Course Name: BCSC1005, Computer Organization

Course Outcome

CO1: Understand the basics of digital computer system.
CO2: Demonstrate the principle of arithmetic operations on unsigned, signed integers and floating point numbers.
CO3: Understand the concepts of Combinational and Sequential circuits and their applications.
CO4: Understand the CPU architecture and organization.
CO5: Explain the basic concepts of pipelining.
CO6: Design the steps for the execution of the complete instruction for hardwired and micro-programmed control unit.
CO7: Explain the function of memory hierarchy.
CO8: Determine the interface of CPU with input/output devices and their modes of transfer.

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End Term Examination, Odd Semester 2022-23
B. Tech. CS (ALL), II Year, III Semester
BCSC1005, Computer Organization

Time: 3 Hours **Maximum Marks: 50**

Instruction for students: Attempt all questions.

Section – A

*Attempt **All** Questions* 4 X 5 = 20 Marks

No.	Detail of Question	Marks	CO	BL	KL
1	Perform in steps the multiplication of the numbers (-7) and (+4) by using Booth's algorithm	4	2	A	P
2	What are the essential component of a digital computer? Discuss briefly the function of each component by giving appropriate block diagram.	4	1	U	F
3	Explain PUSH and POP operations. Convert the following arithmetic expression into reverse polish notation and show the show the stack operations for evaluating it? 5+8*7+(4+3)+8*(5+3)	4	4	A	P
4	Differentiate hardwired and microprogrammed control unit by using appropriate figure? Also discuss its advantage and disadvantage.	4	6	U	C
5	What do you mean by cache memory? Discuss its different types. Differentiate write through and	4	7	U	F

	write back with respect to cache memory. Or What is instruction cycle? Draw the flowchart for instruction cycle.				

Section – B

*Attempt **All** Questions* 3 X 5 = 15 Marks

No.	Detail of Question	Marks	CO	BL	KL
6	Show the execution of complete instruction for Add R1,R3 where contents of Register R1 and R3 are added and result is stored in R3.	3	6	A	P
7	Draw Memory Pyramid. Explain the difference between various memories on the basic of Storage, Cost per bit, Access mode and Speed.	3	7	U	C
8	What do you mean by high-impedance state of buses? A computer uses RAM chips of 1024x1 capacity. How many chips are needed to provide a memory capacity of 1024 bytes? How many address lines are required to access 2048 bytes of memory?	3	7	A	P
9	What do you mean by Interrupt? Discuss different types of interrupt in detail.	3	8	U	C
10	What do you mean by pipeline processing? In a certain scientific computation, it is necessary to perform the arithmetic operation $A_i * B_i * (C_i * D_i)$ with a stream of numbers. Specify a pipeline configuration to carry out this task.	3	5	A	P

Section – C

*Attempt **All** Questions* 5 X 3 = 15 Marks

No.	Detail of Question	Marks	CO	BL	KL
11	What is DMA controller? Explain in detail the Direct Memory Access (DMA) transfer in a computer system by giving appropriate figure.	5	7	U	C

12	A computer employs RAM chips of 256x8 and ROM chips of 1024x8. The computer system needs 2K bytes of RAM, 4K bytes of ROM, and four interface units each with four registers. A memory-mapped I/O configuration used. The two highest-order bits of the address bus are assigned 00 for RAM, 01 for ROM, and 10 for interface registers. How many RAM and ROM chips are needed? Draw a memory-address map for the system. Give the address range in hexadecimal for RAM, ROM and interface.	5	7	A	P
13	What do you mean by virtual memory? How it is useful for executing any program. A virtual memory system has an address space of 8K words, a memory space of 4K words, and page and block sizes of 1K words. The following page reference changes occur during a given time interval. 5 1 3 2 3 7 5 2 1 2 3 1 4 8 6 Determine the four pages that are resident in main memory after each page reference change if the replacement algorithm used is FIFO and LRU.	5	7	A	P