Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2022/2023

COURSE NAME	:	AVIONICS AND INSTRUMENTS
COURSE CODE	:	BDS 20303
PROGRAMME CODE	:	BDM
EXAMINATION DATE	:	JULY/AUGUST 2023
DURATION	:	3 HOURS
INSTRUCTION		1. ANSWER **THREE (3)** QUESTIONS FROM **SECTION A** AND ANSWER **ONE (1)** QUESTION FROM **SECTION B**. 2. THIS FINAL EXAMINATION IS CONDUCTED VIA **CLOSED BOOK**. 3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK.

THIS QUESTION PAPER CONSISTS OF **EIGHT (8)** PAGES

SECTION A

Q1 (a) List 4 indicators that can be found in the Electronic Attitude Direction Indicator (EADI).

(4 marks)

(b) Describe 2 displays that can be found in Electronic Flight Instrument Systems (EFIS).

(4 marks)

(c) **Figure Q1(c)** shows the Attitude Direction Indicator (ADI) with Flight Director System enabled. Demonstrate the movement of control column/yoke by the pilot to achieve:

i. Situation A

(3 marks)

ii. Situation B

(3 marks)

iii. Situation C

(3 marks)

(d) **Figure Q1(d)** illustrates the Electronic Attitude Direction Indicator (EADI) during runway approach, determine the situation of the aircraft and possible corrective action for:

i. Situation A

(4 marks)

ii. Situation B

(4 marks)

Q2 (a) State 3 types of numbering system.

(3 marks)

(b) Discuss the disadvantages of using the decimal numbering system in computer system.

(6 marks)

(c) Convert the following numbers into decimal system:

i. 1011_2

(2 marks)

ii. 10111_2

(2 marks)

iii. 1110001_2

(2 marks)

iv. 1001011_2

(2 marks)

(d) Convert the following numbers into binary system:

i. 596_{10}

(4 marks)

ii. 14.625_{10}

(4 marks)

Q3 (a) Describe the difference between analog signals and digital signals.

(4 marks)

(b) List 4 items that are considered to produce an analog signal.

(4 marks)

(c) **Figure Q3(b)** illustrates the produced digital signal and the binary-weighted DAC with logic 1 corresponds to +4.5V and logic corresponds to 0V.

i. Calculate the voltage gain on each bit.

(4 marks)

ii. Calculate the output voltage from the digital signal.

(10 marks)

iii. Construct the converted analog signal.

(3 marks)

SECTION B

Q4 (a) State the main components for basic computer.

(3 marks)

(b) Describe the operation stages of microprossesor.

(6 marks)

(c) Construct the truth table for logic gates shown in **Figure Q4(c)**.

(8 marks)

(d) Construct the truth table for logic gates shown in **Figure Q4(d)** and identify which gate its represent including the symbol.

(8 marks)

Q5 (a) State 3 main types of display in the flight deck.

(3 marks)

(b) Discuss 3 advantages and 3 disadvantages of fibre optics.

(6 marks)

(c) Convert the following numbers into octal system using the remainder method.

i. 67_{10}

(2 marks)

ii. 1028_{10}

(2 marks)

iii. 576_{10}

(2 marks)

iv. 888_{10}

(2 marks)

(d) **Figure 5(d)** shows the circuit of the multiplexer in term of the logic gates combination.

i. Construct its truth table.

(6 marks)

ii. Choose the value of selectors to achieve X_2 at the output.

(2 marks)

- END OF QUESTIONS -

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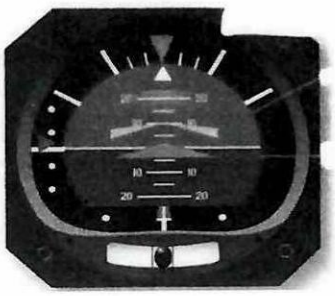
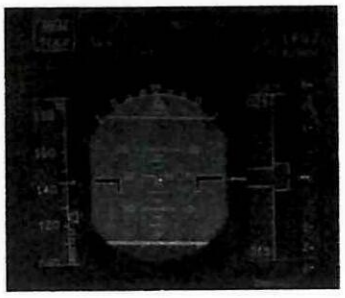
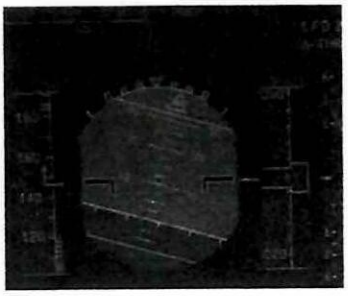


