



BOWEN UNIVERSITY
(Of the Nigerian Baptist Convention)
IWO

College of Environmental Science (COEVS)
SECOND SEMESTER EXAMINATION, 2023/2024
ARCHITECTURE PROGRAMME
ARC 210: BUILDING STRUCTURES II (2 UNITS)

INSTRUCTION: Answer question ONE (1) and any THREE (3) Questions.

TIME ALLOWED: 2 hours

Use well labeled diagram(s) where applicable

WARNING: Please note that you are not allowed to bring mobile phone(s) into the examination hall. Non-compliance will amount to examination misconduct and attract stiff penalty.

1. Calculate the reactions and draw the Shear Force Diagram and Bending Moment Diagram of figure 1.

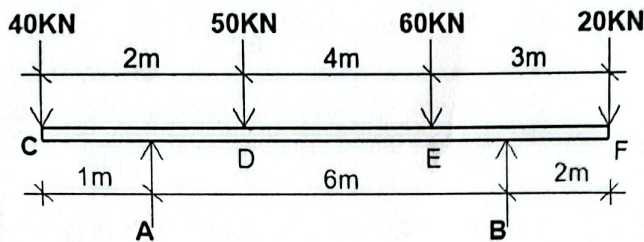


Figure 1. (25 marks)

2. In figure 2 below, determine the reactions of the applied forces about the supports.

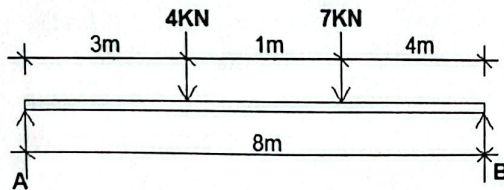


Figure 2. (15 marks)

3. A Steel Stanchion carrying a load of 877.5kN is to be provided with a square steel base plate to spread the load on to a concrete foundation block. Calculate the minimum length of the side (in mm) of the base plate if the stress on the concrete must not exceed 4.5N/mm². (15 marks)
4. Assuming the permissible stress for a Timber post 180mm square and 2.9m high is 6.5N/mm², calculate the safe axial load for the post. How much will the post shorten under this load, assuming E to be 11,200 N/mm². (15 marks)
5. During a compression test, a block of concrete 100mm square and 200mm long (gauge length =200mm) shortened 0.2mm when a load of 155kN was applied. Calculate the Stress, the Strain and Young's Modulus for the concrete. (15 marks)
6. A hollow steel tube 100mm external diameter and 80mm internal diameter and 3m long is subjected to a Tensile load of 400kN. Calculate the Stress in the material and the amount the tube stretches if Young's Modulus is 200,000N/mm². (15 marks)