Punjab Engineering College
(Deemed to be University)
End-TermExamination
Dec, 2020

Programme: **B.Tech (Electronics & Communication)**

Year/Semester: **Third/1st**

Course Name: **Computer Architecture**

Course Code: **ECN 301**

Maximum Marks:**50**

Time allowed: **2 Hours**

Notes:

1. All questions are compulsory.
2. Unless stated otherwise, the symbols have their usual meanings in context with subject. Assume suitably and state, additional data required, if any.
3. The candidates, before starting to write the solutions, should please check the question paper for any discrepancy, and also ensure that they have been delivered the question paper of right course code.

Q. No			Marks
1	(a)	Memory operations currently take 30% of execution time. A new widget called a "cache" speeds up 80% of memory operations by a factor of 4. A second new widget called a "L2 cache" speeds up 1/2 the remaining 20% by a factor or 2. What is the total speed up?	3
	(b)	Write a microprogram for instruction ISZ (Increment and skip if zero).	4
	(c)	Write an assembly language program to copy a block of 100 numbers from one location to other.	5
2	(a)	Using 8-bit two's complement integers, calculate the following operations: (i) -34 + (-12) (ii) -22 – (+7) (iii) ASR -23 by three places	4.5
	(b)	Divide 30 (represent in 8 bit) by 3 using non restoring algorithm.	2.5
3	(a)	Do the following: i. Convert A*B+A*(B*D+C*E) from infix to reverse polish notation. Also write a program to evaluate the expression with zero address operating instructions. ii. Convert ABCDEFG+*+*+* from reverse polish notation to infix notation.	5,2
	(b)	What is a PC relative addressing mode? If a PC relative mode instruction is stored at an address equivalent to decimal 750 and the branch is made to an address equivalent to decimal 500.What should be the value of relative address field of the instruction (in decimal)?	4
4	(a)	What is the difference between isolated I/O and Memory mapped I/O? What are the advantages and disadvantages of each?	5
	(b)	What is the basic advantage of using interrupt initiated data transfer over transfer under program control without an interrupt?	5

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5	(a)	The available space list of a 16KBmemory has the following entries at some time t. The following sequence of allocation and deallocation requests then occur.1K (allocation), 2K (allocation), 1K (deallocation from address 2DFF) and 1K (allocation). Determine and show the available space list after all these requests using Best fit method. Base address / Size: 0000 / 2K; 1000 / 1K; 2000 / 512; 31FF / 3K	5
	(b)	The virtual and physical addresses are 32 bits long and pages are 4KB in size. Demonstrate the calculation of the physical address that corresponds to the virtual address $(22433007)_{16}$. Show all the steps. All mentioned addresses are in hexadecimal. Virtual page no. / Frame no.: abc89 / 97887; 13385 / 99910; 22433 / 00001; 54483 / 1a8c2	5