(141)

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATIONS- 2026

B.Tech-Vth Semester (CSE/IT)

COURSE CODE (CREDITS):18B11CI514 (3) MAX MARKS: 25

COURSE NAME: Computer Organization and Architecture

COURSE INSTRUCTOR: EMP MAX. TIME: 1 Hour 30 Min

Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of calculator is allowed

Q.No	Question	CO	Marks
Q1	a) Define instruction cycle and list its phases. (2) b) Explain memory-reference instructions with one example. (2) c) Differentiate between CISC and RISC architectures (1)	CO-2	5
Q2	a) Explain addressing modes. Illustrate Direct and Indirect addressing modes with examples. (3) b) A computer has 16-bit instruction format with: 4 bits opcode 12 bits address Find: i) Maximum number of instructions ii) Maximum memory locations addressable (2)	CO-2	5
Q3	For each of the following 16-bit instructions of Mano's basic computer, give the equivalent four-digit hexadecimal code and explain the instruction which will be performed. Refer to the instruction format in the overleaf. a. 1001 0010 0110 0100, b. 0011 0101 0010 0101 c. 1111 1000 0000 0000, d. 0110 0001 0100 0000 e. 0111 0001 0000 0000	CO-2	5
Q4	a) Explain stack organization with PUSH and POP operations. (2) b) A stack has initial SP = 400H. Perform the following: PUSH 250H PUSH 300H POP Find final values of SP and top element. (3)	CO-2	5
Q5	In a Mano's basic computer, an instruction is stored at memory location 532H with opcode = ADD, and address field = 133H. The memory location 133H holds the value 0144H and, memory location 144H holds the values 0155H. The Accumulator (AC) contains 1023H. Determine the final contents of the PC, AR, DR, AC, IR and E registers after executing the instruction when I=0 and when I=1.	CO-2	5

Instructions of Mano's Basic Computer

Symbol	$I = 0$	$I = 1$	Description
AND	0xxx	8xxx	AND memory word to *AC*
ADD	1xxx	9xxx	Add memory word to *AC*
LDA	2xxx	Axxx	Load memory word to *AC*
STA	3xxx	Bxxx	Store content of *AC* in memory
BUN	4xxx	Cxxx	Branch unconditionally
BSA	5xxx	Dxxx	Branch and save return address
ISZ	6xxx	Exxx	Increment and skip if zero
CLA	7800		Clear *AC*
CLE	7400		Clear *E*
CMA	7200		Complement *AC*
CME	7100		Complement *E*
CIR	7080		Circulate right *AC* and *E*
CIL	7040		Circulate left *AC* and *E*
INC	7020		Increment *AC*
SPA	7010		Skip next instruction if *AC* positive
SNA	7008		Skip next instruction if *AC* negative
SZA	7004		Skip next instruction if *AC* zero
SZE	7002		Skip next instruction if *E* is 0
HLT	7001		Halt computer
INP	F800		Input character to *AC*
OUT	F400		Output character from *AC*
SKI	F200		Skip on input flag
SKO	F100		Skip on output flag
ION	F080		Interrupt on
IOF	F040		Interrupt off