**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**
FACULTY OF THE BUILT ENVIRONMENT

**DEPARTMENT OF ARCHITECTURE**

BACHELOR OF ARCHITECTURE (HONOURS) DEGREE
2012-2013 ACADEMIC YEAR
PART V – FIRST SEMESTER EXAMINATIONS – JANUARY 2013

**PART V BUILDING CONSTRUCTION – AAR 5102**

*Instructions* *Time: 4 hours*
*Answer all questions*

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## QUESTION 1

Plan International, a non-governmental organization have decided to use 8 multi-span precast concrete portal frames instead of a steel portal frame for a ware house in rural Wedza to store agricultural inputs for farmers. The concrete portal framed warehouse which measures 42 x 18m is brick clad on the bottom 1.5m. *A lightweight chromadeck cladding is on the upper part of the wall.* The warehouse internal clearance is 6m and is accessed by 2 roller shutter doors on one of the 18m wall.

a) Draw the Floor plan and two elevations of the warehouse using a scale of 1:100. (10)

b) (i)Draw a section through a concrete portal frame structure using a scale of 1:50 (8)

(ii)Provide details to reflect the building components of the frame using a scale of 1:5 (12)

c) State advantages and disadvantages for preferring the use of concrete portal frame against a steel portal frame. (5)

(d) Also suggest and illustrate ways of how the building can be provided with lighting and ventilation (5)

**[40]**

## QUESTION 2

a) (i) Explain the functional requirements of claddings. (5)

(ii) Give advantages of using precast cladding units. (2)

b) (i) Define an infill panel and show typical details of infill panels using the following.

(Timber, metal or glass) (8)

(ii) Show a typical detail of an infill panel for sound, heat and moisture protection.

(5)

**[20]**

**QUESTION 3**

(a). What is pre-stressed concrete and identify its applications. (4)

(b). Using well annotated sketches explain the methods of creating pre-stressed concrete systems. (8)

(c). Give disadvantages of pre-stressed concrete and its advantages. (4)

(d) Show using sketches the type of precast sections used to achieve pre-stressed Concrete structures (4)

**[20]**

**QUESTION 4**

Using well annotated sketches provide the following

(a) A typical detail of a reinforced concrete north light barrel roof. (5)

(b) A typical detail of the connection of space deck units to an internal Column (6)

(c) Identify 2 membrane types used in tensile roofing structures (4)

(d) State and explain the disadvantages of space frame systems (5)

**[20]**