

**CONSTRUCTION & FIRE ENGINEERING 1**  
**[Construction Component]**  
**and**  
**BUILDING CONSTRUCTION AND MATERIALS 6**

FIRST SEMESTER EXAMINATION 1999

TIME : 2 HOURS

Subject Code            08174, 05475  
Date of Examination    Saturday, 19/6/99  
Examiner                V Mehrrens

**General Instructions to Candidates :**

Write your name on the examination paper

Read through the questions carefully before answering

You **must** answer **Question 1** and **three** [3] of the remaining **four** [4] Questions

Marks for each question are shown in brackets

Open book examination [all references permitted]

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**Question 1:**

**[40 MARKS]**

The Sydney Committee for Organising the Olympic Games has recently disclosed that it doesn't have a venue for indoor volley ball for the Olympic Games to be held in Sydney in September 2000.

The South Australian Government has seized the opportunity and has given a commitment to provide a new purpose built venue in Adelaide.

The overall size of the building is to be 80 metres x 50 metres, accommodating space for several volley ball courts, seating for approximately 5,000 spectators and associated service areas. A clear floor to ceiling height of 15 metres is required over the court area.

Parking for 1,500 cars is required on site, with the remainder to be accommodated on adjacent streets.

The Government has quickly selected a site for the Volleyball Stadium in the Parklands at North Adelaide. Following the announcement of the selected site, the Parklands Preservation Society has vowed to prevent this building development on the parklands.

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The Adelaide City Council has raised several objections to the project, including the use of parklands for parking and the Walkerville and Prospect Councils have objected to the likely disturbance and inconvenience to the nearby residents.

Although the building must accommodate the Volley ball competition for the 2000 Olympics, it has not yet been decided how the building will be used after that time, although it is unlikely to be for volleyball.

Preliminary site investigations have revealed that part of the site consists of unclassified fill from a former dumping site. Investigations are still proceeding to ascertain whether the site is contaminated in any way.

The project team has not yet been assembled and the project procurement process has not yet been determined.

It is critical that the time, cost and quality objectives be achieved on this project. Constructability is one of the techniques to be used in achieving these project objectives.

You are invited by the Government at this early stage of the project to provide advice which is consistent with the principles of constructability. Your advice should include recommendations, and supporting discussion, on specific actions to be taken with regard to this project.

### **Question 2:**

**[20 MARKS]**

A well established University proposes to construct a new 5 storey building on an inner city site, to accommodate teaching spaces and other facilities for students and staff. The facility is to be designed and constructed as a model intelligent building.

- Briefly describe some of the approaches which have been adopted in attempting to define an intelligent building [5 marks]
- Describe eight [8] specific features / systems / components which you would recommend to be incorporated in the proposed University building to ensure that it would be considered as an intelligent building. You should include brief justification for your recommendations [15 marks]

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**Question 3:**

**[20 MARKS]**

Describe what type of materials you would recommend for the roof cladding and roof structure to provide protection from the sun over an outdoor children's playground near the beach. The area to be covered is 20 metres x 15 metres, there are no walls or internal columns and the clear height is to be 4.5 metres. You should include reasons for your recommendations, and illustrate your answer with diagrams.

**Question 4:**

**[20 MARKS]**

There is an increasing community awareness of the need to reduce energy consumption. Builders of new houses are keen to incorporate construction details which can be advertised as contributing to energy efficiency for the home owner. Describe how thermal control may be provided as part of the roof construction of a house. Discuss whether the energy efficiency of the house is likely to be affected by alternative roof construction details. You should illustrate your answer with appropriate diagrams.

**Question 5:**

**[20 MARKS]**

Discuss what wall cladding system you would recommend for the 5 storey intelligent building described in Question 2. The inner city site is on a congested campus with other buildings nearby. Access and space for construction materials and activities is limited. You should include reasons for your recommendations, and illustrate your answer with diagrams.

##### END OF QUESTIONS #####