TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

DIPLOMA IN BUILDING & CIVIL ENGINEERING (DBCE 13J/12S)

EBC 2307: STRUCTURAL STEEL & TIMBER DESIGN

END OF SEMESTER EXAMINATION
SERIES: DECEMBER 2014
TIME ALLOWED: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*

This paper consists of **FIVE** questions. Answer any **THREE** questions of the **FIVE** questions
All questions carry equal marks
Maximum marks for each part of a question are as shown
Use neat, large and well labeled diagrams where required.

This paper consists of **THREE** printed pages

Question One

a) Outline TWO types of limit states relevant to design of steel structures as per BS 5950. **(4 marks)**

b) Check the suitability of 203 x 203 x 71 UC section in steel grade S275 to carry axial characteristic dead load of 300KN and characteristic imposed load of 450KN. Assuming the column height is 5m and is effectively held in position at both ends, but not rein strained in direction at either end.

203 x 203 x 71 UC section properties are:

D = 215.9mm	B = 206.2mm	T = 17.3mm
Y_{yy} = 52.8mm	Y_{xx} = 91.6mm	t = 10.3mm
A = 9110mm2	d = 160.8mm	

(16 marks)

Question Two

a) Describe THREE methods of design of steel based on BS 5950 **(9 marks)**

b) Design a column base plate for column in 1(b) above. Take f_{cu} = 40N/mm^2

Question Three

Check the suitability of 533 x 210 x 92uB to support simply supported beam effectively span 7.0m with dead and imposed load of 30KN/m and 24KN/m respectively to satisfy bending, shear and deflection requirements. Section properties of 533 x 210 x 92 uB. Assume beam is carrying brittle finish.

Section properties: - T = 15.6mm, D = 528.3mm, B = 209.3mm

t = 10.2mm, plastic module, S_{xx} = 2366cm^3

Question Four

Check the suitability of 75 x 300mm deep timber grade C16 beam to effectively support uniformly distributed load of 3.5KN/m inclusive of self, weight and resting on 200mm bearing as shown in figure 1 below. **(20 marks)**

Question Five

Check the adequacy of 47 x 225mm timber flow joist in strength C18 given that:-

(i) The joists are spaced at 450mm crs
(ii) The floor is tongue and groove boarding with self weight of 0.1KN.m^2
(iii) The ceiling is plasterboard with a self weight of 0.2KN/m^2
(iv) The floor has an effective span of 4m crs.