



MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)

University Examinations for 2015/2016

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

FIRST SEMESTER EXAMINATION FOR DEGREE IN BACHELOR OF SCIENCE IN
CIVIL ENGINEERING

ECV 201: SURVEYING I

Date: 2/12/2015

Time: 2:00 – 4:00 PM

INSTRUCTIONS:

- *This paper comprises five questions*
- *Question one is compulsory and carries 30 marks*
- *All other questions carry 20 marks each*
- *Answer question one and any other two questions* **TOTAL: 70 MARKS**

QUESTION ONE(3MKS EACH)

- Enumerate and explain the basic principles of surveying.
- Under what circumstances is it necessary to carry out plane surveying?
- What is Electromagnetic Distance Measurement and what are some of its basic principles.
- Describe the steps on how can you set up a theodolite.
- How do plane surveying and geodetic surveying differ?
- State five principles considered when locating suitable stations and chain lines.
- The azimuth of the boundary line is $128^{\circ}13'46''$. Convert this to a bearing 180° -
 $128^{\circ}13'46''=51^{\circ}46'14''=S\ 51^{\circ}46'14''E$
- Write short notes on: (i) bookings;
- What are errors in surveying? Briefly explain the two types of errors.
- Explain the differences between a map and a plan.

QUESTION TWO (20 MARKS)

- a) A setting out sketch is given figure Q_5A below. Give a list of instruments/tools which you will need for setting out point 1-4. Shortly describe how you can set out 1-4 with rectangular or polar coordinates.

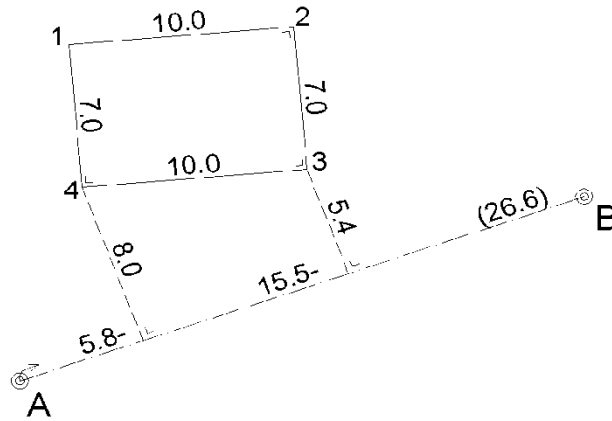
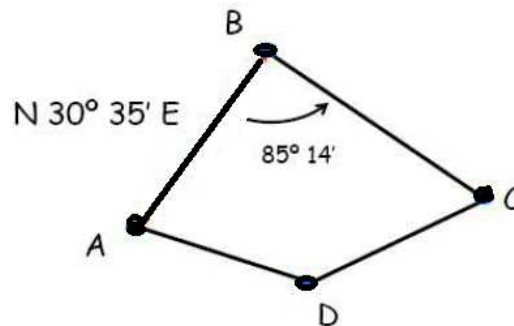


Fig. Q_5A . Setting out sketch

- b) State and explain four different classification of surveying based on the type of equipment used. (8 marks)
- c) From the traverse shown below compute the azimuth and bearing of side BC. (8 marks)



(4 marks)

QUESTION THREE (20 MARKS)

- a) Explain briefly how the following distinct operations at each survey station are carried out for the temporary adjustments of a plane table.
- Centering
 - Leveling
 - Orientation
- (6 marks)
- b) Sources of errors in levelling are divided into THREE major categories. Name these categories and state an example for each category (6 marks)

- c) Reading obtained from a two peg test carried out on an automatic level with a staff placed on two pegs A and B 50m apart are:
Staff reading at A= 1.283m; Staff reading at B = 0.860m. With the level position 5m from peg B (L/10): Staff reading at A= 1.612m; Staff reading at B = 1.219m. Calculate the collimation error of the level per 50m of sighting distance. (8 marks)

QUESTION FOUR (20 MARKS)

- a) State and explain the **Four** methods of plane table survey. (12 marks)
- b) Data from a differential levelling have been found in the order of B.S., F.S.,..., etc, starting with the initial reading on point A (elevation 150.485m) are as follows: 1.205, 1.860, 0.125, 1.915, 0.395, 2.615, 0.880, 1.760, 1.960, 0.920, 2.595, 0.915, 2.255, 2.305, 1.170. The final reading closes at station B. Put the data in a complete field note form and carry out reduction of level by Rise and Fall method. All units are in metres (8 marks)

QUESTION FIVE (20 MARKS)

- a) Define the following terms used in levelling.
i) Back sight
ii) Foresight
iii) Change point
iv) Benchmark (8 marks)
- b) Trace the historical development of surveying from the time of the Greeks to the present time highlighting the milestones in this development (4 marks)
- c) Explain the procedure of leveling. (8 marks)