

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF THE BUILT ENVIRONMENT

DEPARTMENT OF ARCHITECTURE
BACHELOR OF ARCHITECTURAL STUDIES (HONOURS) DEGREE

PART V –FIRST SEMESTER EXAMINATION – DECEMBER 2013
2013-2014 ACADEMIC YEAR

AAR 5102 – BUILDING CONSTRUCTION V

Instructions

Duration: 4 Hours

Answer all Questions.

Answer Question 1 on an A1 sheet/s of paper.

Total Marks: 100

Question 1

The national airline requires an Aircraft maintenance hangar sized to enable two A380-800 aircraft either nose first, or tail first entry into the building, depending on the philosophy of the aircraft maintenance manager to be maintained simultaneously. Basic envelope size to be provided by the hangar for each aircraft is 80m x 85m x 24.5m high. Tail first entry into the building means the roof structure clearance of the hangar must be at a constant height (24.5m) to clear the tail fin. The support accommodation should be planned in 2 halves for each hangar to provide a space in the centre for a tug should the maintenance manager prefer nose entry first.

Main Features

- ✓ Hangar doors to open full width of envelope size, 85m.
- ✓ Three 35 ton cranes required, supported on overhead gantries to access the aircraft.
- ✓ Tug access required for forward entry of aircraft.

(a) Design and draw the hangar under a two bay symmetrical pitch lattice steel roof. The walls and roof are *of insulated metal panels*. The lattice steel roof trusses has 7 rows of castellated steel supporting columns (*1 SECTION*) spanning ninety-five metres (95 m) and have a spacing of 15m. Drawings should show a structural plan, section, two elevations and relevant details, all **at appropriate scales**.

(40)

(b) Explain the choice of the Insulated Metal Wall and Roof Systems

(9)

[49]

Question 2

a) What is a tensioned fabric structure?

(3)

b) Illustrate using sketches the difference between a mast supported and an arch supported fabric structure.

(8)

[11]

Question 3

a) What is structural glazing?

(3)

b) Illustrate using sketches the difference between Point fixed clamping and Point fixed drilling in structural glazing.

(10)

c) Provide sketches to explain the application of stick curtain wall onto the building structure.

(7)

[20]

Question 4

a) What is pre-stressed concrete?

(3)

b) State and explain the three main types of internal pre-stressed concrete.

(9)

c) What is grout and where is it used in coming up with pre-stressed concrete?

(3)

d) Identify five different ways of protecting tendons used in pre-stressing against corrosion.

(5)

[20]