



FACULTY OF ENGINEERING AND THE ENVIRONMENT

DEPARTMENT OF MINING ENGINEERING

MINING SURVEY EXAMINATION

EMI 3101

Special Examination Paper

January 2020

This examination paper consists of 6 pages

Time Allowed: 3 hours

Total Marks: 100

Examiner's Name: Eng Murewa B Zvigumbu

INSTRUCTIONS

1. Answer **ALL** five questions.
2. Each question carries a total of 20 Marks.
3. Scientific calculators allowed to be used in this paper.

Additional Requirements

None

MARK ALLOCATION

Questions	Marks Allocated
Question 1	20
Question 2	20
Question 3	20
Question 4	20
Question 5	20
Total Attainable	100

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Question 1

- a) Explain the following term, using relevant examples, *systematic error* and *random errors*. **[6 Marks]**
- b) During the measurement of catenary of four bays the following information was obtained

Bay	Measured Length(m)	Temp (° C)	Diff in level betwn length(m)	Tension (N)
1	29.899	18.0	+0.064	178
2	29.901	18.0	+0.374	178
3	29.882	18.1	+0.232	178
4	29.950	17.9	+0.238	178

The tape has a mass of 0.026 kg/m and cross sectional area of 3.24 mm². It was standardised on the flat at 20° C under a pull of 89N. The coefficient of linear expansion of the tape is 0.000011m/ ° C. Young Modulus is 20.7 * 10⁴ MN/m². The mean level of the line is 26.89 m above mean sea level.

Determine the absolute length of the survey line reduced to the sea level. **[14 Marks]**

Question 2

Two seams of coal, 30.00 m vertically apart dip 1 in 6. Find the length of a roadway(drift) between driven between the seams:

- a) At a rise of 1 in 4 from the lower to the upper seam. **[3 Marks]**
- b) At a dip of 1 in 2 from the upper to the lower seam. **[3 Marks]**
- c) The coordinates and levels of points A, B and C are as follows:

Table 1

	E(m)	N(m)	Levels (m) relative to datum
A	1119.0	1074.0	-128.0
B	750.0	1787.5	-297.0
C	1812.0	2011.0	-195.0

Calculate the amount and direction of full dip.

[14 Marks]

Question 3

- a) Discuss the operation of a tilting level with aid of sketches. [MARKS 10]
- b) The following figures were extracted from a levelling field book some of the figures being illegible due to exposure to rain. Insert the figures and check your results.

Table 2

BS	IS	FS	H of I	RL	Remarks
			279.08	277.65	OBM
	2.01			?	
	?			278.07	
3.37		0.40	?	278.68	
	2.98			?	
	1.41			280.64	
		?		281.37	TBM

[MARKS 10]

Question 4

- a) Discuss the salient points you must bear in mind pegging an *irregular* precious metal or base metal block with aid of sketches, show all the. [10 MARKS]
- b) A panel 160m long by 360m wide at a depth of 400m is mined in a seam 1.4m high. The extraction is 100%. $q=0.33$. Determine the maximum subsidence, V_m , over the panel.

[10 MARKS]

Question 5

a) Outline the procedure of measuring the volumes of ore in narrow irregular stopes using *swing campus method*. **[10 MARKS]**

b) A length of tunnel **RQS** is to be constructed in heading, the straights **QR** and **QS** having whole circle bearing **202° 46'** and **20° 14'** respectively, whilst a manhole **Q** has coordinates **127.05 mE, 448.62 mN**. If the coordinates of nearby station **A** on a benchmark/peg traverse are **60.00 mE, 300.00 mN** and the bearing of a traverse line **AB** is **21° 33'** obtain data for setting out the two length of the tunnel.

[10 MARKS]

***** **THE END** *****