
CONSTRUCTION & FIRE ENGINEERING 1 (10275)
[Construction Component]
and
BUILDING CONSTRUCTION AND MATERIALS 6 (05475)

EXAM: SEMESTER 1, 2000

TIME : 2 HOURS

Examiner G.Zillante

Instructions

Write your name on the examination book

Read through the questions carefully before answering

You must answer all questions

Marks for each question are shown

Open book examination [all references permitted]

This exam paper has three pages.

Question 1:

[40 MARKS]

The South Australian Government recently obtained some funding from the Federal Government in Canberra. The money is available for special capital works projects as part of the national celebrations to mark the Centenary of Federation in Australia.

The celebrations will begin on January 1, 2001, and the Prime Minister will come to Adelaide on that day to visit the project and make a major policy statement regarding reconciliation with the aboriginal people of Australia. Many millions of people throughout the country will be watching and the South Australian Government is committed to provide an impressive project to serve as an appropriate platform for this major occasion. The special project, which is to be known as The Federation Project, will be a high technology building to accommodate a museum of science and technology. The completed museum will be operated jointly by the University of South Australia and Mitsubishi Motors, and representatives of these bodies have recently formed a Project Steering Committee in conjunction with the Government.

It is not necessary that the project be completed by January 1, 2001 however construction must be well advanced, and equally importantly, the project must generate the interest and support of the community in Adelaide.

The overall size of the single storey building is to be approximately 70 metres x 50 metres in plan, accommodating space for several display galleries at ground level, with workshops and other service areas either at ground level or on a mezzanine floor which may cover up to one third of the floor area. A clear floor to ceiling height of 6 metres is required over the gallery areas, which will occupy approximately two thirds of the floor area. A feature of the entrance to the new museum must be a cantilever roof, projecting up and out from the building to a height of at least 25 metres. (This feature has already been determined by the Project Steering Committee who have recently visited similar new museum buildings in other states.) The building, being a museum of science and technology, must be fitted with the most advanced technology available for building services and display equipment. Parking for 200 cars is required on site, including 100 of these parking spaces which must be under cover, perhaps in a basement car park.

The Government has quickly selected a site for The Federation Project near North Terrace opposite the City West Campus, adjacent to the railway tracks and near the River Torrens.

Following the announcement of the selected site, the Parklands Preservation Society has vowed to prevent this building development on land which is currently designated as Parklands. The Adelaide City Council has raised several objections to the project, including the use of parklands for parking instead of recreation, and the fact that the Government had previously announced that this site would be available for the Council to build a skate boarding facility to attract young people away from the shopping district. As a result the Retail Traders Association have announced their opposition to The Federation Project and their opposition has been supported by the the Skate Boarding Club of Adelaide, who have further threatened to disrupt construction.

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. Due to the pre-GST rush, and the high volume of work being undertaken in Sydney prior to the Olympics, the construction industry in Adelaide is currently extremely busy, and there is a shortage of subcontractors in some trades.

There is a set amount of funds available for the completion of the project, and the design and construction must be managed within that budget.

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 clear recommendations, and supporting discussion, on specific actions to be taken with regard to this project.

Question 2:

20 MARKS

Describe what type of materials you would recommend for the roof cladding and roof structure to provide a roof over an indoor soccer stadium. The area to be covered is 100 metres x 130 metres, there are no walls or internal columns and the clear height is to be 30 metres. Explain the reasons for your recommendations, and illustrate your answer with diagrams.

Question 3:

20 MARKS

A two storey commercial office building was constructed in 1985 just beyond the edge of the Central Business District. It is on a major road leading into the city, and has an outlook across that road to pleasant parklands which separate this area from the Central Business District. There is an undercroft parking area below the two levels of office accommodation. There are many similar commercial buildings along the road, but immediately behind these commercial buildings there are long established residential suburbs.

Describe the typical Building Life Cycle, and discuss its implications, for this building.

Question 4:

20 MARKS

A major new building development is to be constructed near the beach in a suburban area. The building will have six levels. The lower two levels provide accommodation for shops and offices. The upper four levels will be luxury apartments with attractive views along the coast. Discuss what wall cladding system you would recommend for

this building. Explain the reasons for your recommendations, and illustrate your answer with diagrams.

END OF QUESTIONS