DEDAN KIMATHI UNIVERSITY OF TECHNOLOGY

UNIVERSITY EXAMINATIONS 2020/2021 ACADEMIC YEAR

FOURTH YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN CIVIL ENGINEERING AND BACHELOR OF EDUCATION TECHNOLOGY (CIVIL ENGINEERING)

ECE 4216: STRUCTURAL DESIGN II

DATE: 30TH SEPTEMBER 2021 TIME: 2:00-4:00PM

INSTRUCTIONS TO CANDIDATES:

- ANSWER QUESTION ANY THREE QUESTIONS
- RELEVANT DESIGN CODES ARE ALLOWED
- THE DESIGN SHOULD CONFORM TO EC0, EC1 AND EC2 WHERE APPROPRIATE

This paper consists of one printed page

QUESTION ONE [20 MARKS]

A rectangular beam is 300 mm wide 575 mm depth with cover of 55 mm to the compression steel. The beam is simply supported and spans 9 m. The characteristic dead load is 20 kN/m and the characteristic imposed load is 11 kN/m. The materials to be used are f_{ck}=25 MPa and f_{yk}=500 MPa. Design the beam.

QUESTION TWO [20 MARKS]

A slab in an office building 5 m x 7.5 m is simply supported at the edges with no provision to resist torsion at the corners or to hold the corners down. The slab is assumed to be 200 mm thick. The total characteristic dead load is 6.2kN/m^2. The characteristic imposed load is 2.5 kN/m^2. The materials to be used are f_{ck}=25 MPa and f_{yk}=500 MPa. Design the slab.

QUESTION THREE [20 MARKS]

A 275 x 275 mm internal column of a residential building is subjected to an ultimate axial load of 1280 kN and bending moments of 35kNm about the x-x axis and 25 kNm about the y-y axis. The materials to be used are f_{ck}=25 MPa and f_{yk}=500 MPa. Design the column.

QUESTION FOUR [20 MARKS]

The pad footing supports a 350 x 350 mm concrete column subjected to and axial characteristic permanent and variable actions of 900 kN and 300 kN respectively. The materials to be used are f_{ck}=25 MPa and f_{yk}=500 MPa. The safe bearing pressure is 200 kN/m^2. Design the footing.