

## SECTION A: SURVEYING I

*Answer at least TWO questions from this section.*

1. (a) Define the term "surveying". (2 marks)
- (b) Outline the procedure for conducting any survey exercise. (6 marks)
- (c) Outline **three** types of corrections in linear measurements. (6 marks)
- (d) (i) List **four** types of chains. (4 marks)
- (ii) List **two** instruments used to mark points in linear measurements. (2 marks)
  
2. (a) Define the term "chain surveying". (2 marks)
- (b) State the **three** instrument used to measure right angles in chain surveying. (3 marks)
- (c) The sides of a triangle were 12 m, 16.5 m and 23.0 m respectively. If the chain used was 2 cm longer. Determine the correct area of the triangle using a 20 m chain. (7 marks)
- (d) The following slope distances were measured along a chain line AE with a 30 m chain as shown in **table 1** below:

**Table 1**

Slope distance (m)	Angle of slope
28.7	5°
23.4	7°
20.9	10°
29.6	12°

It was noted afterwards that the chain was 0.025 m too short. Determine the true horizontal distance. (8 marks)

3. (a) Define the following terms as used in levelling: (8 marks)
  - (i) datum surface; *imaginary surface upon which other heights are measured from*
  - (ii) reduced level;
  - (iii) backsight; *first reading taken when setting up of a level*
  - (iv) benchmark. *point of known height upon which other heights are referred to*

- (b) List six types of levels. (6 marks)
- (c) (i) Define the term "vertical interval" as used in contouring. (2 marks)
- (ii) State four factors that can be considered in the selection of the contour interval. (4 marks)

4. The following consecutive readings were taken with a dumpy level along a chain line at a common interval of 15 m. The first reading was taken at chainage of 165 m, whose R.L. was 98.085 m. The instrument was shifted after the 4th and 9th readings. 3.150, 2.245, 1.125, 0.860, 3.125, 2.760, 1.855, 1.470, 1.965, 1.225, 2.390 and 3.035. Rule out the level page and reduce the data by collimation method, hence apply the arithmetic checks. (20 marks)

**SECTION B: WORKSHOP TECHNOLOGY I (MECHANICAL)**

Answer at least TWO questions from this section.

5. (a) State four precautions observed when using each of the following tools: (12 marks)
- (i) hacksaw;
- (ii) chisels;
- (iii) files.
- (b) Illustrate a typical accident reporting form for a company. (8 marks)
6. (a) Explain four factors considered in the selection of a water pump. (8 marks)
- (b) With the aid of labelled sketches, explain the operation of each of the following pumps: (12 marks)
- (i) submersible pump;
- (ii) centrifugal pump.
7. (a) Explain four advantages of preventive maintenance. (8 marks)
- (b) With the aid of a labelled sketch, outline the operation of a four stroke engine. (12 marks)