

THE POLYTECHNIC, IBADAN
COMPUTER ENGINEERING TECHNOLOGY DEPARTMENT
2023/24 ACADEMIC SESSION, FIRST SEMESTER EXAMINATION



Course Title: Control System Engineering II Course Code: EEC 433
Class: HND II Time Allowed: (2½) hours
Instruction: Answer any five (5) Questions

QUESTION ONE

A. With the aid of Mathematical Illustrations and Theorems write short notes on the following

- (i) Zeros and Poles of Transfer Function (TF) (3 marks)
- (ii) Types of Systems (3 marks)
- (iii) Initial and Final Value Theorem (3 marks)

B. Find Transfer Function of systems below

$$(i) \frac{d^2y(t)}{dt^2} + 8 \frac{dy(t)}{dt} + 15y(t) = \frac{dx(t)}{dt} + 4x(t)$$

Where $x(t)$ and $y(t)$ are input and output respectively (7 marks)

Hence, determine the Types and Orders of the systems, then, plot the results on S-plane diagram

- C.
- (i) Given $f(t) = e^{-2t} u(t)$, find Initial and Final Values of the function (2 marks)
 - (ii) Find the value of the function $F(s) = \frac{1}{s+2}$ at $t = 0^+$ (2 marks)

QUESTION TWO

A. Explain in brief (i) Time Constant (ii) DC Gain of Control System

(4 marks)

B. With a given System $\frac{d^2y(t)}{dt^2} + 9 \frac{dy(t)}{dt} + 20y(t) = 5x(t)$, determine

the (i) Time Constants (ii) DC gain of the system (4 marks)

C. If output $y(t) = 2e^{-50t} u(t)$ is the output result for Input Impulse Response, determine the Time Constant of the system (2 marks)

C. Explain in details the Concept of Dominant pole, hence, considering 3rd and 2nd order Approximations determine the Dominant Pole of the response (10marks)

$$T(s) = \frac{5}{(s+5)(s^2 + s + 1)}$$

QUESTION THREE

- A. Explain the Concept of stability and use it to justify Nyquist's states that when the system is excited by a bounded input, the output is also bounded.
- B. Use Pole-zero map and Normalized Response to sketch the effects of poles on stability.
- Over-damped Close-loop poles (2 marks)
 - Critically Damped Close-loop poles (2 marks)
 - Negative Over-damped close-loop poles (2 marks)

C. Determine the close-loop poles on the imaginary axis of the systems given below:

(i) $G(s) = \frac{K}{s(s+1)}$ (2 marks)

(ii) $G(s) = \frac{1}{s(s^2 + 5s + 9)}$ (2 marks)

QUESTION FOUR

- A. State four(4) advantages and disadvantages of Routh-Hurwitz Stability (4 marks)
- B. The coefficients of the characteristics equation are represented by determinant

$$\Delta_n = \begin{vmatrix} a_{n,1} & a_{n,2} & a_{n,3} & \dots \\ a_{n,2} & a_{n,3} & a_{n,4} & \dots \\ 0 & a_{n,3} & a_{n,4} & \dots \end{vmatrix}$$

Generate Determinant values for the stability Conditions (4 marks)

- C. The coefficients of the characteristics equation are represented by array below

$$\begin{array}{c|ccc} s^4 & c_4 & c_3 & c_2 \\ s^3 & b_{4,1} & b_{4,2} & b_{4,3} \\ s^2 & b_{3,1} & b_{3,2} & b_{3,3} \\ s^1 & b_{2,1} & b_{2,2} & b_{2,3} \\ s^0 & b_{1,1} & b_{1,2} & b_{1,3} \end{array}$$

Generate b_{n-1} , b_{n-3} and c_{n-4} . (4 marks)

