Diploma in Construction Technology
NVQ Level 05 – Semester I

Surveying and leveling	**F45C001M06**	**Three Hours**

Answers only five (5) questions only

Question 01

Using the given diagram Figure - 01, draw a free hand sketch of the recognition diagram and answer the following questions
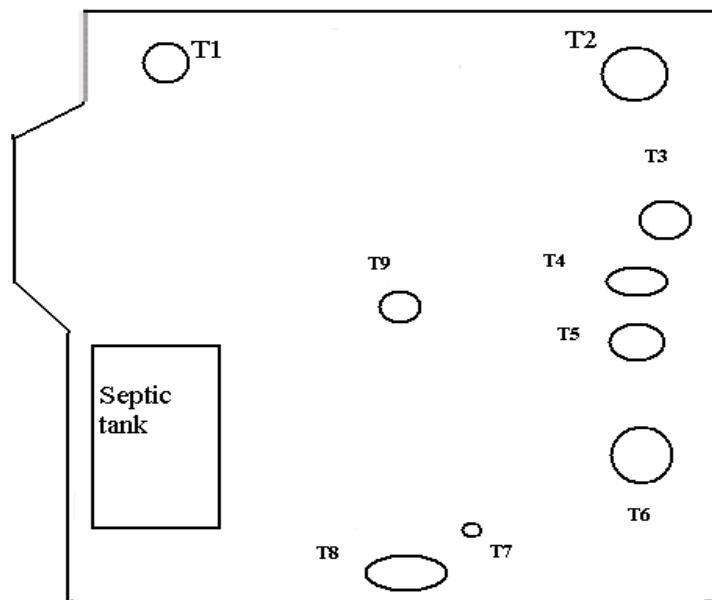

Figure - 01

Note: T1-T8 => Large trees and T9 => Small tree

(i) Explain the method of carrying out the standard chain survey recording for the above diagram

(ii) Assuming the scale, illustrate the surveying point identification, tie measurements and offsets

(20 Marks)

Question 02

(i) Explain about the recording errors and how it will affect on the results.

(03 Marks)

(ii) Explain the importance of leveling theories in road construction. (06 Marks)

(iii) State five accessories of leveling equipment and explain the importance of each of them. (05 Marks)

(iv) Explain the advantages and disadvantages of plotting (06 Marks)

Question 03

(i) The following staff readings were successively taken using instruments during leveling work.

0.58, 0.63, 0.52, 0.82, 0.93, 1.04, 1.95, 2.35, 2.80, 3.15, 2.88, 1.42, 2.15, 1.05 m,

The position of the instrument has changed after 4th, 7th and 11th readings. Calculate the reduced levels of all points by assuming the reduced level of 1st point is 50m.

(10 Marks)

(ii) Define the following terms in leveling with necessary sketches

1. Bench Mark

2. Inter sight

3. Level surface

4. Reduced level (06 Marks)

(iii) Differentiate plan and map (04 Marks)

Question 04

(i) Explain about the difficulties of chain surveying? (02 Marks)

(ii) State four (04) errors of chain surveying and briefly explain two of them. (04 Marks)

(iii) While measuring a chain line MN, total length of chain line MN is 40m, the below records were noted. Prepare the surveying filed book page, illustrate the chain surveying recording. (14 Marks)

Chainage (m)	Offset		Remarks
	Distance(m)	Left/Right	
2.0	3.0	Right	Palm tree
3.0	4.0	Left	Light post-01
5.0	4.0	Right	'Building Conner -01' of rectangular building (11m×12m)

6.0	3.0	Left	Side road edge-'A'
9.0	4.0	Right	Mango tree
10.0	2.0	Right	Side road edge - 'C'
12.5	4.5	Right	Septic tank- 1
14.5	5.0	Right	Septic tank- 2
16.0	4.0	Right	'Building Conner -02'of above building
19.0	3.3	Left	Side road edge - 'B'
24.0	3.9	Right	Septic tank- 3
26.0	4.0	Left	Manhole-01
29.0	2.2	Right	Side road edge- 'D'
31.5	4.2	Left	Manhole-02
34.0	4.0	Right	Septic tank- 4
37.0	4.5	Right	Mango tree

Question 05

(i) Differentiate with the Simpson's and trapezoidal rules to find the irregular land areas.

(04 Marks)

(ii) Briefly explain the usage of the planimeter. (02 Marks)

(iii) Using the following table, find out the irregular boundary area using the Simpson's rule and Trapezoidal rule. (14 Marks)

Distance (m)	0	4	8	12	16	20	24	28	32
Offset (m)	3.25	3.50	4.00	4.25	4.50	3.80	3.50	2.80	2.95

Question 06

A land surveyor conducts the theodolite traversing and identifies the angles of the below stations P, Q, R, S. Using the following table and answers the following questions.

