Faculty of Science and Technology
3rd Year 1st Semester / 2017
Surveying and Leveling

Part B

1. The following staff readings were observed successively with a level. The instrument was removed after the 2nd, 5th, and 8th readings, and the recorded values are; 0.675, 1.230, 0.750, 2.565, 2.225, 1.935, 1.835, 3.220, 3.115, and 2.875. The first staff reading was taken with a staff held on a benchmark of reduced level 165.000 m. Enter the readings in the level book form, and find the reduced levels of all points by the 'Rise and Fall' method.

(20 marks)

2. Two points, P and Q, were selected on opposite banks of a river. To determine the length of PQ, a line PA was laid down perpendicular to PQ and was measured to be 150 m. Another line AB, point B on the line QP produced was erected perpendicular to QA. PB was found to be 45 m. Determine the length of PQ.

(15 marks)

3. 'Cross staff survey' is done to locate the boundaries of a field and to determine its area. A chain line is run through the centre of the area which is divided into a number of triangles and trapezoids. The instruments required for cross staff surveying are chain, tape, arrows and a cross staff.

Plot the following cross staff survey of a field ABCDEFG using a scale of 1: 5000. The unit of measurement is meters (m).

	750	D	
	650	210	E
C 180	490		
	300	250	F
B 160	180		
	100	50	G
	0	A	

(15 marks)

93

4. The length of a line measured with 20 m chain was found to be 500 m. It was subsequently found that the chain was 0.04 m too long. What is the length of the line?

(10 marks)

5. What are systematic errors, and what are random errors? Give an example for each type of error.

(10 marks)

6. Describe how you will bring a perpendicular (offset) from a point to a survey line. Use a sketch to support your answer.

(10 marks)