- D. Use Routh-Hurwitz stability criterion to find stability of the system given by

$$G(s) = \frac{K}{s(s+2)(s+4)} \text{ and } H(s) = 1 \quad (3 \text{ marks})$$

QUESTION FIVE

- A. State the importance of Root Locus, Hence sketch

- Vector from open-loop pole to the root-locus (2 marks)
- Vector from open-loop zero to the root-locus (2 marks)

- B. Outline the Construction Steps of Root Locus

- C. Determine K of the characteristic equation for the root S=-0.85 and tabulate the result (5 marks)

(i) $S^3 + 6S^2 + 8S + K$ (ii) $S^4 + S^3 + 7S^2 + 12S + K$ (8marks)

QUESTION SIX

- A. Outline the steps to determine parts of Real axis of Root Locus (5marks)
- B. Tabulate the behavior of Closed Loop System (5marks)
- C. Considering Characteristics Equation of a closed-loop system

$$1 + G(s)H(s) = 1 + \frac{K(s - z_1)(s - z_2) \dots (s - z_n)}{(s - p_1)(s - p_2) \dots (s - p_d)} = 0$$

- (i) Show that Open-loop poles are also Closed-loop poles for $K=0$ (5marks)
- (ii) Root-locus ends at an open-loop zero or at infinity for $K=\infty$ (5marks)

QUESTION SEVEN

- A. Outline Procedures in using Nyquist criterion to determine the stability of a feedback system (3marks)
- B. Using Nyquist criterion, determine the stability of a feedback system whose open-loop transfer function is given by

$$G(s)H(s) = \frac{K}{s(s+1)}$$

(8marks)

- C. Draw the Bode magnitude and phase plot of the following open-loop transfer function and determine gain margin, phase margin and absolute stability .

$$G(s)H(s) = \frac{1}{s(s+1)}$$

(9marks)

**THE POLYTECHNIC, IBADAN
SOCIAL SCIENCE DEPARTMENT**

FIRST SEMESTER EXAMINATION 2023/2024 SESSION

COURSE TITLE: SOCIAL PSYCHOLOGY

COURSE CODE: GNS 316

CLASS: HND II COMPUTER ENG.

TIME ALLOWED: 2HRS.

INSTRUCTION: ANSWER ANY FIVE (5) QUESTIONS

- ✓ 1. Describe how the presence of others influence our beliefs and behaviours.
- ✓ 2. What are the factors influencing whom we form relationship with?
- ✓ 3. Discuss the process of notifying and placing new employees in the workplace.
- ✓ 4. Use an appropriate theory to explain how people can be motivated to improve their job performance.
- ✓ 5. (a) What is Leadership?
(b) Write short notes on chromatic, transformational, transactional and laissez faire leadership styles.
- ✓ 6. Discuss any four errors in attribution.
- 7. (a) Conflict is inevitable in the workplace .
(b) Mention and explain 4 strategies for reducing conflicts.

THE POLYTECHNIC, IBADAN
DEPARTMENT OF COMPUTER ENGINEERING TECHNOLOGY
FIRST SEMESTER 2023/2024 EXAMINATION

COURSE TITLE: Introduction to Embedded System
INSTRUCTION: Answer Four (4) Questions

COURSE CODE: CTE 434
TIME ALLOWED: 2 hours

Question One

- a) Define 'embedded system' (1 mark)
- b) Explain the following components of the embedded system:
 - i. The Hardware (4 marks)
 - ii. The Software (2 marks)
 - iii. The Real Time Operating System (RTOS) (2 marks)
- c) With the aid of a diagram, explain the basic structure of an embedded system (6 marks)

Question Two

- a) Explain the classification of embedded systems based on performance and functional requirements (7 marks)
- b) State the key feature and the relative advantage of the following:
 - i. i. Harvard Architecture
 - ii. ii. Von Neumann Architecture
 - iii. iii. RISC (Reduced Instruction Set Computing) Architecture
 - iv. iv. CISC (Complex Instruction Set Computing) Architecture (2 mks each)

