বাংলাদেশ আর্মি ইন্টারন্যাশনাল ইউনিভার্সিটি অব সায়েন্স এন্ড টেকনোলজি, কুমিল্লা

BANGLADESH ARMY INTERNATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY (BAIUST), CUMILLA

EXAMINATION CONFIDENTIAL

Term Final Examination, Spring 2023

Department of Computer Science and Engineering

Level-3 Term-I

Course Code: CSE-305

Course Title: Microprocessor and Micro-controller

Credit Hour: 03

Exam Duration: 2 Hours

Full Marks: 150

Notes:

a. Figure on the right of each question indicate marks for respective question.

b. Answer ***any FIVE*** questions out of **SIX**.

c. Use different answer scripts for each section.

Part-A

1. a. Describe the internal architecture and working procedure of the central processing unit of 80386 microprocessor. **20**

   b. How does the 80386 microprocessors overcome the limitations of 80286 microprocessor? **10**

2. a. Describe the internal architecture and functions of descriptor in 80386 microprocessors. **15**

   b. Write short note on the following (any 3) - **15**

      I. Resume flag register

      II. Paging

      III. Virtual 8086 mode

      IV. TLB

3 a. Draw the necessary pin connection diagram for input mode 1 on Port A in 8255A programmable parallel port. **12**

   b. Explain the double handshake parallel data transfer method with necessary timing waveform. **12**

   c. Write down the control word for I/O mode of 8255. **6**

Part-B

4. a. Draw the internal block diagram of 8255 programmable parallel interface. **10**

EXAMINATION CONFIDENTIAL

	b.	Write a simple program to animate 8 LEDs connected to PORT B using Atmega32 micro-controller with 1 second delay at each step.	12
	c.	Write a program to read a byte from PORT A and write it to PORT B.	8
5	a.	Write a program to toggle the content of PORT A whenever a certain sensor connected to your system has any logical change using INT 1.	15
	b.	Write Down interrupt execution sequences in micro-controller.	10
	c.	Why interrupt is better than polling?	5
6	a.	Why prescaler is used in micro-controller? Write down the functions of TCNT1, ICR1, TIMSK, TCCR1B registers of timer.	10
	b.	Write down the functions and operation mode of timer 1 and timer 2.	6
	c.	Write a program to increment the value of PORT-A every 2 seconds using TIMER 1 Overflow Interrupt and Prescaler 8 [System frequency is 1 MHz].	14

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Term Final Examination, Spring 2023

Department of Computer Science and Engineering

Level-3 Term-I

Course Code: CSE-301

Course Title: Database Management System

Credit Hour: 03

Exam Duration: 2 Hours

Full Marks: 150

Notes:

a. Each question carries **30** marks.

b. Answer any **5 (five)** questions out of **6 (Six)**

c. The figure on the right of each question indicates marks for the respective question.

d. Use a different answer script for each part.

Part-A

1. a. Describe the different types of attributes. Provide examples of each from a university database. 15

   b. Demonstrate how to convert a given ER diagram into a set of relational tables, ensuring that primary and foreign keys are appropriately defined. 15

2. a. What is record blocking? Draw the storage hierarchy diagram based on their memory size and speed. 15

   b. Explain the concept of disk controller. What are the factors to consider when choosing a RAID level? 15

3. a. Explain the concepts of atomicity, consistency, isolation, and durability (ACID) in the context of database transactions. How do these properties contribute to data integrity? 20

   b. Show me a transaction schedule where consistency and inconsistency are present. 10

Part-B

4. a. Describe the concept of distributed database systems. What are the advantages and challenges of distributing data across multiple locations? 20

   b. Compare and contrast the two-tier and three-tier architecture models. 10

5. a. Explain the concept of front-end and back-end database functionality in a university context. 15

   b. Mention the differences between homogeneous and heterogeneous distributed database. What are the trade-offs between these database? 15

6. a. Explain the motivations behind data replication. What are the key advantages of data replication in distributed databases? 15

   b. Define data warehousing and explain its significance in decision-making and business intelligence. 15

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Final Term Examination, Spring 2023

Department of Computer Science and Engineering

Level- 3 Term- I

Course Code: CSE-309

Course Title: Computer Network

Credit Hour: 3

Exam Duration: 2 hour

Full Marks: 150

Notes:

a. Figure on the right of each question indicate marks for respective question.

b. Answer ***any Five*** questions out of **SIX**.

PART-A

1.	a.	Write short notes on, "Simplex", "Duplex" & "Half Duplex" multiplexing technique.	09
	b.	What do you mean by "Intranet", "Internet" & "Extranet"? How these related with each other.	09
	c.	Write down the advantages & disadvantages of Client-Server and Peer-to Peer Network.	12
2.	a.	What do you mean by Ad-Hoc network?	03
	b.	Name the OSI reference model and explain any two layers.	03+12
	c.	Write down the CSMA/CD algorithm.	12
3.	a.	Write down the difference between Hub vs Switch.	12
	b.	What are the three technique we have for error detection?	03
	c.	An organization is granted a block of addresses with the beginning address 14.24.74.0/24. The organization needs to have 2 sub blocks of addresses to use in its three subnets as shown below: i) One sub block of 60 addresses. ii) One sub block of 10 addresses. Calculate the first valid host address, last valid host address, broadcast address of each sub blocks.	15

