



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE &  
TECHNOLOGY UNIVERSITY EXAMINATIONS 2012/2013**

**2<sup>ND</sup> YEAR 2<sup>ND</sup> SEMESTER EXAMINATION IN DIPLOMA  
BUILDING AND CIVIL ENGINEERING**

**(KISUMU L. CENTRE)**

**COURSE CODE: TBC 2221**

**COURSE TITLE: MECHANICS OF STRUCTURES II**

**DATE: 12/8/13**

**TIME: 2.00 – 3.30 PM**

**DURATION: 1.30 HOURS**

**INSTRUCTIONS TO CANDIDATES**

**This paper consists of 5 questions**

**Answer question ONE and any other two questions.**

**QUESTION ONE (MARKS 30)**

- i. Define or explain the following terminologies (MARKS 8)
  - a) Beam
  - b) Shear force
  - c) Bending moment
  - d) Lintel
- ii. Three types of beam supports are commonly encountered in engineering structures and are listed in the first column of the table below. Fill in the details required in the other columns by sketching real support, idealized representation in literature and types of reactions offered (MARKS 9)

<b>Type of support</b>	<b>Real support</b>	<b>Idealized support</b>	<b>Reactions provided</b>
<b>Roller support</b>			
<b>Pin or Knife support</b>			
<b>Fixed support</b>			

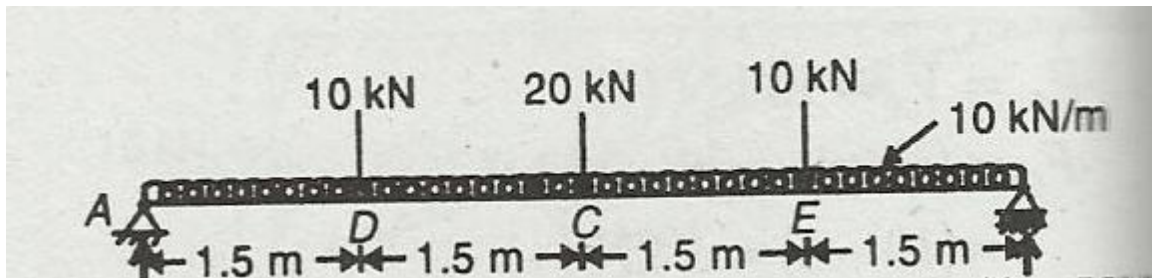
- iii. On what basis are beams classified? (MARKS 2)
- iv. Define the following types of beams giving also appropriate sketches where applicable (MARKS 6)
  - a) Simple beam
  - b) Fixed beam
  - c) Propped cantilever
- v. State the simple bending formula and define the terminologies used in it (MARKS 5)

### QUESTION TWO (MARKS 20)

- i. Briefly explain the following types of loading on beams giving also illustrative sketches where appropriate:
  - a) Concentrated loads (MARKS 4)
  - b) Distributed loads (MARKS 4)
  - c) Moment (Couple) loading (MARKS 4)
  - d) Dead load (MARKS 2)
  - e) Live load (MARKS 2)
- ii. Clearly distinguish between Uniformly Distributed Load (UDL) and Uniformly Varying Load (UVL). (MARKS 4)

### QUESTION THREE (MARKS 20)

- i. State the three laws of equilibrium which are applied in the analysis of structural members (MARKS 6)
- ii. The figure below is a beam diagram subjected to various loads. Compute the support reactions at A and B (MARKS 10)

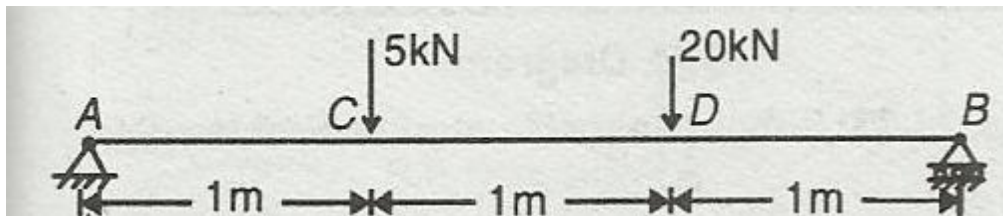


- iii. Name the classification of beams under which the given diagram falls. (MARKS 4)

#### QUESTION FOUR (MARKS 20)

A simply supported beam of 3m span shown below is loaded with point loads of 5kN and 20 kN at 1m and 2m from the left end. Sketch

- i. Loading diagram (MARKS 4)
- ii. Shear force diagram (MARKS 8)
- iii. Bending Moment diagram (MARKS 8)



#### QUESTION FIVE (MARKS 20)

A beam of symmetrical section of depth 200mm with a moment of Inertia  $1 \times 10^8 \text{ mm}^4$  is simply supported over a span of 4m. What uniformly distributed load can it carry if the maximum bending stress is not to exceed  $120 \text{ N/mm}^2$ ? With the same permissible stress, what concentrated load may be carried by the beam at the midspan?