JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF ENGINEERING AND TECHNOLOGY

UNIVERSITY SPECIAL RESIT EXAMINATIONS   FOR THE DEGREE IN SCIENCE IN CONSTRUCTION MANAGEMENT

THIRD YEAR RESIT 2020/2021 ACADEMIC YEAR

CENTRE: MAIN CAMPUS

COURSE CODE: TCM 3321

COURSE TITLE: Structures iii

EXAM VENUE: STREAM: BSc CONSTRUCTION MGT

DATE: ../11/2020   EXAM SESSION:

DURATION: …HOURS

Instructions

1. Answer question 1 (Compulsory) and ANY other two questions
2. Candidates are advised not to write on question paper
3. Candidates must hand in their answer booklets to the invigilator while in the examination room

SECTION A (30marks)

1(a) Give a clear distinction between the following terms:

Softwood and hardwood

Grade stress and permissible stress   (4marks)

(b) A flat roof spanning 4.25m is to be designed using timber joist at 600mm centres. The loads from the proposed roof construction are as follows:

Asphalt 20mm thick $0.45kN/m^2$

Pre-screeded unreinforced woodwool $0.30kN/m^2$

Timber firrings $0.01kN/m^2$

Ceiling $0.15kN/m^2$

The imposed roof load due to snow may be taken as $0.75kN/m^2$ and the load due to the weight of the joist as $0.1kN/m^2$. Determine the size of suitable SC3 whitewood joists, checking shear and deflection. In addition, check the joists if a 75mm deep notch were to be provided to the bottom edge at the bearings.   (16marks)

c) Design a timber column of effective length 2.8m, capable of resisting the following loadings:

Medium-term axial load of 37.5kN

Long-term axial load of 30kNmm and a bending moment of 300Kn   (10marks)

SECTION B: Attempt TWO questions

2. (a) Give a typical applications of timber in the construction industry.   (5marks)

(b) A timber beam with a clear span of 3.85m supports a uniformly distributed load of 10kN including self-weight of beam. Determine a suitable section for the beam using timber of strength class SC4. Assume that the bearing length is 150mm and that the ends of the beam are held in position and compression edge held in line.   (15marks)

3. Select a suitable column section in grade 43 steel to support the ultimate loads from beams A and B shown in figure below. Assume the column is 7m long and is effectively held in position at both ends but only restrained in direction at the bottom.

R_B=75Kn R_A=200kN

PLAN   L= 7m

F

Ultimate load due to

self-weight= 5 kN
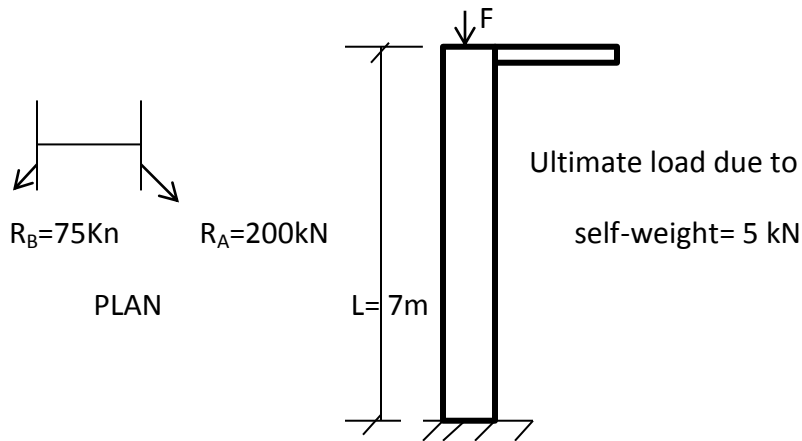
4. A stud wall panel has an overall height of 3.75m including top and bottom rails and a vertical stud at 600mm centers with nogging pieces at mid height. Assuming that the studs rail framing and nogging pieces comprise 44x100mm section of strength class SC4, calculate the maximum uniformly distributed long-term total load that the panel is able to support. (20marks)

5. A proposed 5m long internal column in a rigid jointed steel structure is to be loaded concentrically with 1000kN dead and 1000kN imposed load as shown below. Assuming that fixity at the top and bottom of the column gives effective rotational restrains, design column sections assuming the structure will be

    i.   Braced
    ii. Unbraced