15/11/ 9 am

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

Make-up Examination-Nov-2025

COURSE CODE (CREDITS): 18B11WCI514 (3)

MAX. MARKS: 25

COURSE NAME: Computer Organization and Architecture

COURSE INSTRUCTORS: NTS*, PMI, KTS, SKS MAX. TIME: 1 Hour 30 Minutes

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

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

Q.No	Question	CO	Marks
Q1	(a) Explain briefly the purpose of using RAID in computer storage systems. Discuss any three RAID levels with their merits and limitations. (b) How do we achieve redundancy in a RAID system? What do we understand by "mirroring"?	4	5 + 2
Q2	(a) A computer uses two-way set associative cache having the following configuration: Main Memory Size: 1 MB, Cache Size: 4 KB, Block Size: 32 bytes, Word Size: 1 byte. Determine the number of sets, tag bits, and block offset bits. Show the calculations clearly. (b) Convert the decimal value 23.375 into its IEEE-754 single precision (32-bit) floating-point representation.	3	4 + 3
Q3	A processor uses a write-back cache system with the following details: Cache memory size = 64 KB, Main memory access time = 600 ns, Cache access time = 40 ns. 70% of CPU requests are reads, and 30% are writes. Hit ratio for read = 85%, and for write = 90%. Calculate the average memory access time for the system.	3	5
Q4	(a) A two-way set associative cache has 4 sets and follows the LRU replacement policy. If the sequence of block addresses generated by CPU is [5, 9, 1, 5, 13, 9, 17], find the total number of cache misses. Show step-wise explanation. (b) A hard disk has the following characteristics: Average Seek Time: 7 ms, Rotational Speed: 9000 rpm, Data Transfer Rate: 120 MB/s, Sector Size: 8 KB (i) Calculate the average rotational latency (in ms). (ii) Compute the average time required to read one 8 KB sector (consider seek + rotational + transfer time).	4	4+2

22