Unit - V

5. a) What is a multiprocessor system? What are lightly and tightly coupled systems?

b) What is pipelining?

c) Describe the following terminology associated with multiprocessors.

i) Critical section.

ii) Mutual exclusion.

iii) Hardware lock.

d) What are inter connection structures in multiprocessor systems? Explain any one in detail.

OR

What is the purpose of the system bus controller? Explain how the system can be designed to distinguish between references to local memory and references to common shared memory.

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Roll No .....

EC - 302

B.E. III Semester

Examination, June 2015

Computer System Organization

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each question are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

Unit - I

1. a) What is Von-Newman model of basic computer?

b) What is the difference between a direct and an indirect address instructions?

c) Represent the following conditional control statement by two register transfer statements with control functions. If (P = 1) then ($R_1 \leftarrow R_2$) else if (Q = 1) then ($R_1 \leftarrow R_2$).

d) A computer uses a memory unit with 256k words of 32 bits each. A binary instruction code is stored in one word of memory. The instruction has four parts : An indirect bit an operation code, a register code part to specify one of 64 registers and an address part.

i) How Many bits are there in the operation code, the register code part and the address part.

ii) Draw the instruction word format and indicate the number of bits in each part.

iii) How many bits are there in the data and address inputs of the memory.

OR

Enlist and explain the function of all the computer registers.

Unit - II

2. a) Compare and contrast hardwired control unit and microprogrammed control unit.

b) What is Microprogram sequencer?

c) Define the following : Micro operation, Microinstruction, Microprogram.

d) Draw and explain the hardware and algorithm for multiple operation.

OR

Show that adding B after the operation $A+\overline{B}+1$ restores the original value of A. What should be done with the end carry.

Unit - III

3. a) What is interrupt-initiated I/O data transfer?

b) Differentiate between synchronous and asynchronous data communication.

c) Compare and contrast Isolated and Memory-Mapped I/O.

d) Explain how an I/O processor is used to interface I/O devices to CPU?

OR

What is DMA? What are the different modes of DMA data transfer?

Unit - IV

4. a) What is cache memory? How is it different from other memory?

b) Compare and contrast RAM and ROM.

c) What is associative memory? Draw its hardware block diagram.

d) Describe direct mapping procedure from main memory to cache memory.

OR

The access time of a cache memory is 100 ns and that of main memory 1000 ns. It is estimated that 80 percent of the memory requests are for read and the remaining 20 percent for write. The hit ratio for read accesses only is 0.9. A write through procedure is used.

i) What is the average access time of the system considering only memory read cycles?

ii) What is the average access time of the system for both read and write requests?

iii) What is the hit ratio taking into consideration the write cycles?