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**Question Paper Code : 90189**

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Fifth Semester

Electronics and Telecommunication Engineering

EC 8552 – COMPUTER ARCHITECTURE AND ORGANIZATION

(Common to Electronics and Communication Engineering)

(Regulations 2017)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. List the registers that are available in the processor.
2. State and explain the performance equation.
3. What are the rules to perform addition on floating point numbers ?
4. What is sub word parallelism ?
5. Define processor clock.
6. What is imprecise and precise exception ?
7. Define hit ratio.
8. Differentiate USB and Firewire.
9. Name the interconnections used in a multi processor system.
10. What is meant by hardware multithreading ?

PART – B

(5×13=65 Marks)

11. a) i) If computer A runs a program in 10 seconds and computer B runs the same program in 15 seconds, how much faster is A than B ? (4)  
ii) Describe the different kinds of addressing modes with an example. (9)

(OR)

- b) i) A program runs in 10 seconds on computer A, which has a 2 GHz clock. Try to help a computer designer build a computer, B, which will run this program in 6 seconds. The designer has determined that a substantial increase in the clock rate is possible, but this increase will affect the rest of the CPU design, causing computer B to require 1.2 times as many clock cycles as computer A for this program. What clock rate should we tell the designer to target ? (8)  
ii) State the advantages of multiprocessor system. (5)



12. a) i) Subtract  $(11010)_2 - (10000)_2$  using 1's complement and 2's complement method. (8)  
 ii) Differentiate arithmetic shift and logical shift. (5)  
 (OR)
- b) Write down the Booth's algorithm. List the two attractive features of Booth's algorithm. Give an example for worst case of Booth's algorithm. (5+4+4)
13. a) Name and explain the two approaches used for generating the control signals in proper sequence. Differentiate the approaches. (13)  
 (OR)
- b) List the reasons of pipeline conflicts in pipelined processor. How are they resolved? (13)
14. a) What is virtual memory? Describe the advantages of virtual memory. (13)  
 (OR)
- b) What is Cache memory? What are the two ways in which the system using cache can proceed for a write operation? (13)
15. a) i) List the characteristics of Graphics Processing units. (8)  
 ii) Differentiate in-order execution and out-of-order execution. (5)  
 (OR)
- b) Explain in detail, the shared memory multiprocessor, with a neat diagram. (13)

## PART - C

(1×15=15 Marks)

16. a) i) Use the Booth and bit-pair recording techniques to multiply  $(-10 \times -10 = 100)_{10}$ . (10)  
 ii) List the rules to perform addition on floating point numbers. (5)  
 (OR)
- b) i) Compare UMA and NUMA multiprocessors. (5)  
 ii) A virtual memory has a page size of 1K words. There are eight pages and four blocks. The associative memory page table contains the following entries. (10)

Page	Block
0	3
1	1
4	2
6	0

Make a list of all virtual address (in decimal) that will cause a page fault if used by the CPU.