Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2022/2023

COURSE NAME	:	APPLIED GEOMATICS
COURSE CODE	:	BFG 40703
PROGRAMME CODE	:	BFF
EXAMINATION DATE	:	FEBRUARY 2023
DURATION	:	3 HOURS
INSTRUCTION	:	1. ANSWERS ALL QUESTIONS 2. THIS FINAL EXAMINATION IS COMDUCTED 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 FIVE (5) PAGES

Q1 The **TABLE Q1** shows ground levels and formation levels for a proposed road construction. Embankments are to be built with side slopes of 1:2.5 and cutting with slopes of 1:3.0. The embankment crest width and cutting base width is 13 meter. It may assumed that the ground is horizontal across the section.

Calculate and evaluate the cumulative volume and proposed a Mass haul diagram for the project given the following:
Bulking Factor = 1.1
Shrinkage Factor = 0.8

(20 marks)

Q2 (a) Based on the **FIGURE Q2(a)**, determine the estimated cross-sectional area of an inclined road surface cutting. Given the formation width as 10 meter [b], the height along the center line as 5 meter [h], the side slope as 1:3 [1:n], and the traverse slope is 1:10 [1:s].

(10 marks)

(b) Based on the **TABLE Q2(b)**, estimate the volume of a 90 meter road cross sections using the Prismoidal formula. Given the interval of the cross section as 15 meter.

(10 marks)

Q3 (a) Civil engineering works are often done in a complex and unfriendly environment making it difficult for personnel to operate efficiently. The ability of GPS to provide real-time centimeter-level accuracy in a cost-effective manner has significantly changed the civil engineering industry. Construction firm are using GPS in many applications such as road construction, earth work, and fleet management. Discuss how does a GPS work for those applications and add with diagram where appropriate.

(15 marks)

(b) There are numerous factors that need to be considered when purchasing a GPS receiver (or system) for project control (construction work and road design) and mapping purposes. Discuss in details any FIVE (5) factors and features should be reviewed during the selection process.

(5 marks)

Q4 (a) The uses of drones in construction grown dramatically in recent years. Discuss briefly the beneficially of drones in construction industries and proposed best fit drones type for construction work.

(10 marks)

(b) Discuss the difference between Digital Elevation Model (DEM), Digital terrain Model (DTM) and Digital Surface Model (DSM) in term of applications? Draw or illustrate the diagram to support your answers.

(10 marks)

Q5 Two straight line AB and PQ have a bearing 35° and 230° intersect at I. Circular curve with radius (R) 800 meter will develop to connect with AB and PQ. Chainage I was given 38 + 40.70 meter and chord interval fixed as 20 meter. Produce s setting out circular curve table using deflation angle method.

(20 marks)

END OF QUESTIONS

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Table Q1. Ground and formation level

Chainage	Ground Level (mAD)	Formation Level (mAD)	Chainage	Ground Level (mAD)	Formation Level (mAD)
0	28	35	800	4	11
100	29	32	900	3	8
200	32	29	1000	2	5
300	35	26	1100	–5	2
400	30	23	1200	–5	2
500	19	20	1300	10	5
600	11	17	1400	15	8
700	7	14	1500	23	11

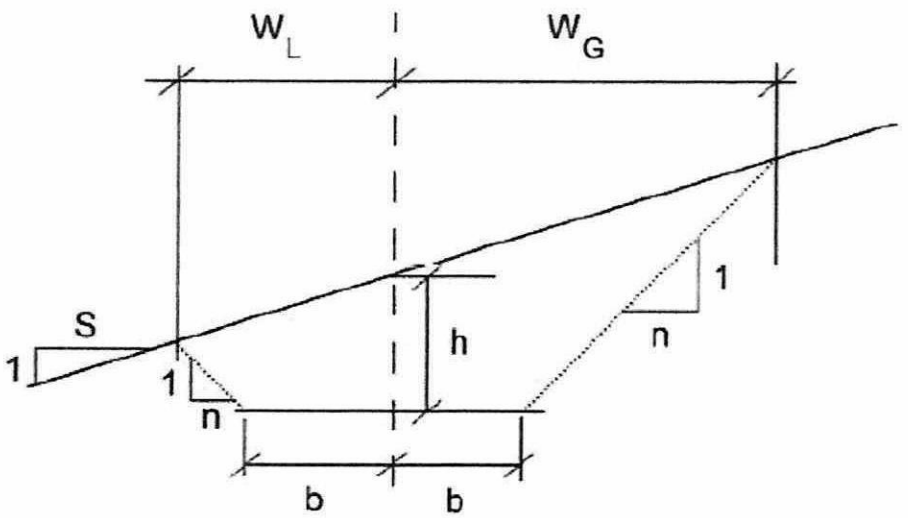

Figure Q2(a). Cross-sectional area

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Table Q2(b) : Road cross sections

Distance (m)	0	15	30	45	60	75	90
Cross Sectional Area (m^2)	11	42	64	72	160	180	220