



**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**FACULTY OF THE BUILT ENVIRONMENT**

**DEPARTMENT OF ARCHITECTURE**

**BUILDING CONSTRUCTION IV**

**AAR 3208**

**Supplementary Examination Paper**

**July 2016**

This examination paper consists of 4 pages

**Time Allowed: 4 hours**

**Total Marks: 100**

**Special Requirements: A1 DRAWING BOARDS, A1 PLAIN SHEETS, MASKING TAPE.**

**Examiner's Name: I. MHANDU.**

**INSTRUCTIONS**

1. Answer ALL questions
2. Answer question 1 on an A1 sheet/s of paper

**MARK ALLOCATION**

<b>QUESTION</b>	<b>MARKS</b>
1.	40
2.	20
3.	20
4.	20
<b>TOTAL</b>	<b>100</b>

## QUESTION 1

The diagram below shows a typical beam and column layout of a 17 storey office building with an atrium which is centrally located. The atrium is designed as part of the whole building energy and lighting strategy, and also provides the safe means of escape in fire; therefore smoke control in the atrium is a crucial part of the design solution. For a building layout point of view, the commercial space is typically 15 to 18m wide around the atrium and the cores should be located at positions dictated by means of escape in fire. Generally, a minimum of two cores, and often as many as four separate cores may be required on plan in buildings with atria.

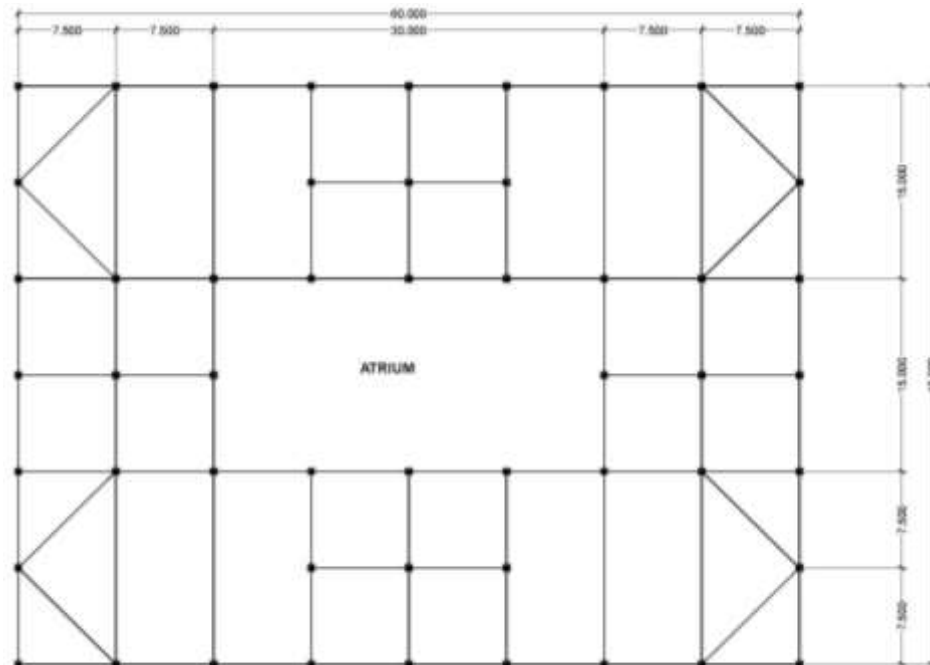


Figure 1: Typical column and beam layout in an office building with an atrium

- (a) Redraw the layout at a scale of 1:200 and show the position of the cores consisting of the stairs, lifts, and service voids. (6)

- (b) The office building makes use of an insitu composite floor slab. Provide a detail of the floor slab at a scale of 1:5 clearly showing all the components. (5)
- (c) Provide the details of the following at a scale of 1:5
- (i) Steel beam to column connections
  - (ii) Steel column splice
  - (ii) Typical steel bracing (12)
- (d) Clearly explain the following using well labelled sketches to an appropriate scale
- (i) type of ceiling used (4)
  - (ii) type of roofing used and show how you ensure proper rainwater drainage (8)
  - (iii) Explain the benefits of steel construction for the building in Figure 1. (5)

[40]

## **QUESTION 2**

- (a) Using sketches explain the difference between curtain walls and infill panels (6)
- (b) What are the disadvantages of cavity walls (4)
- (c) Provide a fixing detail of stone facings on a wall. (4)
- (d) Explain the difference between grout and mortar and where each is applied (6)

[20]

### **QUESTION 3**

- a) Define a pavement and what are the three main purposes it serves? (5)
- b) Use well labelled sketches to explain the two types of pavements (8)
- c) Explain using sketches the purpose of the following in pavement construction.
  - (i) Longitudinal joint
  - (ii) Expansion Joint (4)
- (d) Explain the causes of pavement deterioration (3)

**[20]**

### **QUESTION 4**

- (a) Explain the following terms in ceiling installations.
  - (i) Plenum space
  - (ii) Interstitial space (6)
- (b) Using sketches explain the following in suspended acoustical ceilings
  - (i) Exposed grid suspension systems.
  - (ii) Recessed grid suspension systems.
  - (iii) Concealed grid suspension systems. (9)
- (c) What is the application of metal or plastic-tipped divider strips in terrazzo finishes (5)

**[20]**