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UNIVERSITY EXAMINATIONS 2024/2025

FOURTH YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR
OF TECHNOLOGY IN ELECTRICAL AND ELECTRONIC ENGINEERING

EET 3401: COMPUTER HARDWARE AND MAINTENANCE

DATE: JANUARY 2025

TIME: 2 HOURS

INSTRUCTIONS: Answer Question ONE and any other TWO questions.

QUESTION ONE (30 MARKS)

- (a) (i) Distinguish between a personal computer and a server
(ii) Define a computer expansion bus and state ONE type of expansion buses with diverse features (5 Marks)
- (b) (i) Two computers runs the same program; computer X in 15secs and computer Y in 25secs, how much faster is computer X than computer Y?
(ii) Differentiate between a computer- motherboard and Universal Serial Bus switch (4 Marks)
- (c) (i) State the functions of computer power supply system
(ii) Determine the decimal value of the following 32-bit two's complement number:
1111 1111 1111 1111 1111 1111 1111 1001_{two} (7 Marks)



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- (d) (i) Explain the main differences between Hard disk- and Solid-state drives as applied in computer systems
- (ii) State any TWO steps applied when troubleshooting a CD-drive in computer system (6 Marks)
- (e) (i) Draw a classic organization of a shared memory multiprocessor
- (ii) Using the Amdahl's law show how you can achieve a speed-up of 90 times faster with 100 processors and state the percentage of the original computation which can be sequential (8 Marks)

QUESTION TWO (15 MARKS)

- (a) (i) Draw a block diagram of a microprocessor-based system and explain the functions of each bus
- (ii) Distinguish between clusters and send message routine multiprocessors (10 Marks)
- (b) (i) A single shared memory processor has 20GB of the main memory, five clustered computers each have 4GB and the Operating System occupies 1GB. Determine the percentage more space available for the shared memory users
- (ii) Outline how the power delivery standards of an expansion bus can be improved (5 Marks)

QUESTION THREE (15 MARKS)

- (a) Outline the Common Faults and Remedies for the following computer motherboard components:
- (i) AGP slot
- (ii) Hard Disk Drive (10 Marks)
- (b) Explain how you can maintain a computer mother board major components and state how they are replaced (5 Marks)

QUESTION FOUR (15 MARKS)

- (a) Outline the operations of the following components of a computer hard drive:



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- (i) Platters
 - (ii) Spindle
 - (iii) Read/Write Arm
 - (iv) Actuator (8 Marks)
- (b) A program runs in 10 seconds on computer A which has a 2GHz clock. Design a computer B to this program in 6 seconds at 1.2 times clock cycles as computer A and state the clock rate target (7 Marks)

QUESTION FIVE (15 MARKS)

- (a) (i) Distinguish between Direct Memory Access and Accelerated Graphics Port computer cards, stating their applications
- (ii) Outline the steps followed when upgrading computer BIOS program (8 Marks)
- (b) (i) Draw a block diagram of a of computer power supply components and state the functions of each block
- (ii) Discuss how to troubleshoot a computer hard drive failure using the File Explorer method (7 Marks)



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