

2705/104 2709/104
2707/104 2710/104
SURVEYING I AND WORKSHOP
TECHNOLOGY I (MECHANICAL)
June/July 2022
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

**DIPLOMA IN BUILDING TECHNOLOGY
DIPLOMA IN CIVIL ENGINEERING
DIPLOMA IN ARCHITECTURE**

MODULE I

SURVEYING I AND WORKSHOP TECHNOLOGY I (MECHANICAL)

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Answer booklet;

Scientific calculator;

Drawing instruments.

This paper consists of EIGHT questions in TWO sections; A and B.

Answer FIVE questions choosing TWO questions from section A, TWO questions from section B and ONE question from either section.

All questions carry equal marks.

Maximum marks for each part of a question are as indicated.

Candidates should answer the questions in English.

This paper consists of 4 printed pages.

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

SECTION A: SURVEYING I

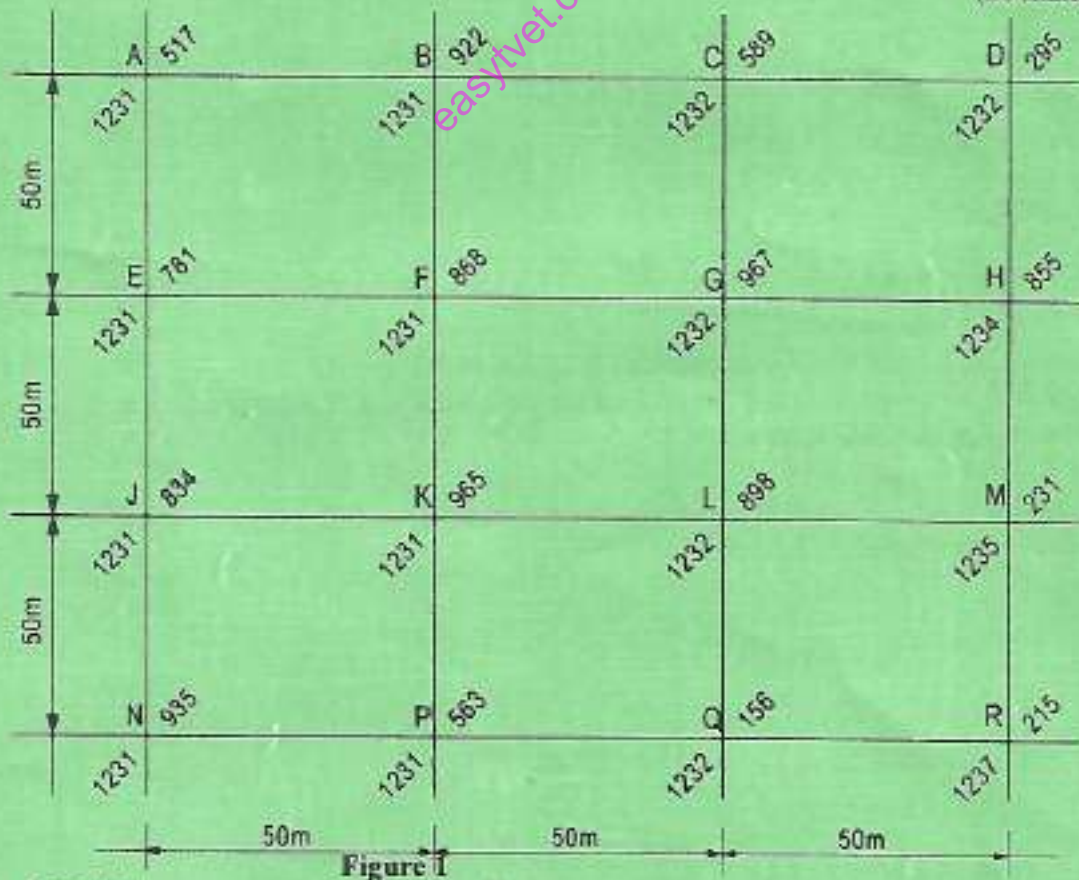
Answer at least TWO questions from this section.

1. **Table 1** shows some of the data from a reduced levels sheet. Compute the missing data and apply arithmetical checks. (20 marks)

Table 1

BS	IS	FS	Height of instrument	Reduced levels (m)	Remarks
-----	-----	-----	933.907	931.517	
	-----	-----		931.922	
1.998	2.328	-----	-----	-----	
	2.512	-----	-----	932.295	
	2.425	-----	-----	-----	
-----	-----	-----	935.387	932.967	
	-----	-----		934.855	

2. (a) **Figure 1** shows reduced levels of grid points of a piece of land. To a scale of 1:1000, interpolate the contours at 1 m interval. (Example level at A is 1231.517) (20 marks)



3. (a) Define each of the following terms used in levelling:
- (i) Instrument station;
 - (ii) temporary bench mark;
 - (iii) reduced level. (6 marks)
- (b) The following readings were taken with a level on a continuously sloping ground: 0.865, 1.655, 2.445, 3.655, 3.755, 0.935, 3.216, 3.985, 0.998, 3.892, 0.355, 1.635, 1.960, 2.785, 3.875. the last reading was taken on a bench mark whose reduced level is 950 m above mean sea level.
- (i) Rule out a field note sheet and enter the bookings.
 - (ii) Reduce the levels by rise and fall method apply arithmetical checks. (14 marks)
4. (a) Outline **four** principles considered when selecting chain lines in chain surveying. (6 marks)
- (b) A line measured with a steel band was recorded as 139.453 m. Upon standardization the steel band was found to be 30.025 m instead of 30 m. Compute the correct length of the line. (6 marks)
- (c) Explain each of the following types of surveys:
- (i) topographical surveying
 - (ii) cadastral surveying;
 - (iii) engineering surveying;
 - (iv) aerial surveying. (8 marks)

SECTION B: WORKSHOP TECHNOLOGY I (MECHANICAL)

Answer at least TWO questions from this section.

5. (a) Explain **four** practices for maintaining tools. (8 marks)
- (b) Differentiate between fastening and forming tools giving **one** example for each. (5 marks)

- (c) Sketch each of the following tools stating **one** use for each:
- (i) adjustable wrench;
 - (ii) slip joint pliers. (7 marks)
6. (a) With the aid of labelled sketches, explain the operation of each of the following pumps:
- (i) rotary lobe pump;
 - (ii) piston pumps. (14 marks)
- (b) Outline **four** reasons for preventive maintenance. (6 marks)
7. (a) State **three** comparisons between a two and a four stroke petrol engine. (6 marks)
- (b) With the aid of a labelled vertical cross-sectional sketch, explain the function of a carburetor. (7 marks)
- (c) State **three** roles of employees in relation to the 'health and safety act' (3 marks)
- (d) State **four** critical details to be recorded in accident reporting. (4 marks)
8. (a) Outline the procedure of performing finish turning using a lathe machine. (8 marks)
- (b) Explain **four** considerations when selecting hand tools for mechanical works. (8 marks)
- (c) Differentiate between boring and drilling operations in metal work. (4 marks)

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