



**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**FACULTY OF THE BUILT ENVIRONMENT**  
**DEPARTMENT OF ARCHITECTURE**  
**BUILDING CONSTRUCTION V**  
**AAR 5102**

**Examination Paper**

**December 2017**

This examination paper consists of 3 pages

**Time Allowed: 4 hours**

**Total Marks: 100**

**Special Requirements:** Computer installed with ArchiCAD/AutoCAD SOFTWARE

**Examiner's Name: B. Madondo**

**INSTRUCTIONS**

1. Answer Question 1 and any other 3 questions.
2. Answer Question 1 using a computer provided.

**MARK ALLOCATION**

<b>QUESTION</b>	<b>MARKS</b>
1.	40
2.	20
3.	20
4.	20
5.	20
<b>TOTAL</b>	<b>100</b>

### QUESTION 1

- a. Using CAAD skills draw a section through a typical two bay symmetrical pitched two bay aircraft hangar covering an area of 42mx20mx4.5m height. The roof of the same is to be supported by steel portal frames made out of a standard I-section (universal beam). (20)
- b. Draw typical details at appropriate scales of the following:
  - i. Valley gutter details (5)
  - ii. Base connection and knee joint (5)
  - iii. Chromadeck roof and wall cladding (5)
  - iv. State 5 reasons on the preference of steel over concrete portal frames (5)

### QUESTION 2

You have been commissioned to refurbish a five-storey building. The budget doesn't allow for any alterations to the structure and a glazed curtain wall is proposed while maintaining the existing fenestration.

- a. With the aid of sketches illustrate how the curtain wall will be constructed. (15)
- b. Explain with the aid of sketches how the natural ventilation system on the building will be maintained. (5)

### QUESTION 3

- a. State three advantages and two disadvantages of either pre or post tensioned concrete over in-situ cast concrete. (3)
- b. Clearly discuss and illustrate the difference between pre and post tensioned concrete mentioning two uses of each. (8)
- c. Define pre-fabricated modular structures and comment on their use in Zimbabwe (4)
- d. Identify five design considerations for the prefabricated modular structures. (5)

#### QUESTION 4

- a. Explain the differences between a girder and a space frame (5)
- b. Illustrate the difference between a steel girder north light roof and a steel girder south light. (10)
- c. List the advantages and disadvantages of using space frames. (5)

#### QUESTION 5

- a. (i) Explain the functional requirements of claddings. (5)  
(ii) Outline the limitations of Aluminum as a cladding material. (2)
- b. (i) Define an infill panel and show typical details of infill panels using the following. (8)  
(Timber, metal or glass)  
(ii) Show a typical detail of an infill panel for sound, heat and moisture protection. (5)