



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2023/2024

- COURSE NAME : SUSTAINABILITY IN ARCHITECTURE
- COURSE CODE : BFR 21103
- PROGRAMME CODE : BFR
- EXAMINATION DATE : JULY 2024
- DURATION : 3 HOURS
- INSTRUCTIONS :
1. ANSWER ALL QUESTIONS
 2. THIS FINAL EXAMINATION IS CONDUCTED VIA
 - Open book
 - Closed book
 3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK

THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

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- Q1**
- (a) Define the following terms:
 - (i) Soil erosion
 - (ii) Deforestation
 - (iii) Sustainable design

(6 marks)
 - (b) Interpret **THREE (3)** of the Sustainable Development Goals (SDGs) highlighted by the United Nations that are related to architecture.

(9 marks)
 - (c) Differentiate construction materials used between traditional architecture and sustainable architecture.

(10 marks)
- Q2**
- (a) Solar passive design strategies emphasize sun orientation as a major design consideration and shading devices are commonly used to control the amount of sunlight entering buildings.
 - (i) Explain types of shading devices suitable for Malaysia's climate.

(6 marks)
 - (ii) Illustrate the use of external shading devices in reducing solar radiation and optimizing daylighting in the Malaysian context.

(9 marks)
 - (b) Bioclimatic design refers to an architectural approach that integrates natural elements and environmental conditions to create comfortable buildings, energy-efficient, and harmonious with the surroundings.

Discuss the principles and advantages of bioclimatic design as a passive design strategy in architecture.

(10 marks)

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- Q3 (a) Convection, conduction, and radiation are three important mechanisms of heat transfer in a building. Label the process of heat transfer in **Figure Q3.1**.

(6 marks)

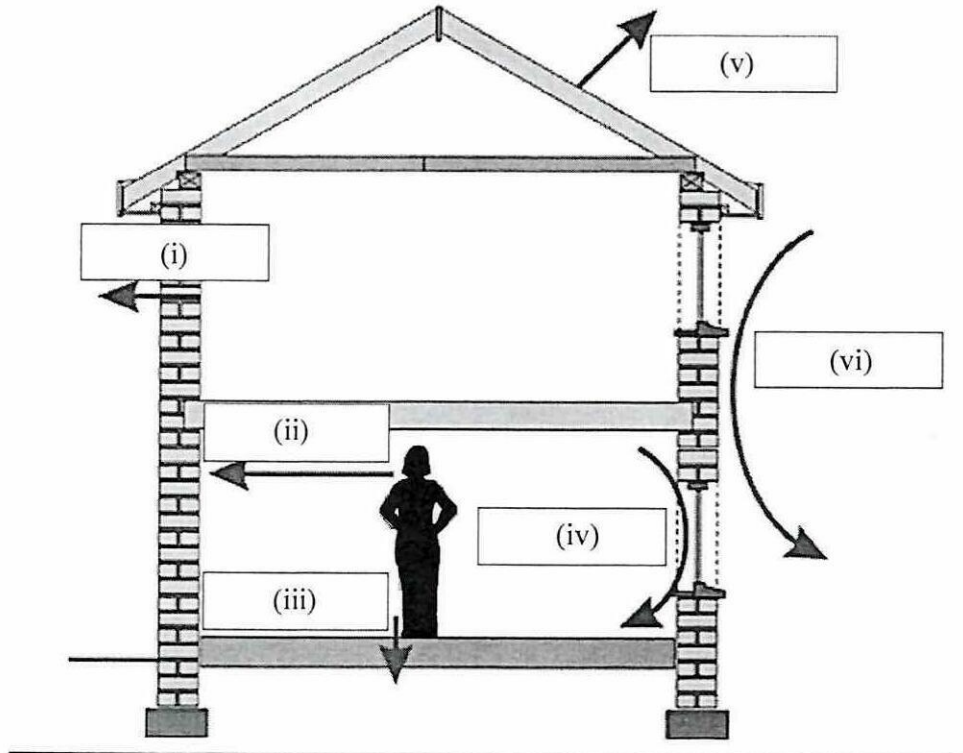


Figure Q3.1 Heat transfer in a building

- (b) Windows are vital parts of buildings' envelope, serving not only to establish physical and visual connections with the outdoors but also facilitating natural ventilation and the ingress of natural light into the interior space.
- (i) Illustrate the improvement of natural ventilation through window design. (7 marks)
- (ii) With the aid of illustration, discuss how to avoid thermal discomfort in naturally ventilated building design. (12 marks)

(12 marks)

Q4 An energy audit involves a thorough examination of a building's energy usage, identifies inefficiencies, and recommends actions to enhance energy efficiency.

(a) Describe **TWO (2)** factors that can affect building energy use.

(4 marks)

(b) Propose a recommendation for improving energy efficiency and integrating renewable energy sources into non-residential buildings. Justify and illustrate to support your proposal.

(9 marks)

(c) Review **FOUR (4)** detailed energy audit procedures.

(12 marks)

- END OF QUESTIONS -

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