



FACULTY ART DESIGN AND ARCHITECTURE

2014 November

Main Assessment

DEPARTMENT OF ARCHITECTURE

MODULE NAME : CONSTRUCTION & DETAILING

MODULE CODE : ATC111

DATE : 11 November 2014

DURATION : 08:30 – 11:30

TIME : 3HRS

TOTAL MARKS : 150

ASSESSOR(S) : Mr. A.J Makhubu

MODERATOR(S) : Dr. F. Saidi

NUMBER OF PAGES : 10 PAGES INCLUDING THE COVER

INSTRUCTIONS TO CANDIDATES:

- This is a closed book assessment
- Use the supplied answer sheets
- Read the questions carefully and answer only what is asked.
- Number your answers correctly
- Write neatly and legibly.
- Structure your answers by using appropriate headings and sub-headings.
- The general University of Johannesburg policies, procedures and rules pertaining to written assessments apply to this assessment.
- **Answer all Questions**

Question 1: Overview [20]

1. Explain the following construction terms using simple and clearly annotated diagrams?
 - 1.1 Pad foundation
 - 1.2 Brick-force
 - 1.3 Moment frame
 - 1.4 Threshold
 - 1.5 Damp Proof Membrane
 - 1.6 Waste pipe
 - 1.7 Roof ridge
 - 1.8 Insulation
 - 1.9 Lintol
 - 1.10 Load path

Question 2: The Industry [17]

- 2.1 Name 4 members of the professional team and give one main function they each serve respectively? (8)
- 2.2 Explain the functions of SABS 0400 (5)
- 2.3 In your own words explain the difference between rational design and empirical design (4)

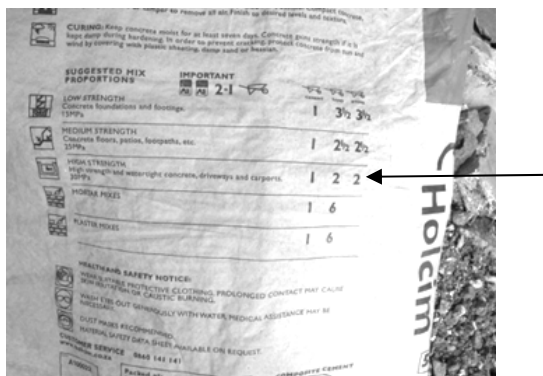
Question 3: Soil and Substructure planning [10]

- 3.1 Describe the process of compaction of soil, to create a formation level on a sloping construction site. Include the typical equipment used in this process. Illustrate your answer with neat, annotated sketches (10)

Question 4: Foundations [19]

- 4.1 Use examples to explain the difference between “shallow foundations” and “deep foundations”. Include diagrams. (8)
- 4.2 A bag of cement has suggested mixing proportions on it (see photo). It is decided that as high strength concrete is required, the proportions will be 1:2:2

Answer the following questions about this situation:



- 4.2.1 How does the water:cement ratio affect the workability of the mix? (include a brief explanation in terms of water:cement ratio and workability) (6)
- 4.2.2 What will be the effect on the ultimate strength of the dry concrete, if the contractor adds too much water to the mix? Why is this? (5)

Question 5: Framed Structures [10]

- 5.1 Use neat annotated diagrams to illustrate the following structural elements
- 5.1.1 Cantilever (2)
- 5.1.2 Retaining wall (2)
- 5.2 Tabulate the difference between load bearing and non-load bearing walls, include examples of each (4)

Question 6: Superstructure: Floors [10]

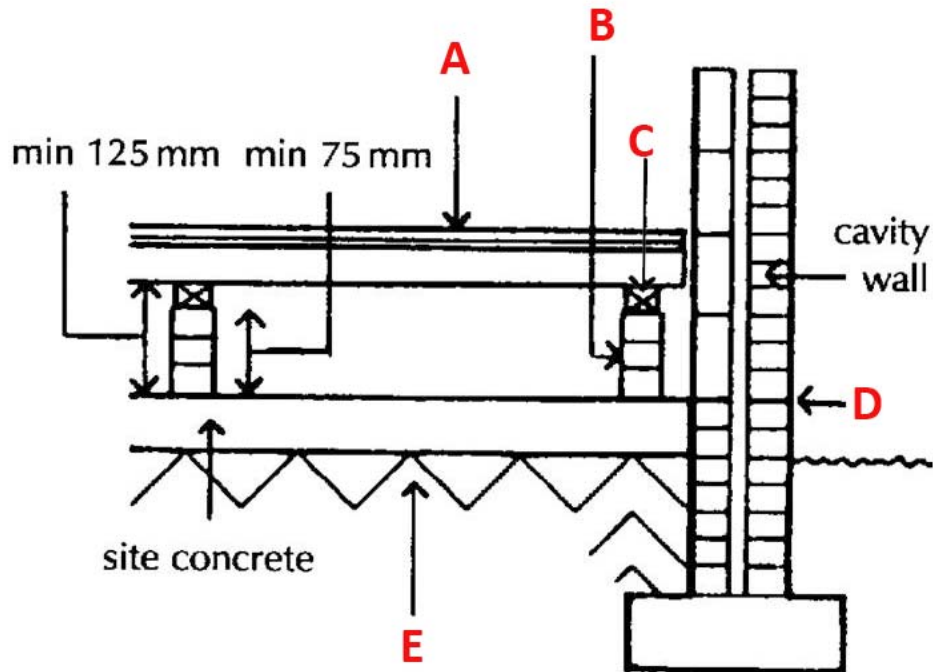
6. You are commissioned to design a holiday house, a double storey on an Erf. no. 1882 (see figure 6.1) on the slopes of Betty's Bay Close to Cape Town for Joburg based Mr. & Mrs Malema



