ELIZADE UNIVERSITY, ILARA-MOKIN, ONDO STATE

FACULTY OF ENGINEERING

DEPARTMENT OF COMPUTER ENGINEERING

FIRST SEMESTER EXAMINATION, 2019/2020 ACADEMIC SESSION

COURSE TITLE: COMPUTER SYSTEM ENGINEERING

COURSE CODE: EEE 419

EXAMINATION DATE: FRI. FEB. 14 2020

COURSE LECTURER: ENGR. J.O. OGUNNIYI

HOD's SIGNATURE

TIME ALLOWED: **2 HRS 30 MINS.**

INSTRUCTIONS:

1. ANSWER FIVE QUESTIONS ONLY
2. SEVERE PENALTIES APPLY FOR MISCONDUCT, CHEATING, POSSESSION OF UNAUTHORIZED MATERIALS DURING EXAM.
3. YOU ARE **NOT** ALLOWED TO BORROW ANY WRITING MATERIALS DURING THE EXAMINATION.

Question 1

a. Juxtapose why the Computer System is categorized as a complex system. **2 Marks**
b. System complexity has different perspectives in many fields including Engineering but there are common signs of complexity. List and discuss four (4) signs of system complexity known to you. **6 Marks**
c. Have the Engineers in Nigeria has solutions to system complexity in the nation, if yes explain two of such solutions known to you that you agreed with. **4 Mark**

Question 2

a. Write a transfer PROCEDURE for bank accounts without the concept of atomicity and explain the problems of such a procedure when implemented for concurrency-based operations. **4 Marks**
b. Briefly explain the differences between each of the following:

i. Active Hub and Passive Hub   ii. Basic ATM and Complex ATM   **4 Marks**

c. List and explain the function of four (4) parts of ATM   **4 Marks**

Question 3

a. There are different definitions given to the term atomicity. Explain the term as used in Engineering design principles.   **2 Marks**

b. Explain the two types of Atomicity with emphasis on the purpose of such type in any engineering design.   **4 Marks**

c. Consider figure 2.

   i. Which transaction will first complete it process and why? **3 Marks**

   ii. What is the term use to describe such situation? **1 Mark**

   iii. Suggest the way forward. **2 Marks**

T_3	T_4
lock-X(B)	
read(B)	
B := B − 50	
write(B)	
	lock-S(A)
	read(A)
	lock-S(B)
lock-X(A)	

Figure 2

Total = 6 Marks

Question 4

a. Explain the significant of fault-tolerance in the design of reliable system   **2Marks**

b. State the Network topology that you know and describe the distinct features of each topology, include appropriate diagrams.   **4 Marks**

c. Explain the following concepts used in reliable system:

   i. Mean Time to Failure   ii. Mean Time Between Failure   iii. Mean Time to Repair.   **6 Marks**

Question 5

a. Failure recovery is an essential measure in the design of computer-related systems; discuss the roles of cell storage and Journal storage in failure recovery. **4 Marks**

b. Illustrate with appropriate diagrams, three (3) Common Logging Configurations used in database design.   **6 Marks**

c. Explain what you understand by lock-based protocol as a mechanism to control concurrency operations.   **2 Marks**

Question 6

a. Explain two primary types of locking techniques used in coordination of concurrency operations.

   4 Marks

b. Copy and complete Table1 using Figure 1.   **4 Marks**

Figure 1: Lock table

Table 1: showing relationship b/w Trans_ID, data & Lock

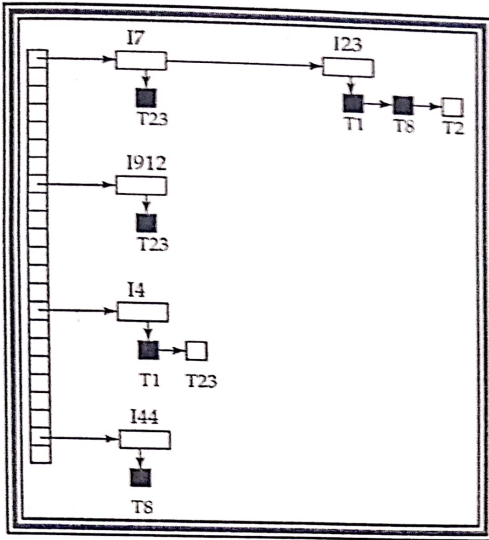| S/N	Trans_ID	Data	Type of Locking technique
1	T1	___ , 123	_____
2	T2	123	_____
3	___	14,17,1912	_____
4	___	144, ___	_____

c. The component of a system has the availability of 0.9895 each. Suppose three of the components were used in the design of the system, calculate the system availability when connected in series and when connected in parallel. **4 Marks**

Question 7

a. If the MTTR of a system is 30 seconds, how many crashes can it sustain per year and still maintain a five 9s uptime? What is the MTTF in this case? **4 Marks**

b. Discuss four (4) Impacts of the computer system on society **4 Marks**

c. Explain two (2) approaches to ensure fault prevention in building a reliable system. **4 Marks**