Question Three

Mention and explain the steps required to design an embedded system (15 marks)

Question Four

- a) Define SBC (1 mark)
- b) Mention and explain the key components of SBC (5 marks)
- c) State the area of applications of SBC (5 marks)
- d) State the factors that influence the selection of language (4 marks)

Question Five

- a) What is a sensor? (2 marks)
- b) Mention and explain the key features of sensor module (5 marks)
- c) With examples, state 8 categories of sensor (8 marks)

Question Six

- a) Differentiate between communication protocol and interfacing (4 marks)
- b) Mention and explain the purpose of five (5) peripherals for SBC (5 marks)
- c) Discuss the key aspects of interfacing SBC with peripherals (6 marks)

Examiner: Engr. G. O. Fadiran

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to 1/5th of a division. An output of 2mV appears across the terminals of the LVDT when the core is displaced through a distance of 0.5mm. Calculate

- i. the sensitivity of the LVDT
- ii. the sensitivity of the whole set up
- iii. the resolution of the instrument in mm

2 mks
2 mks
2 mks

QUESTION FIVE

- a. Describe the basic principle of operation of a resistance strain gauge 5mks
- b. Show that Gauge factor of strain gauge of a circular wire, $Gf = 1 + 2V + \frac{\Delta\rho}{\rho} / \varepsilon$ 10 mks

QUESTION SIX

- a. Derive the sensitivity of a parallel plate Capacitive Transducer when
 - i. Area of plates is varied 2 mks
 - ii. The separation (d) is varied 2 mks
 - iii. Dielectric between plates is varied 2 mks
- b. A parallel plate capacitive transducer has a plate area ($l \times w$) = (80mm x 80mm) and plate spacing (d) = 2.0mm. find
 - i. the device capacitance 3 mks
 - ii. the displacement (Δd) that cause the capacitance change by 5pF 3 mks
 - iii. the transducer sensitivity 3 mks

EXAMINER: ENGR. A.A. ONI



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THE POLYTECHNIC, IBADAN
DEPARTMENT OF COMPUTER ENGINEERING TECHNOLOGY
FIRST SEMESTER 2023/2024 EXAMINATION

COURSE TITLE: ELECTRICAL MEASUREMENT AND INSTRUMENTATION III
COURSE CODE: CTE 312
CLASS: HND II
INSTRUCTION: ANSWER ANY FOUR (4) QUESTIONS
TIME ALLOWED: 2 HRS

(30)

QUESTION ONE

- a. State five (5) factors that must be considered while selecting transducers 5 mks
- b. Briefly describe any five (5) capacitive inductive transducers 5 mks
- c. State three (3) advantages and two (2) disadvantages of electrical transducers 5 mks

QUESTION TWO

- a. Describe the basic construction of linear potentiometer 5 mks
- b. Mention two (2) applications of potentiometer 2 mks
- c. A basic slide-wire potentiometer has a working battery voltage of 3.0 volts with negligible resistance. The resistance of the slide-wire is $400\ \Omega$ and its length is 200cm. A 200-cm scale is placed along the slide wire. The slide-wire has 1 mm scale divisions and it is possible to read up to $1/5$ of a division. The instrument is standardized with 1.018 volt standard cell with sliding contact at the 101.8 cm mark on scale. Calculate
 - i. Working current 2 mks
 - ii. Resistance of series rheostat 2 mks
 - iii. Measurement range 2 mks
 - iv. Resolution of the instrument 2 mks

QUESTION THREE

- a. Describe the general principle of operation of a resistive transducer 5 mks
- b. State five (5) criteria considered in classifying transducers 5 mks
- c. Briefly describe any five (5) resistive transducers 5 mks

QUESTION FOUR

- a. Describe the principle of operation a thermocouple 5 mks
- b. Mention four (4) types of thermocouple and materials used in forming them 4 mks
- c. The output of an LVDT is connected to a 5 V voltmeter through an amplifier of amplification factor 250. The voltmeter scales has 100 divisions and the scale can be read

