Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2013/2014

COURSE NAME	:	MECHANICAL AND ELECTRICAL SYSTEM
COURSE CODE	:	BFC 32602/ BFC 32603
PROGRAMME	:	3 BFF / 4 BFF
EXAMINATION DATE	:	JUNE 2014
DURATION	:	2 1/2 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **THREE (3)** PAGES

Q1 (a) Heat transferred from hot to cold in three basic ways, conduction, convection and radiation. Explain how a good building design helps to control the heat gain and loss during day and night time, base on the above statement.

(6 marks)

(b) A room 15m x 7m x 2.8m high has a ventilation rate of 11 air changes per hour. Air enters from a duct at a velocity of 8.5 m/s. Calculate the air volume flow rate to the room and the dimensions of the square duct.

(4 marks)

(c) A lecture theatre has dimensions of 25m × 22m × 6m height with 100 occupants; 8l/s of fresh air and 25 l/s of re-circulated air are supplied to the theatre for each person. A single-duct ventilation system is used. If 10% of the supply volume leaks out of the theatre, calculate the room air change rate and the air volume flow rate in each duct.

(10 marks)

(d) The north wall of an existing construction is designed for 110 mm thickness of brickwork inner leaf whereas the south wall of the construction with 200 mm thick of heavyweight concrete blocks. Calculate the thermal resistance value of the brickwork and determine the thickness of the south wall if the heavyweight concrete blocks is replaced with fibre board having the same thermal resistance of the original design.
(The thermal conductivity values (λ) for brickwork, heavyweight concrete block and fibreboard is 0.62 W/mK, 1.63 W/m K and 0.06 W/mK respectively.)

(5 marks)

Q2 (a) Describe the requirement of design considerations when carrying out an elevator traffic analysis.

(10 marks)

(b) Identify the factors that affect design and layout considerations for escalators.

(5 marks)

(c) Explain the electrical distribution for high-rise buildings.

(5 marks)

(d) Illustrate the principle issues of electrical safety in buildings.

(5 marks)

Q3 (a) Explain **THREE (3)** ways that can be consider in maximizing the natural ventilation through windows.

(6 marks)

(b) Ventilation in buildings is the process of changing air in a room or in some other external spaces. In order to satisfy the comfort of the occupants, ventilation of a building has other vital objectives. Give **five (5)** common objectives of ventilation system for building.

(5 marks)

(c) Explain in detail, **THREE (3)** differences between dry riser and wet riser for fire hydrants system. Provide sketches of the schematic layout for both systems to support your answer.

(10 marks)

(d) Define the following terms:

(i) Active fire system

(2 marks)

(ii) Passive fire system

(2 marks)

Q4 (a) Discuss advantage and disadvantage of cold water for direct and indirect system.

(6 marks)

(b) As a consultant engineer, you are asked to design square shape water storage tank, suction tank, and supply pipe for the discharge rate of 1.25litres/sec, based on gravity supply for a hostel. The hostel is consists of three (3) blocks of building, each building has 100 rooms to accommodate four (4) students in each room. Determine the total water requirement for hostel. Assume head loss is negligible, and length of pipe is 30m allow 20% for bends and other unforeseen. Assume total water demand is 91 litres per person for 24 hours, and supply disruption is 12 hours. Pressure head from the water level in the tank to the point of outlet is 6m height.

(12 marks)

(c) Explain in detail the meaning of water efficiency program and water conservation program. Provide **ONE (1)** example for each program to support your answer.

(7 marks)

- END OF QUESTION -