Situation A

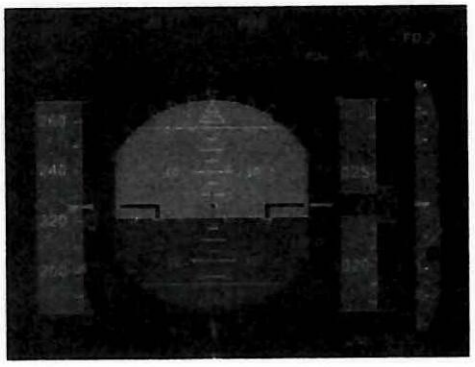


Situation B

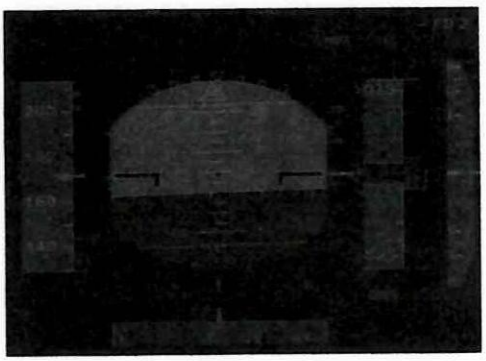


Situation C

Table Q1(c) Flight director system



Situation A



Situation B

Table Q1(d) Flight director system

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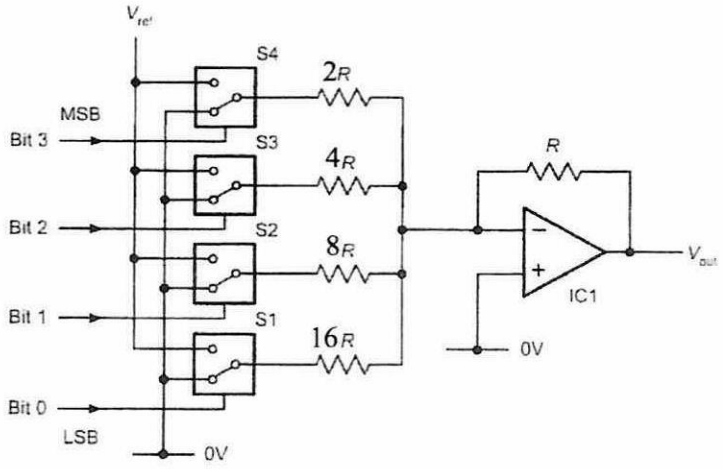

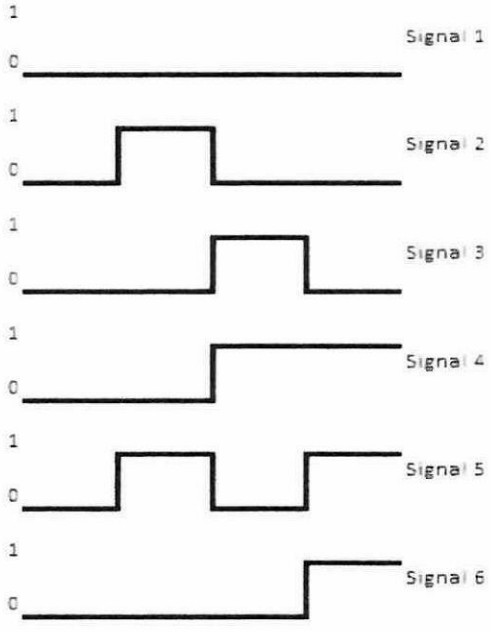

Table Q3(b) Binary Weighted DAC

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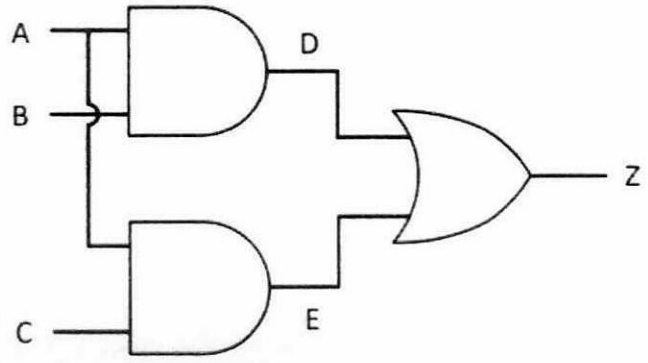

Table Q4(c) Logic gates

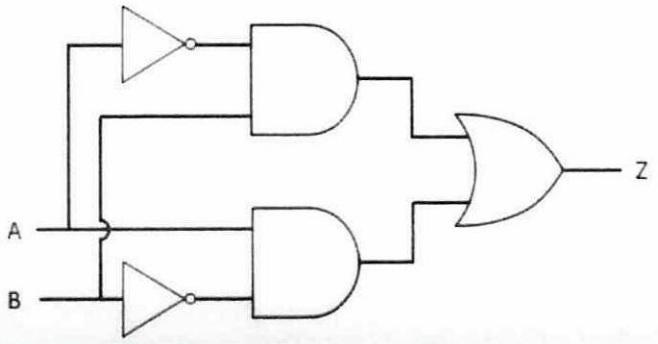

Table Q4(d) Logic gates

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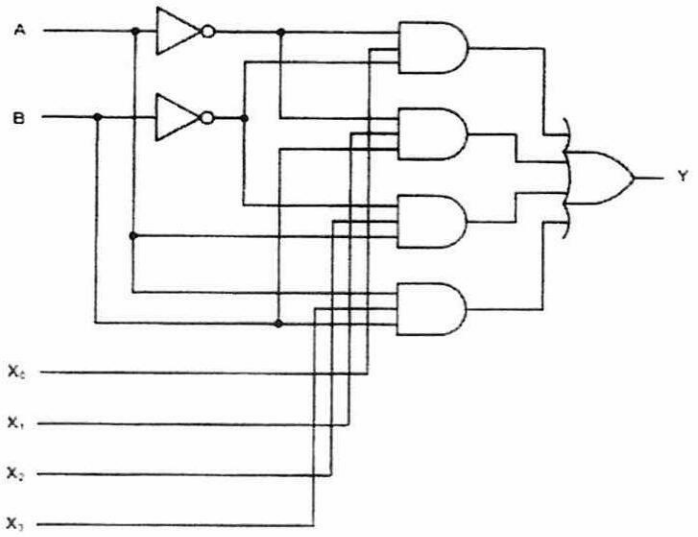

Table Q5(d) Multiplexer