- (b) State Four (4) applications of an electromagnetic spectrum. (3 marks)
- (c) The carrier frequency of an FM modulator is 4MHz, if the modulating frequency is 100Khz, what are the first three USB and LSB Frequencies. (6 marks)

QUESTION FIVE

- (a) Using block diagram, explain working principle of an AM Super heterodyne radio receiver. (5 marks)
- (b) Explain the following Wave Propagation Techniques:
(i) Ground wave (ii) Sky wave (iii) Space wave. (6 marks)
- (c) A single tone FM signal is given by
 $e(t) = 20\cos(7\pi \times 10^5 t + 15\sin 4\pi \times 10^3 t)$ volts Determine the;
(i) Bandwidth (ii) Frequency Deviation
(iii) Carrier swing. (iv) Carrier Frequency (4 marks)

QUESTION SIX

- (a) Highlight Five (5) advantages of Satellite telecommunications. (5 marks)
- (b) Describe the following Satellite orbits in terms of the orbital height with distance from earth.
i. Geosynchronous Earth Orbit (GEO).
ii. Medium Earth Orbit (MEO).
iii. Low Earth Orbit (LEO). (2 marks)
(2 marks)
(2 marks)
- (c) In tabular form show frequency band and frequencies ranges allocated to the telecommunication satellites. (4 marks)

EXAMINER
Oluleye O. Akanji



THE POLYTECHNIC, IBADAN
DEPARTMENT OF COMPUTER ENGINEERING TECHNOLOGY
FIRST SEMESTER EXAMINATION
2023/2024 ACADEMIC SESSION

COURSE TITLE: COMPUTER PROGRAMMING (MATLAB)
COURSE CODE: CTE 436
CLASS: HND II
INSTRUCTION: ATTEMPT TWO (2) QUESTIONS FROM EACH SECTION.
TIME ALLOWED: 2 HOURS

SECTION A (Attempt only two questions)

QUESTION 1

- State the function of an ellipsis in MATLAB. (2 marks)
- (i) Given that $x = [1 \ 3 \ 2]$ and $y = [2 \ 4 \ 1]$, discuss dot(x,y) and cross(x,y) in MATLAB? (2 marks)
(ii) Write out the values generated by this vector: $y = [1.5 : 0.25 : 3.0]$. (2 marks)
- Using switch...case statement, write a MATLAB snippet to compute the grade for a student's score as follows: (4 marks)

| | |
|---------------------------|-------------------------------------|
| 0 to 39, grade is 'Fail' | 60 to 69, grade is 'Credit' |
| 40 to 49, grade is 'Pass' | 70 to 100, grade is 'Excellent' |
| 50 to 59, grade is 'Good' | Other scores, grade is 'Ungradable' |

QUESTION 2

- Briefly explain the eye(n) command. (2 marks)
- Write MATLAB equivalent statement for x formula given below. Hence compute for x given that:
 $a = 6$
 $b = 4$
 $c = (3b)/a = 2$
 $d = (abc)/(a+b+c) = 4$
- Write a MATLAB snippet to add two (2) unknown even numbers together. (4 marks)

$$x = a \frac{b}{c+d} + \frac{da}{cb} - (a+b^2)(c+d) + 2\pi \sqrt{\frac{1}{2}(a^2+b^2)}$$

(4 marks)

QUESTION 3

- Describe the graphical interface of the MATLAB desktop workspace. (3 marks)
- Discuss four (4) rounding functions in MATLAB. Hence state the output of the functions when each is performed on the value -5.661778. (4 marks)
- Consider the Matrix A given below. Write simple MATLAB expressions to perform the following: (1/2 marks each)

$$3 \times 4 = 12 / 10$$

$$6 \times 4 \times 2 = 48 / 12 = 4$$

$$A = \begin{bmatrix} -4 & -3 & -2 \\ -1 & 0 & 1 \\ 2 & 3 & 4 \end{bmatrix}$$

- i) Declare the given matrix A.
- ii) Get a sub-matrix B with the last two columns of A.
- iii) Get the size of the sub-matrix B.
- iv) Delete the third row of the matrix A.
- v) Determine the dimension of A.
- vi) Compute the transpose of matrix A.
- vii) Compute the inverse of A
- viii) Get the determinant of matrix A.

