Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2019/2020

COURSE NAME	:	BUILDING SERVICES TECHNOLOGY
COURSE CODE	:	BFR 32103
PROGRAMME CODE	:	BFR
EXAMINATION DATE	:	DECEMBER 2019 / JANUARY 2020
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **SIX (6)** PAGES

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Q1 (a) **Figure Q1 (a)** shows a psychometric chart that are used by designers to determine the level of comfort. Name each components as marked (A-F) in the **Figure Q1 (a)**.

(6 marks)

(b) State and define **THREE (3)** processes that could happen on the phychrometric chart (which also known as phychrometric process).

(6 marks)

(c) Define the term 'thermal comfort' according to ASHRAE Standard 55.

(3 marks)

(d) List **SIX (6)** parameters of thermal comfort and its unit of measurement.

(6 marks)

(e) Explain the following thermal comfort variables:

(i) Wet Bulb Temperature
(ii) Dry Bulb Temperature
(iii) Mean Radiant Temperature
(iv) Relative Humidity

(4 marks)

Q2 (a) State **SIX (6)** sources of indoor air pollutants.

(6 marks)

(b) There are two mechanism for ventilation which are stack ventilation and cross ventilation.

(i) Explain the stack ventilation system process using diagram.

(5 marks)

(ii) Provide **FOUR (4)** design details or recommendations to optimise cross ventilation.

(4 marks)

(c) Calculate the U-Value of composite building envelopes below:

(i) Aluminium composite cladding with insulation has layers of 4 mm ACP cladding (k = 0.40 W/mK), 25 mm of Exp. Polystyrene Board (k = 0.04 W/mK), 13 mm of external wall plaster (k = 0.57 W/mK), 100 mm of brickwall (k = 0.77 W/mK) and 13 mm of internal wall plaster (k = 0.57 W/mK).

(6 marks)

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(ii) R.C. roof with insulation has layers of 50 mm cement screed (k = 0.41 W/mK), 60 mm of expended polystrene (k= 0.04 W/mK) and 150 mm of R.C Slab (2.30 W/mK).

(4 marks)

Q3 (a) State **THREE (3)** design criteria that are usually used in determining elevator service quality.

(3 marks)

(b) **Figure Q3 (b)** shows vertical section of elevator component. Label elevator components from A to E in **Figure Q3 (b)**.

(5 marks)

(c) Define the terms in regards to building transportation system below:

(i) Average lobby time or average lobby waiting time
(ii) Round-trip time (RT)
(iii) Registration time
(iv) Travel time or average trip time (AVTRP)

(8 marks)

(d) Provide an example of building situation where escalators are chosen instead of elevators in the building. Discuss the reason why escalators are chosen as the transportation system in the building.

(5 marks)

(e) Explain **TWO (2)** principal purposes of walkalators.

(4 marks)

Q4 (a) According to UBBL Part VII, define the terms below which are related to fire safety requirements:

(i) Direct distance
(ii) Exit discharge or exit door
(iii) Exit route
(iv) Final exit
(v) Travel Distance

(10 marks)

(b) List **FIVE (5)** areas or uses that should be separated from occupancy's areas with fire resisting construction.

(5 marks)

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(c) Describe the following type of fire extinguisher:

(i) Foam
(ii) Carbon dioxide
(iii) Sprinklers

(6 marks)

(d) Discuss the differences between passive fire protection and active fire protection system.

(4 marks)

