END SEMESTER EXAMINATION, JUNE-2023
Computer Organization and Architecture (EET 2211)

Programme: B.Tech   Semester: 4th

Full Marks: 60   Time: 3 Hours

Subject/Course Learning Outcome	*Taxonomy Level	Ques. Nos.	Marks
Able to explain the concepts that underline the modern Computers evolution, function, and organization.	L2	1,2, 8	18
Able to identify the appropriate organization of a computer for achieving the best performance.	L3	3	6
Able to analyze and demonstrate the computer function and interconnection.	L2	4,7(c)	8
Able to understand and analyze the computer memory system.	L2	6,7(a), 7(b)	10
Able to understand and analyze computer arithmetic via digital logic.	L3	5	6
Able to interpret low level processor operations using a series of computer instructions.	L3	9,10	12

*Bloom's taxonomy levels: *Remembering (L1), Understanding (L2), Applying (L3), Analysing (L4), Evaluating (L5), Creating (L6)*

Answer all questions. Each question carries equal mark.

1. (a) Briefly define the main structural components of a computer.   2

   (b) What are the major structural components of the central processing unit (CPU)?   2

   (c) Describe the defenses among the single-processor computer and multicore computer.   2

2. (a) Explain the concepts of Internet of Things (IoT).   2

   (b) What is the difference between microprocessor and microcontroller.   2

   (c) Explain the services provided by cloud service providers.   2

3. (a) Briefly describe some of the methods used to increase processor speed.   2

   (b) Briefly describe the Amdahl's law.   2

   (c) Two benchmark programs are executed on three computers with the following results: 2

	Computer A	Computer B	Computer C
Program 1	50	20	10
Program 2	100	200	40

The table shows the execution time in seconds, with 1,000,000 instructions executed in each of the two programs. Calculate the MIPS values for each computer for each program. Then calculate the arithmetic and harmonic means assuming equal weights for the two programs, and rank the computers based on arithmetic mean and harmonic mean.
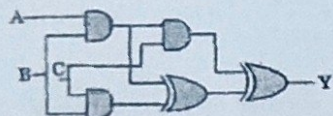
4. (a) Explain the interconnection structure of I/O module. 2

(b) Explain program timing diagram of long I/O wait with interrupts. 2

(c) Explain the instruction cycle state diagram. 2
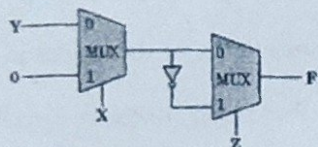
5. (a) Convert 45.25 decimal number into octal, hexadecimal and Binary. 2

(b) 2

Consider the circuit shown in the figure and find the expression of Y.

(c) 2

Consider the circuit shown in the figure and find the expression of F.

6. (a) What are the differences among direct mapping and associative mapping? 2

(b) For a direct-mapped cache, a main memory address is viewed as consisting of three fields. List and define the three fields. 2

(c) Explain semiconductor main memory organization. 2

7. (a) For the 8-bit word 00111001, the check bits stored with it would be 0111. Suppose when the word is read from memory, the check bits are calculated to be 1101. What is the data word that was read from memory? 2

(b) Explain RAID2, RAID 4 and RAID6 levels. 2

(c) Suppose that the 8255A is configured as follows: port A as output, port B as output, and all the bits of port C as input. Show the bits of the control register to define this configuration. 2

8. (a) List and briefly define the major types of OS. 2

(b) Explain the memory layout for a resident monitor. 2

(c) Explain the Interrupt driven I/O technique for input of a block of data with the help of flow diagram. 2

9. (a) Write assembly language program for addition of two 16 bit numbers using direct addressing mode. 2

(b) Write a program for addition of two 32 bit numbers using load/store addressing mode of ARM processor. 2

(c) Write a program to find the largest number in a given array of size N (8-bit numbers). 2

10 (a) Describe the pointer and index registers of 8086. 2

(b) Describe the different registers present in ARM processor. 2

(c) Describe with example any four logical instructions of 8086. 2

End of Questions