SECTION B (Attempt only two questions)

QUESTION 4

- a) State the difference between (*, /, ^) and (.* , ./, .^). (2 marks)
- b) What is the output of this line statement:

$$A=[10 : -1 : 4; \text{ones}(1,7); 2 : 2 : 14; \text{zeros}(1,7)]. \quad (3 \text{ marks})$$
- c) Write a user-defined function that calculates the average, variance and the standard deviation of a list of numbers. Use the function to calculate the average, variance and the standard deviation of the following list of grades: 80 75 91 60 79 89 65 80 95 50 81. (5 marks)

QUESTION 5

- a) Explain the function of this line statement: `my_var = xlsread('my_file')`. (2 marks)
- b) Explain succinctly the following formatting elements: %e, %f, and %i. (3 marks)
- c) A vector is given by $V = [5, 17, -3, 8, 0, -7, 12, 15, 20, -6, 6, 4, -7, 16]$. Write a MATLAB snippet that doubles the elements that are positive and are divisible by 3 or 5, and, raises to the power of 3 the elements that are negative but greater than -5. (5 marks)

QUESTION 6

- a) Contrast the hold on and hold off Commands. (2 marks)
- b) The maximum daily temperature (in F) for Sango and Ologuneru, Nigeria during the month of August 2022 are given in the vectors as: $t_{sa} = [75 79 86 86 79 81 73 89 91 86]$ and $t_{ol} = [69 68 70 73 72 71 69 76 85 87]$. Write a MATLAB snippet to compute the following: (8 marks)
 - i) Calculate the average temperature for the month in each area.
 - ii) How many days was the temperature above the average in each city?
 - iii) How many days, and on which dates in the month, was the temperature in Sango lower than the temperature in Ologuneru?
 - iv) How many days, and on which dates in the month, was the temperature the same in both areas?



THE POLYTECHNIC, IBADAN
DEPARTMENT OF COMPUTER ENGINEERING TECHNOLOGY
FIRST SEMESTER 2022/2023 EXAMINATION

COURSE TITLE: TELECOMMUNICATION ENGINEERING II

COURSE CODE: EEC 316

CLASS: HND II

INSTRUCTION: ANSWER ANY FOUR QUESTIONS TIME ALLOWED: 2 HOURS

QUESTION ONE

- (a) Derive the propagation constant and characteristic impedance of the following transmission lines below.
- Loss free line (3 marks)
 - Loss less line (4 marks)
- (b) A distortionless line has the following parameters; characteristics impedance of 60Ω , wave velocity of $0.6c$, where c is the speed of light in a vacuum, a is 20mNp/m , calculate the line parameters R , L , G and C at 100MHz respectively. (8 marks)

QUESTION TWO

- (a) (i) Sketch a typical Frequency Modulated waveform? (3 marks)
(ii) Derive an expression for Total Power of an AM waves (5 marks)
- (b) A carrier of frequency 1GHz and amplitude 6volts is frequency modulated by a sinusoidal of 500Hz and amplitude 1volts , the frequency deviation is 4KHz , the level of modulating signal changed to 5volts and frequency of 3KHz due to increased, obtain the expression for old and new modulated waves. (7 marks)

QUESTION THREE

- (a) (i) Show mathematically, expression for a single tone equation of an Amplitude Modulated waves, Containing the carrier and the two sidebands. (5 marks)
(ii) Using sketch of AM Spectrum/Envelope Waveform derive equation for Modulation Index. (4 marks)
- (b) The antenna current of an AM transmitter is 10A when only the carrier is sent but increases to 8.93A when the carrier is modulated by a single sine wave, find the percentage modulation and determine the antenna current when the modulation changes to 0.8 . (6 marks)

QUESTION FOUR

- (a) Draw the electromagnetic Spectrum indicating its frequencies band, allocated frequency range and their corresponding wavelength as recommended by ITU. (6 marks)

4(ai) State Lagrange polynomial of degree 3.

