Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2013/2014

COURSE NAME	:	BUILDING SERVICES I
COURSE CODE	:	BFB 40603
PROGRAM	:	3 BFB
EXAMINATION DATE	:	JUNE 2014
DURATION	:	2 HOURS 30 MINUTES
INSTRUCTION	:	ANSWER **ALL** QUESTIONS IN **PART A**, AND **TWO (2)** QUESTIONS IN **PART B**. WRITE ALL ANSWERS IN THE ANSWER SCRIPT.

THIS PAPER CONSISTS OF **FIVE (5)** PAGES

Part A : Answer ALL Questions

(a) Choose the correct answers.

1. Building services in a building are intended to provide the following, except;

   (a) Healthy indoor environment
   (b) Comfortable indoor environment
   (c) Safe indoor environment
   (d) Vibrant indoor environment (2 marks)

2. Which of the following is not the design factor that affects energy use in buildings?

   (a) Macro and micro climate
   (b) Envelope fabric selections
   (c) Indoor environmental standards
   (d) Occupancy and management (2 marks)

3. The following are variables and specifications of humidity, except;

   (a) Moisture content
   (b) Heat gains
   (c) Dew point
   (d) Vapour pressure (2 marks)

4. The physical comfort of humans greatly depends upon the following factors, except;

   (a) Acoustic
   (b) Air quality
   (c) Lighting
   (d) Physical activities (2 marks)

5. An improved microclimate around a building brings the following types of benefits, except;

   (a) Longer life for building materials
   (b) Increase of rainfall in the region
   (c) Lower energy cost
   (d) Increased user satisfaction and value (2 marks)

6. _____ heat is the heat energy absorbed of released from a substance during change of temperature.

   (a) Latent
   (b) Solid
   (c) Sensible
   (d) Radiation (2 marks)

7. The transfer of heat energy through a material by the bodily movement of particles is called:

   (a) Convection
   (b) Expansion
   (c) Radiation
   (d) Conduction (2 marks)

8. The principle greenhouse gases as the following, except:

   (a) Methane, CH4
   (b) Carbon dioxide, CO2
   (c) Carbon Monoxide CO
   (d) Chlorofluorocarbons, CFCs

9. A thermodynamic function of a system, equivalent to the sum of the internal energy of the system plus the product of its volume, is called;

   (a) Thermal heat transfer
   (b) Specific latent heat
   (c) Substance expansion
   (d) Enthalpy (2 marks)

10. Which of the following factors is insignificant to be considered in the provision of ventilation?

    (a) Water supply
    (b) Control of fire
    (c) Energy conservation
    (d) System noise (2 marks)

(b) Briefly define the following terms:

11. Humidity : _____ (2 marks)

12. Energy : _____ (2 marks)

13. Dew-point : _____ (2 marks)

14. Temperature : _____ (2 marks)

15. Ventilation : _____ (2 marks)

(c) Describe the electrical supply of large and tall buildings.

(10 marks)

Part B

Q1 (a) Give three (3) reasons why the necessary understanding of building services is important to civil engineers.

(3 marks)

(b) Differentiate between Direct Current and Alternating Current.

(4 marks)

(c) Explain the suitability and effects between the choice of using a centralized system or a split unit air-conditioning system for the building with the conditions sated below:

- Type: 8 storey concrete (brick & mortar) building with14 (4m x 5m) rooms at each floor
- Occupancy: office
- Occupants: lecturers / office workers
- Opertaional time: 8.00am – 6.00pm (5 working days)
- Location: UTHM
- Climate : Hot & humid (tropical)

(10marks)

(d) Explain the significance of the green building concepts/approach in establishing an environmentally sustainable world.

(5 marks)

(e) Most existing buildings were constructed when energy was less expensive, technologies were less advanced, and environmental performance rarely a priority. Discuss how to transform existing buildings into high performance sustainable buildings.

(8 marks)

Q2 (a) Define cooling load

(5 marks)

(b) Name five components that contribute to cooling load for a given space

(5 marks)

(c) What is Psychrometry and its relation to air-conditioning design?

(10 marks)

(d) Describe the function of Air-handling Unit (AHU) in an air-conditioning system.

(10 marks)

Q3 (a) Sketch and briefly describe **three (3)** stages of electrical supply.

(10 marks)

(b) List **five (5)** passive design factors affecting energy use in buildings.

(5 marks)

(c) Discuss the differences of air conditioning requirements and design between residential buildings, hospitals and restaurants.

(10 marks)

(d) Explain how electrical overload protection can be provided in buildings .

(5marks)

- END OF QUESTION -