Figure 6.1: The Client's Site

The client is a diamond dealer and requires a private space to have meetings and work. She wants to have a mezzanine floor built over the living spaces. She wants the erection of the floor to take place quickly – no mess, no fuss. You recommend a timber and joist flooring as well as a pre-cast floor system.

- 6.1 Explain with two reasons why these flooring systems are advantageous over in-situ. (4)
- 6.2 What is the disadvantage of RC in-situ flooring? (2)
- 6.3 Give the missing annotations in the following drawing of a raised floor? (5)



Question 7: Superstructure: Walls [7]

- 7.1 Give a definition of a retaining wall? (2)
- 7.2 What is the maximum height of a freestanding wall with piers as set out in the SANS 10400? (2)
- 7.3 Draw a diagram (3D) showing how to stabilise a long freestanding boundary wall (3)

Question 8: Superstructure: Stairs [14]

- 8.1 The purpose of stairs is to connect different levels, create access and means of fire escape in a multi-storey building. To fulfil the above, any stair must be designed and built with 4 functional requirement/considerations in mind. Name 2 of those requirements? (2)

8.2 Choose the correct answer. The minimum head height for a stair (as per the SABS 0400) is? (1)

A. 2200mm

B. 2100mm

C. 1800mm

8.3 Label the missing dimensions (as per the SABS 0400) (3)

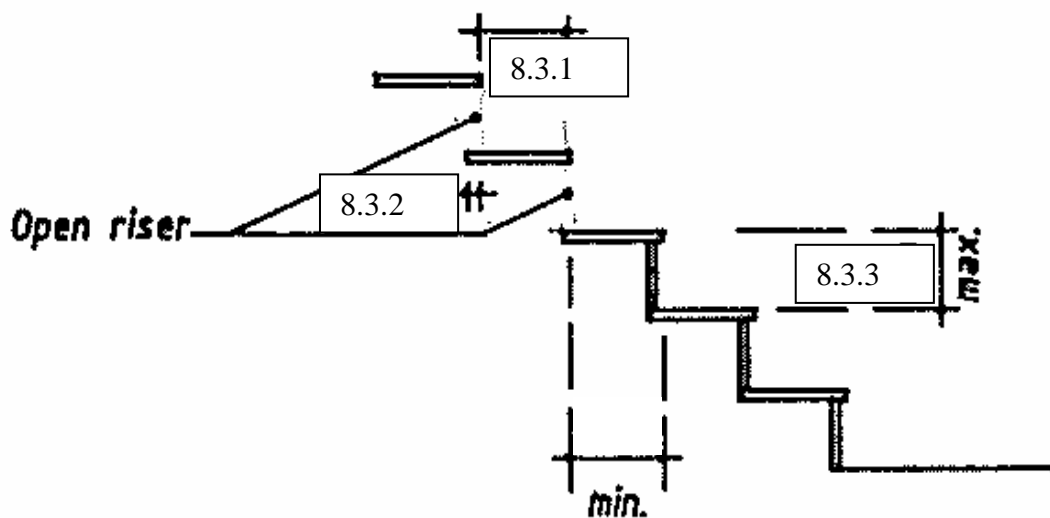


Fig. 2 - Stairway Tread Dimensions

8.4 There are 4 ways of supporting a concrete dog-leg (half turn) stair. Using a simple diagram, illustrate 2 (two) ways of supporting these flights of stairs. (4)

8.5 Work out the number of risers and height of each riser if the height to underside of suspended floor slab is 2400mm and the slab is 170mm thick (4)

Question 9: Superstructure: Openings [10]

- 9.1 The building regulations specify that windows in habitable spaces be designed so as to allow sufficient supply of 2 factors. Name these factors and the percentages there of respectively. (4)
- 9.2 Safety glass is both laminate and toughened glass; however, both are made differently. Explain how toughened glass is made. (2)
- 9.3 There are three types of flush timber doors discussed in class, namely hollow core; semi-solid and solid flush timber doors. What type of timber door would you specify for the following spaces and give a reason why? (4)

9.3.1 Entrance foyer

9.3.2 Bathroom

Question 10: Superstructure: Roofing [10]