(ii) Use Lagrange's interpolation method to form the polynomial of the table

| | | | | |
|------|---|---|----|----|
| x | 2 | 4 | 7 | 8 |
| f(x) | 5 | 8 | 10 | 12 |

4(b) Use Newton's to prepare the divided difference table for the function $y = f(x)$ whose values are shown in the table below

| | | | | | |
|---|---|---|---|---|----|
| x | 2 | 3 | 4 | 5 | 6 |
| y | 4 | 5 | 7 | 8 | 10 |

5a (i) State the Trapezoidal rule to approximate the integral $I_s = \int_a^b f(x)dx$

(ii) Evaluate the integral $\int_0^{\pi/2} \frac{\sin x}{1+x} dx$ by using Trapezoidal rule with $n = 5$ to four decimal places

5(b) Use Simpson's rule to evaluate the integral in equation 5a(ii) to the same decimal places and compare your answers.

6(a) Show that a root of the equation $3x^3 - 4x^2 = 4x + 7$ lies in the interval $2 < x < 3$. Hence, starting with $x_0 = 2.5$. Solve the equation by Newton-Raphson's method.

6(b) Using Euler's method, find an approximate value of $y(1.1)$ for the differential equation subject to the initial condition $y(1) = 1$, taking the interval $h=0.1$.

**THE POLYTECHNIC, IBADAN
FACULTY OF SOCIAL MANAGEMENT AND HUMANITIES
DEPARTMENT OF LANGUAGES AND COMMUNICATION
FIRST SEMESTER EXAMINATION 2023/2024 SESSION**

COURSE TITLE: COMMUNICATION IN ENGLISH IV OPTION A
COURSE CODE: GNS 401
CLASS: HND II
DURATION: 2 HOURS

INSTRUCTION: Answer ONE questions from Section A; TWO from Section B and ONE from Section C.

SECTION A: THEORY AND PRACTICE OF COMMUNICATION
(Answer one question from this Section)

- 1a. With the aid of diagram, briefly establish the difference between Harold Lasswell's and David Berlo's models of communication as propounded in their theories.
- 1b. Communication is a cyclical process. Justify this assertion with reference to interacting variables.
- 1c. Written Communication is the most ideal in a formal setting. Discuss four strengths and three weaknesses of written communication.

SECTION B: ORGANISATIONAL COMMUNICATION
(Answer TWO questions from this Section)

- 2af Effective Communication could be jeopardised with the existence of certain factors. Identify and explain seven of such factors.

2b. The chairman and the secretary are two important stakeholders in the conduct of a meeting. Discuss four roles of each of the duo in a successful meeting.

2c. Write short notes on any FIVE of the following with relevant illustrations/examples:

- (i) Conference (ii) Symposium (iii) Workshop (iv) Structured Interview (v) Minutes of meeting
- (vi) Vertical Communication (vii) Rumour

2d. Identify and explain any six factors a prospective interviewer must consider as yardsticks of evaluation in an interview process.

SECTION C: LEADERSHIP AND CONFLICT MANAGEMENT

(Answer one question from this Section)

3a. Dynamism in Leadership styles is a prerequisite for good performance in an organisation. Discuss any THREE styles a leader could employ in administration of an organisation.

3b. (i) Explain the term "conflict"

(ii) In your capacity as the General Manager in a named organisation, explain any FIVE ways through which you can detect conflict.

