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Universiti Tun Hussein Onn Malaysia

**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER II  
SESSION 2015/2016**

**COURSE NAME : MECHANICAL AND ELECTRICAL  
SYSTEM**

**COURSE CODE : BFC 32602**

**PROGRAMME : BFF**

**EXAMINATION : JUNE / JULY 2016  
DATE**

**DURATION : 2 HOURS**

**INSTRUCTIONS : ANSWER ALL QUESTIONS**

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

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Q1 Calculate the total rate of heat gain in the simple building shown in Figure Q1. The construction has the following U-values ( $\text{W/m}^2 \text{ } ^\circ\text{C}$ ) for building components;

- Windows = 2.8
- Door = 2.4
- Walls = 0.45
- Flat Roof = 0.8
- Floor = 0.7

The inside temperature is maintained at  $24^\circ\text{C}$  while the outside temperature is  $38^\circ\text{C}$ . The volumetric specific heat capacity of the air is taken as  $1300\text{J/m}^3 \text{ } ^\circ\text{C}$  and there are 1.5 air changes per hour.

(10 marks)

Q2 (a) One of natural ventilation method of air movement is through stack effect by pressure difference. Briefly explain how the mechanism works in moving the air into and out of a building.

(5 marks)

(b) Natural ventilation effect on building is highly influenced by surrounding factors. Describe how the following factors may influence the natural ventilation. You may use sketches and diagram to help your explanation.

- i) building orientation
- ii) surrounding landscape
- iii) building design

(15 marks)

Q3 A bakery shop of  $19.81\text{m} \times 9.15\text{m} \times 3.5\text{m}$  has 20 air changes/hour from air supplied through a duct where it flows at a velocity of  $9.5 \text{ m/s}$ . Answer the following questions:

(a) Calculate fresh air entering the bakery shop through ductwork.

(3 marks)

(b) The dimensions of the square duct.

(4 marks)

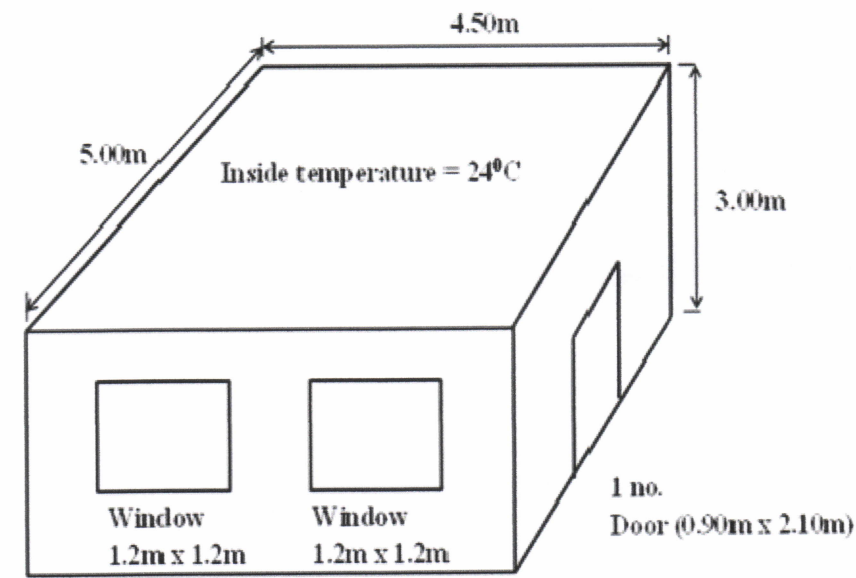
- (c) Make an inference/conclusion from the above question regarding the relationships between quantity of fresh air supply, IAQ and energy consumption.  
(3 marks)
- Q4 (a) Compartmentation is one of the compulsory requirement for fire safety in big building. Define compartmentation and its function.  
(5 marks)
- (b) Dry and wet risers are an active means of fire fighting equipments. Describe five (5) differences between dry riser and wet riser.  
(5 marks)
- (c) There are two types of water supply system installation in building. Using diagram, describe the difference between direct water supply system and indirect water supply system.  
(10 marks)

**-END OF QUESTIONS-**

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**Figure Q1**