- END OF QUESTION -

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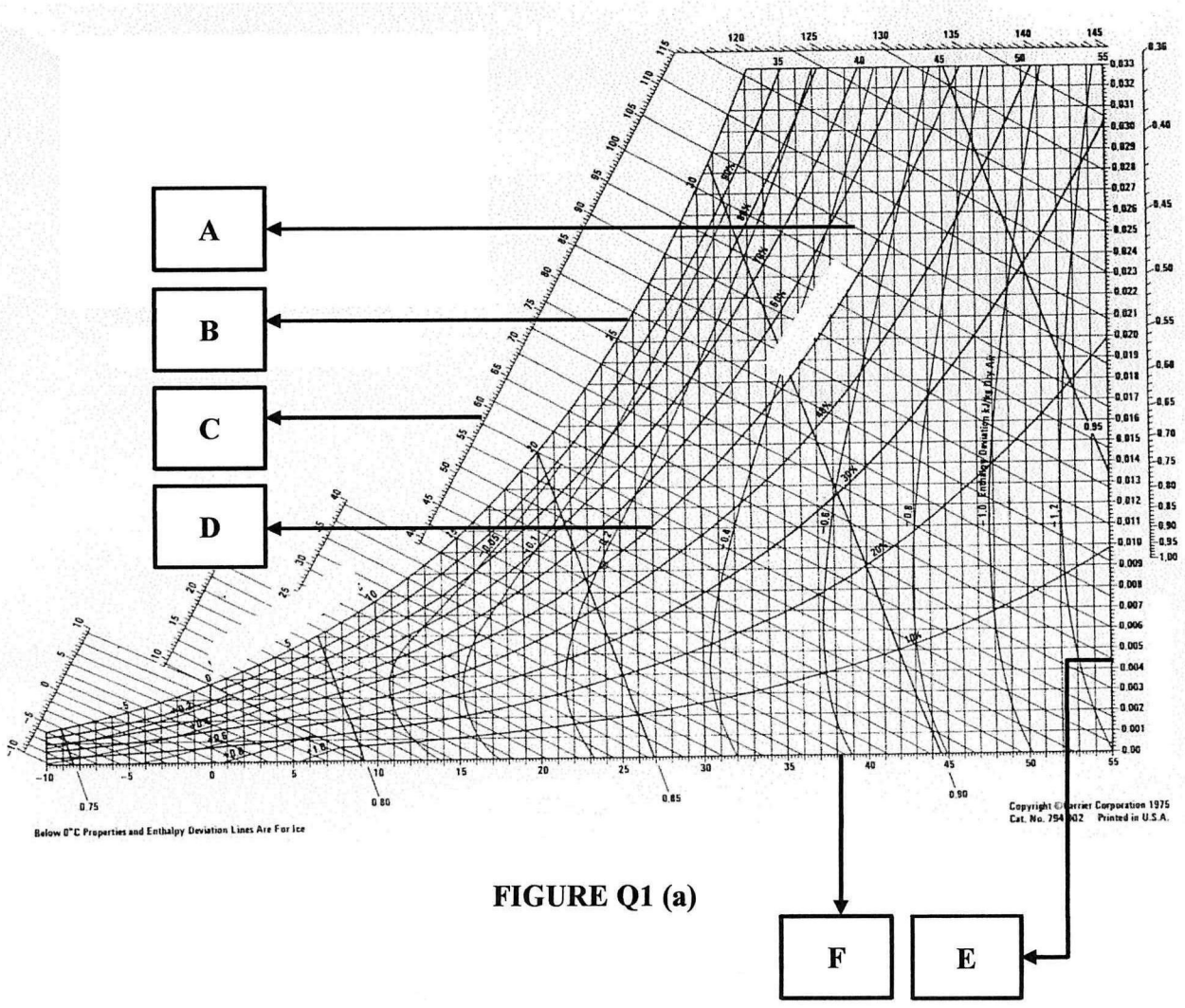

FIGURE Q1 (a)

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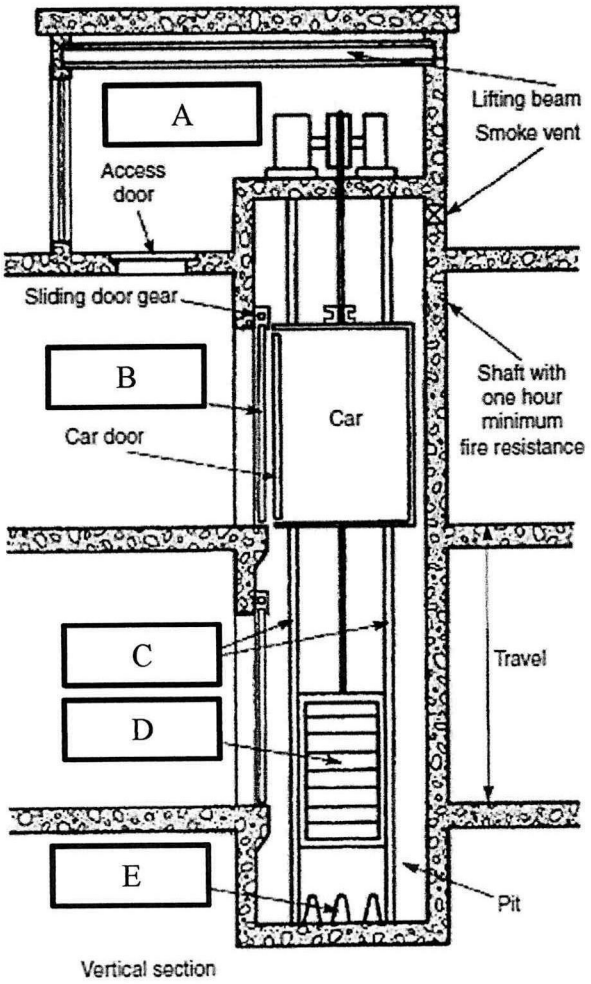

FIGURE Q3 (b)

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