3c. With relevant examples, write short notes on any FIVE of the following:

(i) Path-goal Theory (ii) Bureaucratic Leadership (iii) Situational Theory

(iv) Negative Conflict (v) Win-lose method (vi) Lose-lose method

(vii) Exit-Interview

THE POLYTECHNIC, IBADAN

**DEPARTMENT OF MATHEMATICS AND STATISTICS
FIRST SEMESTER EXAMINATION 2023/2024 SESSION**

COURSE CODE: MTH 412

HND 2

COURSE TITLE: NUMERICAL ANALYSIS

CLASS: COMP., ELECTRICAL, MECHATRO., MECHANICAL ENG. TIME:2HRS

ANSWER ANY FOUR QUESTIONS

1.(a) Rewrite the system of linear equation in matrix form $A X = B$.

$$3x_1 + 2x_2 - 2x_3 = 1$$

$$2x_1 - 3x_2 + 2x_3 = 2$$

$$4x_1 + 3x_2 + 2x_3 = 16$$

Show that A is diagonally dominant.

1.(b) By Gauss Seidel iteration, compute the solution of the above system of linear equation starting from $(0, 0, 0)$ to 10^{-1} degree of accuracy.

2.(a) State the conditions for the convergence of a solution x of a nonlinear equation $f(x) = 0$, which lies between (a, b) using a simple iteration $x_{n+1} = g(x_n)$.

2.(b) Use the simple iteration $x_{n+1} = g(x_n)$, approximate the solution of the nonlinear equation $3x - \cos x - 1 = 0$ within the interval $(0.6, 0.7)$ to 10^{-3} degree of accuracy.

3.(a) Use the General formula (k^{th}) to define the finite differences of (i)forward (ii)backward and (iii) central.

3.(b)i Prove the following identities (i) $\delta^2 \Delta = \Delta^2 - \delta^2$ (ii) $2\mu\delta = V + \Delta$ (iii) $E \delta^2 = \Delta^2$

3(c) By finite differences method, detect and correct the error in the table

| | | | | | | | | |
|---|---|---|---|----|----|----|----|----|
| x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| y | 1 | 4 | 9 | 16 | 24 | 36 | 49 | 64 |

THE POYTECHNIC IBADAN
DEPARTMENT OF COMPUTER ENGINEERING,
FIRST SEMESTER EXAMINATION, 2023/2024 SESSION.

CLASS: HND II
COURSE TITLE: COMPUTER TECHNOLOGY
COURSE CODE: CTE 431
COURSE UNIT: 2
INSTRUCTION: ANSWER FOUR (4) QUESTIONS IN ALL.
TIME ALLOWED: 2HRS.

QUESTION ONE

- (a) Explain the following types of memory devices in a microprocessor-based systems:
(i) PROM (ii) EEPROM (iii) EPROM (iv) dynamic RAMs (v) static RAM. 5mks
- (b) Draw the internal organization of the 8088 microprocessor and distinguish it from the 8085 microprocessors. 5mks
- (c) Explain three (3) factors to be considered while improving on the designs of microprocessors. 3mks
- (d) Implement an AND gate using NAND gate/s only. 2mks

QUESTION TWO

- (a) With the aid of a block diagram, describe the connection of internal and external buses to the I/O devices. 6mks
- (b) Compare a memory I/O data transfer by the CPU to a DMA transfer. 6mks
- (c) Determine the total time required to serially transfer nibble of data within the computer system if 10 kHz Clock is used as reference. 1mk
- (ii) What is the total time required to transfer a byte in parallel? 2mks

QUESTION THREE

- (a) Mention the importance of circuits' simplification. .4mks
- (b) With the aid of relevant diagrams showing basic data movement, describe four (4) types of shift registers. 6mks
- (c) Convert the following numbers to binary:
(i) 3.5 (ii) 45.125 (iii) 100 BCD (iv) 100 (v) 2.25 5mks

QUESTION FOUR

- (a)i) Derive the Boolean expression for F where, $F(A,B,C) = \sum(0,1,2,3)$ 4mks
(ii) Draw the logic circuit for (i).
(iii) Use k – maps to minimize the function F. Hence, draw the Logic circuit for the reduced function. 6mks

Cost
Compatible

(b) With the aid of the circuit diagram, truth table and the symbol, describe the operations of 3-to-8 Decoder.

