

TUNKU ABDUL RAHMAN UNIVERSITY OF MANAGEMENT AND TECHNOLOGY

FACULTY OF BUILT ENVIRONMENT

ACADEMIC YEAR 2023/2024

MAY/JUNE EXAMINATION

ATGB1363 BUILDING SCIENCE AND SERVICES I

THURSDAY, 30 MAY 2024

TIME: 9.00 AM – 11.00 AM (2 HOURS)

DIPLOMA IN BUILDING

DIPLOMA IN REAL ESTATE MANAGEMENT

DIPLOMA IN QUANTITY SURVEYING

Instructions to Candidates:

Section A: Answer all questions.

Section B: Answer only one question.

All questions carry equal marks.

ATGB1363 BUILDING SCIENCE AND SERVICES I

SECTION A: Answer all questions

Question 1

- a) A 10 mm thick fiberglass is proposed to be added to a partition wall construction to reduce the U-value of $0.95 \text{ W/m}^2 \text{ K}$ to $0.65 \text{ W/m}^2 \text{ K}$. With calculation of minimum insulation thickness required, comment whether the proposed 10 mm thick fiberglass is appropriate to be used. (The thermal conductivity of the fiberglass is 0.02 W/m K). (11 marks)
- b) State and discuss in detail the FOUR (4) factors that can influence condensation in a building. (8 marks)
- c) State and provide the explanation for the THREE (3) components of rainwater harvesting system. (6 marks)
- [Total: 25 marks]

Question 2

- a) Provide FOUR (4) principles with detailed explanation in which a good sound insulation depends upon. (8 marks)
- b) In the renovation of a multipurpose hall with dimensions of $12 \text{ m} \times 28 \text{ m} \times 8 \text{ m}$, the designer has recommended to reduce the reverberation time from 3.5 s to 1.0 s . Calculate and suggest the amount of extra absorption required in order to meet the design requirement. (9 marks)
- c) Construction industry emits a lot of noise during the construction process. Provide EIGHT (8) actions which are useful to control noise from many industrial sources including factory and construction sites. (8 marks)
- [Total: 25 marks]

Question 3

- a) A lamp with total emitted flux of 5000 lm is suspended 2.0 m above the centre of a $1.0 \text{ m} \times 1.5 \text{ m}$ rectangle table. Calculate the minimum illuminances (E) produced on the table. (8 marks)
- b) Provide the definition for luminaries and also FOUR (4) of its functions. (7 marks)
- c) Provide the definition of glare. State the TWO (2) types of glare and provide the detailed explanation. (10 marks)
- [Total: 25 marks]

ATGB1363 BUILDING SCIENCE AND SERVICES I**SECTION B: Answer only one question****Question 4**

- a) State with detailed explanation the FOUR (4) processes involved in the hydrological cycle. (12 marks)
- b) Calculate the discharge through a 30 mm diameter pipe when the head of water is 4 m and the effective length of pipe is 20 m. (4 marks)
- c) Indirect water supply system is one of the types of water supply system. State SIX (6) features and THREE (3) advantages of this water supply system. (9 marks)
- [Total: 25 marks]

Question 5

- a) Waste treatment is an important process to ensure that waste is safely taken away from the building and converted to a non-harmful material which can be disposed of safely. Name and discuss the functions of the THREE (3) stages of sewerage treatment. (6 marks)
- b) A vitrified clay underground pipe is being designed to allow water to flow at $0.02 \text{ m}^3/\text{s}$ using a 150 mm \varnothing clay pipe. Calculate the inclination needed for the water to flow full bore. Assume Chezy constant as 55. (12 marks)
- c) State SEVEN (7) points which need to be considered when designing the external sewerage discharge pipe system. (7 marks)
- [Total: 25 marks]