



MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2015/2016

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

FIRST SEMESTER EXAMINATION FOR
DIPLOMA IN BUILDING CONSTRUCTION AND TECHNOLOGY
DIPLOMA IN CIVIL ENGINEERING

BCECD /BCEBD 304: REINFORCED CONCRETE AND MASONRY DESIGN

Date: 4/8/2016

Time: 8.30-10.30 AM

INSTRUCTIONS:

- This paper comprises of **five** questions
 - Question **one** is **compulsory** and carry 30 marks
 - Answer **question one** and any **other two** questions
 - No mobile phones are allowed in the room
 - You should also have BS 8110
1. A simply supported reinforced concrete beam, with an effective span of 4m, 500mm deep and 250mm wide carries a ultimate uniformly distributed design load (including own self weight) of 50KN/m. Concrete grade C35 is used under moderate exposure conditions. High yield reinforcement steel is to be used. Design the beam. (30 marks)
 2. Design the longitudinal steel and links for a 300mm square column short braced which is to carry an ultimate load of 1200KN with the following material property;
 $f_{cu}=30\text{N/mm}^2$, $f_y=460\text{N/mm}^2$. (20 marks)

3. A 200mm thick simply supported reinforced concrete slab spans 5.0m. Design a suitable slab using grade 35 concrete and high yield reinforcement to support the following characteristic loads:

Imposed loads = 5KN/m^2

Finishes = 0.85KN/m^2

Concrete density = 24KN/m^3

The slab will be exposed to mild situation. (20 marks)

4. A solid footing has to transfer a dead load of 1450KN and an imposed load of 350KN from a column of size 350×350mm. Assuming $f_y=415\text{N/mm}^2$ and $f_{cu}=20\text{N/mm}^2$ and the safe bearing of soil to be 200KN/m^2 design the footing. (20 marks)

5. A reinforced concrete beam which is 350×650mm deep is required to span 6m. The beam carries a dead load and live load of 25KN/M and 10KN/M respectively. Assume $f_{cu}=30\text{N/mm}^2$, $f_y=460\text{N/mm}^2$, $f_{yv}=250\text{N/mm}^2$, and exposure condition=Mild, design the beam. (20 marks)