UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2016/2017

COURSE NAME	:	MECHANICAL & ELECTRICAL SYSTEM
COURSE CODE	:	BFC32602
PROGRAMME CODE	:	BFF
EXAMINATION DATE	:	JUNE 2017
DURATION	:	2 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

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

Q1   (a)   List **SIX (6)** importances of the mechanical and electrical system for a building.

(6 marks)

(b)   Compare and explain how your home loses and gains heat in **THREE (3)** ways.

(4 marks)

(c)   A brick wall has a thermal conductivity, $\lambda = 0.62$ W/m K and a thickness of 155mm. Find the thermal resistance of this brick wall.

(5 marks)

(d)   Calculate the U-value of a wall that comprises 100mm outer brick, 40mm cavity, 90mm inner aerated lightweight concrete block and 13mm plaster? Thermal conductivity and thermal resistance values are given in **Table 1.**

(10 marks)

Q2   (a)   Thermal comfort in a building is established by controlling the heat gain and loss during the day and night time. Justify a good passive design of building envelope and suitable construction materials that can help to establish thermal comfort in a building.

(10 marks)

(b)   Ventilation is a process of changing or replacing air in any space to provide high indoor air quality. Illustrate a diagram for ventilation through roof and ventilation through window.

(5 marks)

(c)   Give **THREE (3)** types of building transportation systems and differentiate the movement of each transportation system.

(6 marks)

(d)   Sketch a basic escalator system and briefly describe **TWO (2)** functions of any escalator's component.

(4 marks)

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Q3   (a)   As an engineer, you are asked to design suitable hydrant systems for two multistorey buildings construct in different climate conditions. With the aid of sketches, propose one sprinkler system suitable for a building in a tropical country and one sprinkler system suitable for a building in a four season country. Justify your proposed design.

                                              (10 marks)

    (b)   Compare **FIVE (5)** differences between single phase power supply and three phase power supply.

                                              (10 marks)

    (c)   Determine the total resistance of the following circuit between points A and B as shown in **Figure Q3(c)**.

                                              (5 marks)

Q4   (a)   Propose a suitable water efficiency approach for non-potable applications such as toilets and urinal flushing, landscape irrigation and washing clothes.

                                              (5 marks)

    (b)   Differentiate between pump system with gravity system for a typical domestic supply system.

                                                (10 marks)

    (c)   Compare advantages and disadvantages of direct and indirect water supply systems.
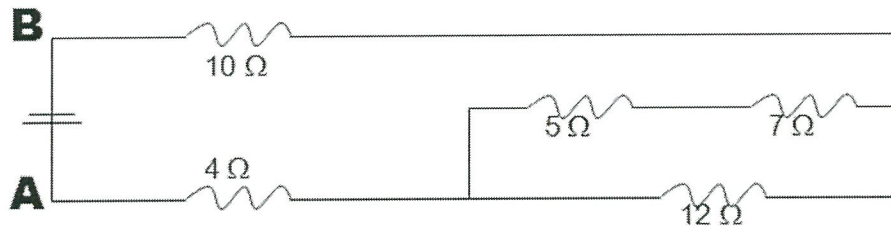
                                                (10 marks)

-END OF QUESTIONS-

FINAL EXAMINATION

TABLE Q1(d)

Material Components	Thickness (mm)	Thermal conductivity (W/m^{0}C)	Thermal resistance (m^2 ^{0}C/W)
External resistance of surface			0.06
Brick	100	0.94	
Cavity	40		0.16
Aerated lightweight concrete	90	0.20	
Plaster	13	0.55	
Internal resistance of surface			0.12

FIGURE Q3(c)