacheometry technique were made from station 1 to point A and station 1 to point B. The staff reading at point A was 2.2m and at point B was 1.7m.
- (i) Calculate the distance from station 1 to point A (1.5 marks)
- (ii) Calculate the distance from station 1 to point B (1.5 marks)
- (iii) If the angle between station 1 to point A and station 1 to point B is 90° calculate the distance from point A to point B (3 marks)
- Q5** (a) The **Figure Q5** shows a block of land and its dimensions, in meters. The block of land is bounded on one side by a river. Measurements are taken perpendicular to the line AB to the river, at equal intervals of 25 meter.
- (i) Calculate and detect an approximation to the area of a block of land using Trapezoidal and Simpson's rule. (6 marks)
- (ii) Assuming the ground level was completely flat, determine the estimated reclamation volumes if the ground level needs to be raised to a height of 2.5 metres. (4 marks)

- (b) On new route developments, one circular curve with a radius of 450 meter will be built. The deflection angle is $12^{\circ} 00'00''$ and the chainage of the junction point is CH 271.574 meter. Every 25 meter offset, the curve will be marked. Calculate the data needed to stake the curve using the using deflection angle method. (10 marks)

END OF QUESTIONS

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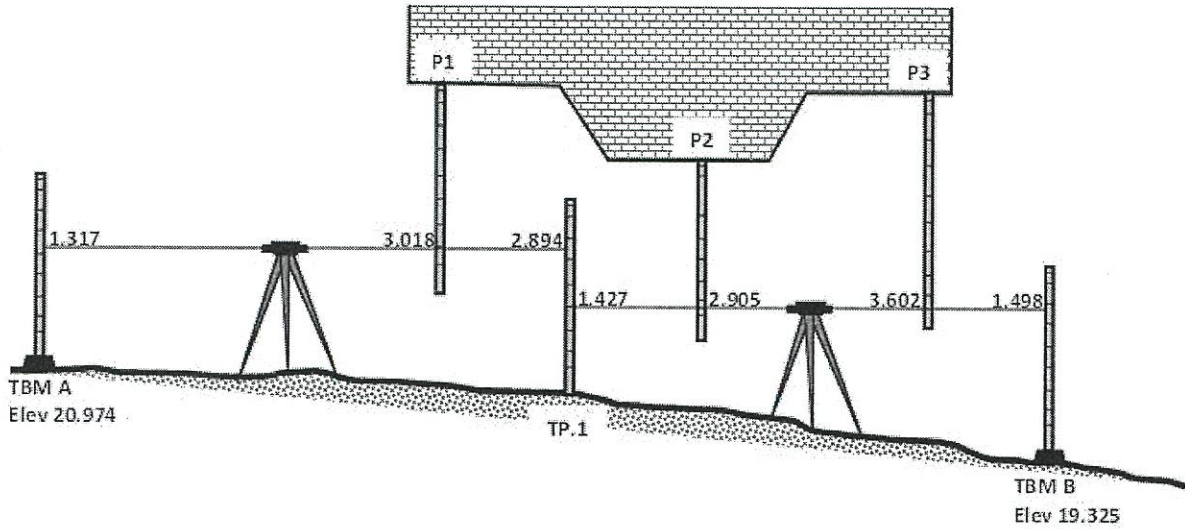


Figure Q2(a). Inverted staff levelling

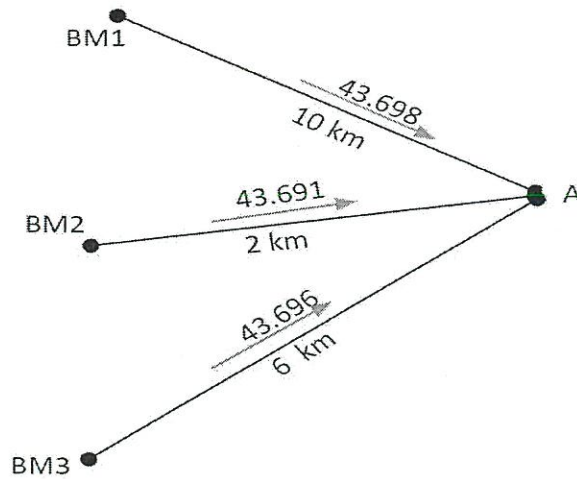


Figure Q2(b). Determination of point A

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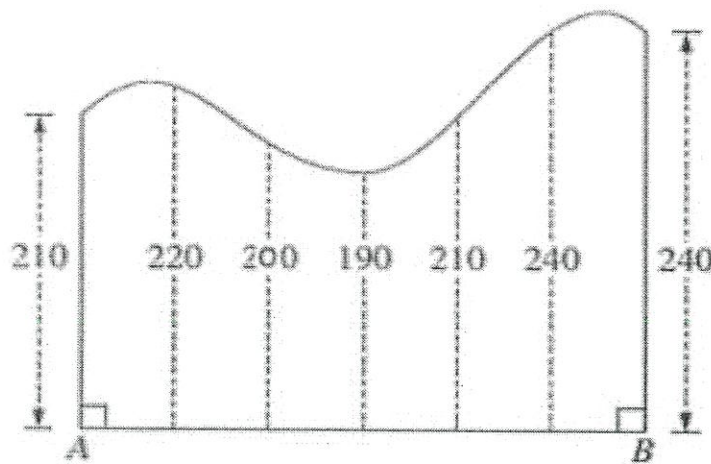
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Table Q3 : Coordinates computation form

| Line | Adjusted Latitude | | Adjusted Departure | | Coordinates | |
|------|-------------------|---------|--------------------|---------|-------------|----------|
| | N | S | E | W | N | E |
| 1 | | | | | 5110.500 | 1202.450 |
| 2 | 129.214 | | | 94.436 | | |
| 3 | | 21.962 | | 180.601 | | |
| 4 | | 195.470 | 29.933 | | | |
| 5 | | 30.551 | 139.080 | | | |
| 1 | | | | | | |
| | | | | | | |



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Figure Q5: A block of land and its dimensions

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