



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

University Examination 2010

SECOND YEAR/FIRST SEMESTER EXAMINATION FOR THE DEGREE IN BACHELOR OF SCIENCE IN CIVIL ENGINEERING SUPPLEMENTARY PAPER

ECE 2205: THEORY OF STRUCTURES I

SERIES: APRIL/MAY 2010

TIME: 2 HOURS

Instructions:

You should have the following for this examination:

- Answer booklet
- Mathematical table/pocket calculator

Question **ONE** is Compulsory. Answer any other **TWO** questions from the remaining FOUR questions.

QUESTION ONE

- (a) What is a free body in analysis of structures? (3 marks)
- (b) Determine the degree of statical indeterminacy for each of the structures shown in figure 1(a)-1(c). 12 marks)
- (c) Explain how one can inspect of geometric instability in trusses. (3 marks)
- (d) Show that maximum shear is given by $WL/2$ and Maximum moment is given by $WL^2/8$ in a straight beam with a uniformly distribute load. (12 marks)

QUESTION TWO

Draw the shear force diagram (SFD) and bending moment diagram (BMD) for the beam loaded as shown in Figure 2. Clearly mark the opposition of the maximum bending moment and determine its value. (20 marks)

QUESTION THREE

For the frame structure shown in Figure 3, determine the reactions at A and B and sketch the quantitative shear force diagram (SFD) bending moment diagram (BMD) as well as the deflected shape due to the loading shown. (20 marks)

QUESTION FOUR

The compound truss shown in Figure 4 consists of two simple trusses ABC and DEF that are linked together by three bars AF, ED and CD. Determine the bar forces in these members. (20 marks)

QUESTION FIVE

Find the reactions at the fixed end of the cantilever loaded as shown in Figure 5. Draw the shear force diagram (SFD) and bending moment diagrams (BMD). (20 marks)