Line	Angle points	Angles
PQ	^ P	90° 6' 11"
QR	^ Q	73°6' 18"
RS	^ R	125°6' 20"
SP	^ S	70° 41' 11"

(i) Identify the angular errors and correct the errors. (04 Marks)

(ii) Angle NPQ = 6° 5' 24" is north angle, Calculate the whole circle bearings for the above each corrected angle using clockwise approach. (06 Marks)

(ii) Make the page of contour lines in this drawing (figure 02), (each contour interval =100mm), mention the highest point and lowest point. (04 Marks)
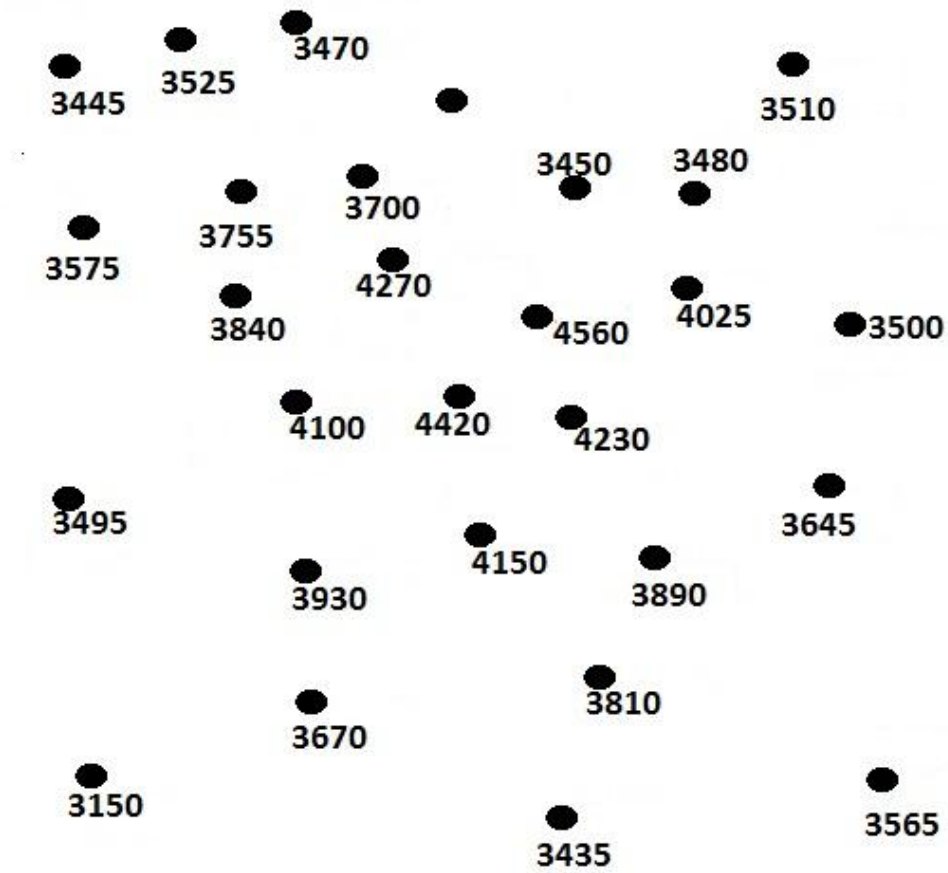
Contour survey

Figure 02

(iv) Using given figure 03, calculate the volume of excavation, proposed level of basement is 120m, total area is 50m². (06 Marks)
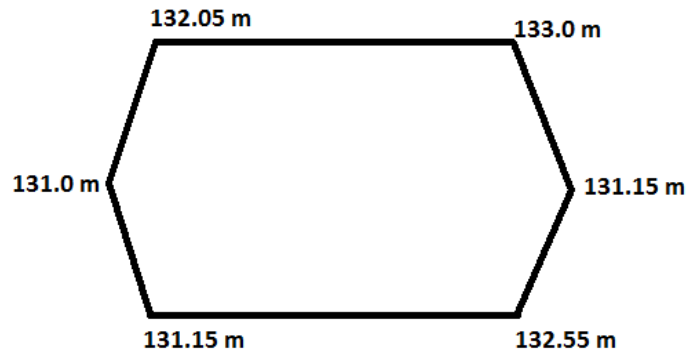
132.05 m

133.0 m

131.0 m

131.15 m

131.15 m

132.55 m

Figure 03