HOUSING and DESIGN  
(HDS315118)

Time allowed for this paper
- Working time: 2 hours
- Plus 15 minutes recommended reading time

Candidate Instructions
1. You MUST make sure that your responses to the questions in this examination paper will show your achievement in the criteria being assessed.
2. There are TWO sections to this paper.
3. You must answer:
   - ONE question from Section A - on the A3 answer sheet for that section.
   - ONE question from Section B - on the relevant A3 answer sheet for that section.
4. All written responses must be in English.

On the basis of your performance in this examination, the examiners will provide results on each of the following criteria taken from the course statement:

Criterion 3 Analyse and apply features and principles which will contribute to environmental sustainability within design decisions.

Criterion 4 Apply architectural design principles relating to functional use of space.

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Answer ONE question from this section.

Your answer should be on the A3 answer sheet labelled Section A.

This section assesses Criterion 3.

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**Question 1**

Refer to Figures 1 and 2.

The Durack Homestead was built in the Kimberley Region in far northern Western Australia in 1895. Despite the high temperatures and humidity of the tropical wet season, the homestead stayed remarkably cool all year round. To save the building from being flooded when the property was turned into a dam in 1963, the Durack Homestead was dismantled and reassembled high above the new water level.

Patrick and her daughter Liz, have decided to build self-contained accommodation near the homestead. They would like to re-use some of the large limestone blocks, windows and doors from the original buildings.

Each of the three doors measure 2100 mm x 900 mm. Each of the four casement windows are 900 mm high x 1500 mm wide.

They have found a floor plan they like but are unsure how to keep the new building thermally comfortable. The dimensions of the building will be 12000 mm x 6000 mm x 3000 mm high.

**Aim**

Without changing the floor plan, provide advice about the design considerations to be applied to enable thermal comfort including:

- the orientation of the building on the site
- water storage
- energy collection
- placement of doors and windows
- outdoor living area

**Response**

Use the A3 answer sheet provided for Section A to answer this question.

- At a scale of 1:100:
  - draw a plan of the site. Within the site, sketch the floorplan of the building.

- At a scale of 1:50:
  - draw a section of the building

Your drawings should indicate the materials, openings and zones. Annotate to justify the design decisions and principles of passive solar design.
Figure 1: Proposed Floor Plan (not to scale)

Figure 2: Site Plan (not to scale)

Section A continues.
Section A (continued)

Question 2
Refer to Figures 3 and 4.

When Gomez and Ivy purchased a Heritage Listed cottage in Hobart for their family, they understood this attracted a number of building restrictions that required the internal walls of the original house to remain in place.

The back rooms, however, including the kitchen, laundry and bathroom, were built in the 1960s and have since become run down and must be removed. The cottage is situated between several tall buildings and experiences significant overshadowing (see Figure 3 and 4).

The owners would like you to design an extension that is thermally comfortable for their family of four.

To further add to the challenge, the owners would like to feature a cherry tree, planted soon after the house was built, into the extension works.

Aim
To provide Gomez and Ivy with advice about the design considerations to be applied to enable thermal comfort including:

- what are the most suitable functions/zones to be located in the original section of the house (four rooms)?
- the ideal orientation and siting of an extension behind the existing building. Label the location of each room(s), but do not design the internal layouts (furniture or joinery).
- the extension must not exceed 70 square metres.
- the inclusion of a historically significant cherry tree to feature in the extension.

Response
Use the A3 answer sheet provided for Section A to answer this question.

- At a scale of 1:100:
  - draw a plan of the site (24 000 mm x 12 000 mm)
  - within the site, draw a plan of the original house and your proposed extension.

- At a scale of 1:100:
  - draw a section of the extension along the north-south axis to show the impact of the neighbouring two storey Georgian dwelling on the extension during Winter.

Your drawings should indicate the materials, openings and zones. Annotate to justify the design decisions and principles of passive solar design.
Figure 3: Existing Site Plan (not to scale)

Figure 4: Sketch of the Street Elevation
Answer ONE question from this section.

Your answer should be on the A3 answer sheet labelled Section B, with the number corresponding to your chosen question.

This section assesses Criterion 4.

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Question 3

Refer to Figure 5.

Tai has come to you with an idea to build a small guest house at the back of her property in the form of a large water tank. She understands the properties of rolling corrugated iron will make a strong structural form and potentially quicken the building process, meaning a more affordable house.

The circular plan will have an external diameter of 8200 mm, a ceiling height of 2700 mm, making for an approximate area of 50 square metres.

Tai has asked you to design a solution for her new guest house that ensures sufficient access to light and privacy from the existing house and neighbouring buildings, and does not feel too cramped in the space.

In addition, only two openings can be made into the external wall of the water tank so it does not lose structural integrity.

The design will need to include a:

- bathroom
- small kitchen
- space to sleep two people with some level of privacy from the living space
- open plan living area with space to set up and work on a laptop.
- an internal courtyard (2000 mm x 2500 mm) to provide natural light to the house and protected outdoor space
- one entrance door (1000 mm wide)
- one window (up to 2400 mm wide and 1000 mm high)

Aim

To make design recommendations for Tai.

Response

On the answer sheet provided for Section B, Question 3:

- At a scale of 1:50:
  - draw the design layout of the new guest house, including the position of the entrance door, one window, internal courtyard, furniture and fittings.
- Annotate to justify the principles of functional design.
Figure 5. Plan of Tai’s existing house and the proposed guest house
Not to Scale
Section B (continued)

Question 4

Refer to Figures 6 and 7.

The Glass House, by architect Philip Johnson, is a modernist icon and known for bringing the ‘outdoor’ into the inside. Your client, Jess, has aspired to live in a house that shares some of the same qualities, and loves its seamless integration into the landscape as well as its open plan.

Jess has come to you for your design advice on how to incorporate a universal access bathroom into such a design. He would like to keep the round form of the fire place and bathroom but is unsure how the toilet, shower and basin could be positioned to comply with standards. He also wants to know what other alterations may be required to allow universal access.

The design problem includes:

- the key dimension requirements for toilet, basin, and shower that allows universal access, including the circulation areas.
- the location of the toilet, hand basin, mirror, shower and other fittings.
- the location and size of the door.

Aim
To make design recommendations for Jess in order to show the critical layout and dimensions.

Response
On the answer sheet provided for Section B, Question 4:

- At a scale of 1:20:
  - draw the design layout of the new bathroom.
  - draw a section(s) which shows the critical dimensions of the furniture and fittings.

Annotate to justify the layout of functional design.
Figure 6. Illustration of the Glass House

Figure 7. Plan of the Glass House
Not to scale