PART-B

4. a. Assume you have a data 10110 to send over a network with a code generator of 1101. 12+12

   i) Find out the senders data after CRC calculation.
   ii) If the receiver receives 10110110, show the process whether received data is correct or not?

   b. Write two difference between TCP vs UDP. 06

5. a. What do you mean by circuit switching & packet switching? 06

   b. Write down the advantages and disadvantages of static routing vs dynamic routing. 12

   c. What do you mean by Autonomous System? With proper diagram name the different routing protocols we have. 12

6. a. Write short notes on "DHCP", "FQDN" & "PQDN". 12

   b. With proper diagram explain three types of proxy server. 18

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Term Final Examination, Spring-2023

Department of Computer Science and Engineering

Level-3 Term-I

Course Code: CSE-303

Course Title: Compiler

Credit Hour: 03

Exam Duration: 2 Hours

Full Marks: 150

Notes:

a. Figure on the right of each question indicate marks for respective question.

b. Answer ***any FIVE*** questions out of **SIX**.

c. Use different answer scripts for each section.

Part-A

1. a. Consider the following grammar: 10

stmt → expr ; | if (expr) stmt | for (optexpr ; optexpr ; optexpr) stmt | other

optexpr → ϵ | expr

Derive the parse tree for the following input:

for (; expr ; expr) other

b. Using the grammar defined in 1(a), generate a pseudocode for a predictive parser. 20

2. a. If *stmt* is a production head, then what is FIRST(*stmt*) and why it is used for? 10

What is the difference between FIRST and FOLLOW?

b. Eliminate Left-Recursion from the following grammar: 20

$E \rightarrow E + T / T$

$T \rightarrow T \times F / F$

$F \rightarrow id$

3 a. (i) What is the difference among (a) Token, (b) Pattern and (c) Lexeme? Write down some of the tasks of Lexical Analyzer. 05+05

(ii) Why lexical analyzer in a compiler is seperated from syntax analyzer? Explain in brief.

b. Describe the working mechanism of Buffer-Pairs using lexemeBegin, forward and sentinels and the statement: E = M * C * * 2 20

Part-B

4. a. Design regular definitions for (i) *id* and (ii) *numbers*. 05+05

b. Create a transition diagram for '*relop*'. Explain the meaning of asterisk (*) used in your transition diagram. 20

5 a. Calculate the FIRST and FOLLOW for each of the non-terminals from the following grammar: 15

$$E \rightarrow TE'$$
$$E' \rightarrow +TE' \mid \varepsilon$$
$$T \rightarrow FT'$$
$$T' \rightarrow *FT' \mid \varepsilon$$
$$F \rightarrow id \mid (E)$$

b. After calculating FIRST and FOLLOW in 5(a), create a LL(1) parsing table for the above grammar. 15

6 a. Generate a Three-Address Code for the following statement: 10

$$a + a * (b - c) + (b - c) * d$$

b. Using the Three-Address Code of 6(a), draw (i) a DAG and create (ii) a Quadruple data structure. 10+10

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Final Term Examination, Spring 2023
Department of Computer Science and Engineering
Level- 3 Term- I
Course Code: CSE-307
Course Title: Operating System
Credit Hour: 3
Exam Duration: 2 hour
Full Marks: 150

Notes:

a. Figure on the right of each question indicate marks for respective question.
b. Answer ***any Five*** questions out of **SIX**.

PART-A

1. a. Calculate the average waiting time & average turnaround time for the following processes using SJF algorithm. 12

Process	Arrival time	Burst Time
P1	3	5
P2	2	7
P3	1	8
P4	0	2

b. Calculate the average waiting time & average turnaround time for the following processes using SRTF algorithm. 18

Process	Arrival time	Burst Time
P1	0	8
P2	2	4
P3	2	2
P4	3	1

2. a. Calculate the average waiting time & average turnaround time for the following processes using Preemptive & Non Preemptive Priority Scheduling. 15+15

Process	Arrival Time	Burst Time	Priority
P1	0	8	3
P2	1	1	1
P3	2	3	2
P4	3	2	3
P5	4	6	4

3. a. Calculate the average waiting time & average turnaround time for the following processes using Round Robin algorithm where time quantum is 5. 18

Process	Arrival time	Burst Time
P1	0	6
P2	1	7
P3	2	4
P4	3	2
P5	4	6
P6	6	5

b. Explain the four conditions that are responsible for Deadlock? 12

PART-B

4. a. What do you mean by safe state? Write down the basic facts of safe state. 06

b. Explain deadlock prevention in details. 12

c. Explain the data structures for the bankers algorithm. 12

5. a. Determine whether the system is in safe state or not for the following processes. Also show the running sequence. 30

Available Resources: A=3, B=3, C=2

Allocated resources for each process

Process	A	B	C
P1	0	1	1
P2	2	0	0
P3	2	1	2
P4	0	1	1
P5	0	0	2

Maximum resource needs for each process

Process	A	B	C
P1	0	1	2
P2	2	0	0
P3	3	2	2
P4	2	1	1
P5	0	0	2

6. a. Write details about security violations categories. 12

b. Explain Memory allocation techniques in details. 18