

 **MURANG’A UNIVERSITY OF TECHNOLOGY**

**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**UNIVERSITY EXAMINATIONS FOR THE DEGREE OF SCIENCE IN:**

**BUILDING CONSTRUCTION AND MANAGEMENT**

**2ND YEAR 1ST SEMESTER 2016/2017 ACADEMIC YEAR**

**CENTRE: MAIN CAMPUS**

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**COURSE CODE: TLM 3215**

**COURSE TITLE: BUILDING SCIENCE**

**EXAM VENUE: W/S STREAM: BSc IN CONSTRUCTION**

**DATE: 27/4/17 EXAM SESSION: 9.00 – 11.00 AM**

**TIME: 2 HOURS**

**Instructions**

1. **Answer Question 1 (compulsory) and ANY other two questions**
2. **Candidates are advised not to write on question paper.**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room**

**QUESTION ONE**

1. Discuss the attributes of light giving specific characteristics of each attribute. (6 marks)
2. Define the following terms;
3. Hue
4. Value
5. Chroma. (6 marks)
6. Explain the suitability of an artificial lighting source as a qualitative requirement in a building envelop. (8 marks)
7. Discuss the modes of heat transfers. (6 marks)
8. A refrigerator stands in a room where the temperature is 20° C. The surface temperature on the outside of the refrigerator is 16° C. The sides are 30 mm thick and have an equivalent thermal conductivity of 0.1 W/mK. The heat transfer coefficient on the outside is 10W/$M^{2}$K. assuming one dimensional conduction through the sides; calculate the net heat flow and the surface temperature on the inside. (6 marks)

**QUESTION TWO**

1. Define the following terms:-
2. Specific heat
3. Latent heat (2 marks)
4. Given 0.5l of water at $20℃$ in an electrical jug with an immersion heater element, how long will it take to bring the water to boiling point?

(Take specific heat capacity of water as 4176j/Kg) (5 marks)

1. Given the outside temperature as $10℃$ and the required internal temperature as $22℃$ in a $10m^{2}$ brick wall. Calculate the heat flow rate in the room ( take U = 1.5w/$m^{2}$ k) (5marks)
2. Outline the THREE factors of thermal comfort in a building (6 marks)
3. Explain the green house effect (2 marks)

**QUESTION THREE**

1. Explain FOUR basic principles of noise control. (10 marks)
2. Explain sound proofing in building giving at least TWO approaches of sound proofing in a building (10 marks)
3. Outline any TWO “good acoustic” conditions in a room as used in sound(4 marks)

**QUESTION FOUR**

1. Using a suitable sketch, illustrate heat exchange processes between a building and the external environment (6 marks)
2. Describe TWO techniques used to provide natural ventilation in a building

(6 marks)

1. An opal diffuser luminaire is mounted at 1.75m above the work plane, with its axis vertical and the illuminance at 1m to one side of the aiming point. Calculate the illuminace (E). I = 230cd (6 marks)

**QUESTION FIVE**

1. Describe a “free field” as applied to sound propagation (5 marks)
2. Outline TWO sound insulating properties of a partitioning or a dividing wall in a building (5 marks)
3. List THREE main sources of environmental noise (3 marks)
4. List any TWO sound absorbers used in a building. (2 marks)