Figure 10: Roof

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- 11.2.2 What is the minimum height off the Natural Ground Level (NGL) do openings on drainage pipes exposed to rainwater have to be to prevent rain water run-off into the system? (2)
- 11.2.3 Name the loop that contains water in the drainage pipe to prevent smells. (2)
- 11.3 According to the new revision of SANS 10400 PART XA which refers to energy efficiency and sustainability, pipes reticulating hot water supply must be insulated, why do you think this is necessary? (2)
- 11.4 What is the box from which the main electrical cables are fed to and from? (2)
- 11.5 Using the supplied annexure 11.5, draw a simple electrical layout plan of the given floor plan, showing positions of DB, ideal and functional lighting layout (inside and exterior, plug points etc. (8)

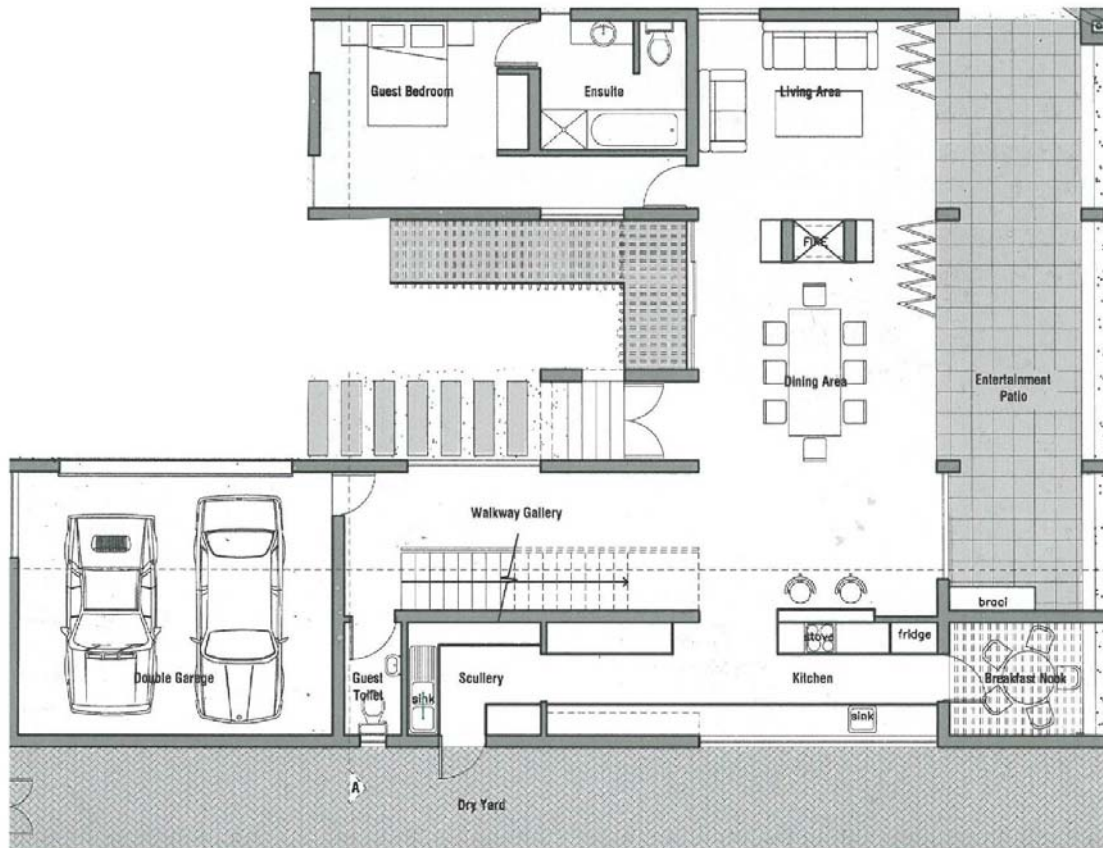
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ANNEXTURE 11.5 GROUND FLOOR PLAN

STUDENT NAME: _____

STUDENT NUMBER: _____

ATC111 NOVEMBER 2014 ANSWER SHEET



ELECTRIC KEY:

	2,1m HIGH POLE MOUNTED GARDEN LIGHT
	CEILING LUMINAIRE
	EXT. WATERPROOF LUMINAIRE
	WALL-MOUNTED LUMINAIRE
	SPOTLIGHT
	SPOTLIGHTS ON TRACK/ BAR
	DOUBLE FLUORESCENT 1200
	SWITCH @ 1000 ABOVE FFL
	2-WAY SWITCH 1000 ABOVE FFL
	DOUBLE PLUG SOCKET 300 ABOVE FFL

	DOUBLE PLUG SOCKET 1000 ABOVE FFL
	SINGLE PLUG SOCKET 1000 ABOVE FFL
	SINGLE PLUG SOCKET 300 ABOVE FFL
	PLUG-IN FOR TV
	DOUBLE TEL. & MODEM SOCKET
	DISTRIBUTION BOARD
	BATTERY OPERATED BELL
	200 LITRE GEYSER IN ROOF
	AUTOMATICALLY DARK-ACTIVATED SWITCH
	INTERCOM GATE CONNECTION