5mks

QUESTION FIVE

(a) Distinguish between low and high level languages.

5mks

(b) Using the symbol, Combinational logic Circuit and the truth tables, describe the operations of a 4x1 Multiplexer.

6mks

(c) Describe the operations of the following peripheral devices;

4mks

(i) Joystick (ii) Character recognition (iii) VDU (iv) Line Printers.

QUESTION SIX

(a) Draw the seven-segment array of LEDs and with the aid of the truth table, explain How they can be used to display digits 0-9.

5mks

(b) What are the functions of the operating systems?

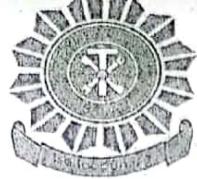
4mks

(c) Distinguish between the compilers and interpreters of the computer system.

4mks

(d) Implement an OR Gate using NAND gates only.

2mks



THE POLYTECHNIC, IBADAN
DEPARTMENT OF COMPUTER ENGINEERING TECHNOLOGY
FIRST SEMESTER EXAMINATION
2023/2024 ACADEMIC SESSION

COURSE TITLE: COMPUTER GRAPHICS & ANIMATIONS
COURSE CODE: CTE 435
CLASS: HND II
INSTRUCTION: ATTEMPT ALL QUESTIONS IN SECTION A AND ANY TWO (2) QUESTIONS FROM SECTION B.
TIME ALLOWED: 2 HOURS

SECTION A (Attempt all questions)

QUESTION 1

- Draw the line between points m(1,2) and n(4,8) using both Digital Differential Analyzer and Bresenham Algorithms respectively. (6 marks)
- Explain the following two-dimensional transformations: (1 mark each)
 - Translation
 - Rotation
 - Scaling
 - Reflection

QUESTION 2

- State any four (4) areas of application of Computer Graphics. (2 marks)
- Given the coordinates of a 2D shape as a(2,2), b(2,6), c(3,6), d(3,4), e(5,4) and f(5,2).
 - Sketch the 2D shape using appropriate scale. (2 marks)
 - Produce a horizontal reflection of the 2D shape. (3 marks)
 - Translate the shape with $dx = -7$ and $dy = -8$. (3 marks)

SECTION B (Attempt only two questions)

QUESTION 3

- i) Concisely differentiate between CAD and CAM. (2 marks)
ii) Sketch an emoji/emoticon to describe the word "Renewed Hope". (3 marks)
- What is scan conversion in computer graphics? Hence describe four (4) objects which can be scan converted. (5 marks)

QUESTION 4

- a) Highlight history of Computer Graphics between the years 1995 to 2021. (5 marks)
- b) Describe the following shading models: (1 mark each)
 - i) Constant shading
 - ii) Gouraud shading
 - iii) Phong shading.
- c) Explain the following terms: (i) Pixel (ii) Resolution. (1 mark each)

QUESTION 5

- a) Discuss the principles of 3-dimensional graphics. (2 marks)
- b) Differentiate between the parallel and perspective projections. (4 marks)
- c) Explain these methods of 3D object representation: (2 marks each)
 - i) polygon tables
 - ii) polygon surfaces.

QUESTION 6

- a) Discuss the graphics file formats. (2 marks)
- b) Explain details of Morphing and Simulating accelerations. (4 marks)
- c) Differentiate between the web graphics designs and graphics design packages. Use suitable examples. (4 marks)