

Name

Roll No :

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SECOND SEMESTER M.TECH DEGREE EXAMINATION, MAY 2016**

Branch: Computer Science and Engineering

Specialisation: Computer Science and Systems Engineering

Subject: 04CS6402 Computer System Design and Architecture

Max Time : 03 hrs

Max Marks: 60

PART A

Answer All Questions

Each question carries 3 marks

1. What are the different taxonomies followed by a computer machine.
2. What is loop unrolling?
3. With a neat sketch explain memory hierarchy design?
4. What are the different ways in which a designer can reduce the hit time of a cache?
5. What is swapping mechanism?
6. What is stripping? What are its advantages and disadvantages?
7. With a neat sketch explain Distributed Shared Memory?
8. Compare and contrast Distributed Shared Memory and Centralized Memory?

PART B

Each question carries 6 marks

9. State Amdahl's law. Solve the following
Suppose we have made the following measurements:

Frequency of FP operations = 25%
Average CPI of FP operations = 4.0
Average CPI of other instructions = 1.33
Frequency of FPSQR = 2%
CPI of FPSQR = 20

Assume that the two design alternatives are to decrease the CPI of FPSQR to 2 or to decrease the average CPI of all FP operations to 2.5. Compare these two design alternatives using the processor performance equation.

OR

10. State Amdahl's Law and solve the following problem FP square root (FPSQR) is responsible for 20% of the execution time of a critical graphics benchmark. One proposal is to enhance the FPSQR hardware and speed up this operation by a factor of 10. The other alternative is just to try to make all FP instructions in the graphics processor run faster by a factor of 1.6; FP instructions are responsible for half of the execution time for the application. The design team believes that they can make all FP instructions run 1.6 times faster with the same effort as required for the fast square root. Compare these two design alternatives
11. Compare and contrast the time space diagram of a pipelined machine and a non – pipelined machine

OR

12. Does the following MIPS code support pipeline. If not as a designer how will rearrange the code
- | | |
|-----------|------------|
| Loop: L.D | F0,0(R1) |
| ADD.D | F4,F0,F2 |
| S.D | F4,0(R1) |
| DADDUI | R1,R1,#-8 |
| BNE | R1,R2,Loop |

13. With a neat sketch explain the working of GPU. What are its advantages to that of a normal processing unit?

OR

14. Explain why a designer will choose a CUDA system to that of a GPGPU system for processing weather forecasting data?

15. Calculate the average access time of a machine where the following parameters are been

Average seek time is 5ms

Disk spins at 10,000RPM

Transfer rate is 40 MB/sec

Control over head is 0.1 ms

Assume that the disk is idle so that no queuing delay exist .What is the average time taken by the disk to read/write for a .5KB sector

OR

16. Explain the different cache optimisation techniques used for cache optimisation

17. Draw the schematic diagram for the following

a) RAID 0+1 (3)

b) RAID 1+0 (3)

OR

18. Explain the different types of storage devices used for the memory storage.

19. What type of data storage model is been used in a data center for storing data/code. With a neat sketch explain its pros and cons

OR

20. With examples explain software multi threading and hardware multi threading