



TECHNICAL UNIVERSITY OF MOMBASA

---

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

DIPLOMA IN BUILDING AND CIVIL ENGINEERING

EBC 2307: STRUCTURAL STEEL AND TIMBER DESIGN

END OF SEMESTER EXAMINATION

SERIES: APRIL 2016

TIME: 2 HOURS

### INSTRUCTIONS TO CANDIDATES

You should have the following for this examination

- Answer booklet
- BS for steel and timber

This paper consists of **FIVE** questions

Answer any other **THREE** questions

Use neat, large and well labelled diagrams where required

Maximum marks for each part of a question are as shown

This paper consists of **TWO** printed papers.



### QUESTION ONE

A timber beam with a clear span of 2.85m supports a udl of 10KN including self-weight of the beam determine a suitable section for the beam, using timber of strength class C16 under service class 1. Assume the bearing length is 150mm and that the member will be exposed to dry condition under long term loading. **(20marks)**

### QUESTION TWO

A timber floor spanning 3.8m center to center is to be designed using timber joist at 400mm center. The floor is subjected to a domestic imposed load of 1.5KN/m<sup>2</sup> and carries a dead loading including self weight of 0.35KN/m<sup>2</sup> carry out design checks to show that a series of 44mm by 200mm deep saw section British spouse grade ss under service class 1 is suitable. **(20marks)**

### QUESTION THREE

A timber column of red wood grade Gs consist of 100mm square section which is restrained at both ends in position but not in direction assuming the actual weight of column = 3.75m calculate the maximum axial long term load that the column can support. **(20marks)**

### QUESTION FOUR

Design a simple supported beam carrying conc. floor slab over a span of 8m in grade S 275 steel the unfactored dead loads which include an allowance for safe weight is 14KN/m and the unfactored imposed loads which is 19KN/m **(20marks)**

### QUESTION FIVE

- a) A 120x120x5x15Bs angle is used as a strut in a truss. It may be assumed to have one end hinged and one end fixed its actual length is 3m. Calculate the safe axial load given factor of safety is 4. **(6marks)**
- b) Explain the classification of compression members. **(6marks)**
- c) Using the rankness formula find the safe axial load for a 308x305x97kg uc 3.3m high to be regarded having both end fixed given  $f_c=330\text{N/mm}^2$   $a = \frac{1}{7500}$  and factor of safety is 4. **(6marks)**

