

**PARUL INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**  
**(203105397)**

Name of Programme: B.Tech\_CSE\_AI

Semester: VI

Subject Name: HPC

**QUESTION BANK**

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1. Describe GPU. Explain and compare various GPU 's.
2. Differentiate CPU and GPU.
3. Define GPU Computing?
4. Explain role of GPU in Gaming with suitable example.
5. Write a detailed note on memory hierarchy.
6. Differentiate between local and global barriers.
7. Write short note on profile tools and performance aspects.
8. What is an event and event-based synchronization?
9. What are various image processing techniques?
10. Write a note on multi-GPU and Heterogeneous processing.
11. Explain modern GPU Architecture.
12. Discuss various kernel functions and their effects on threads.
13. Why image processing applications extensively use GPU? Give logical insight between CPU and GPU for it.
14. Explain the following ways of parallelism:
  1. Loop-based Parallelism
  2. Divide and Conquer
15. What are the three main options for adding GPU acceleration? Discuss their implementation criteria and use.
16. Illustrate the difference between following:  
(a) CPU and GPU architecture (b) Global and local memory.
17. Describe any two GPU programming models.
18. Write a note on constant memory & global memory in CUDA.
19. What is an Accelerator? Explain different accelerators for graphics processing.
20. Explain CUDA computing architecture.
21. Explain 1D, 2D and 3D thread mapping.
22. What is a barrier? Discuss various memory fence operations.
23. Explain following terms: warps, threads, accelerator
24. How can we perform profiling of a CUDA program?
25. Explain the concept of thread synchronization.
26. What is the use of streams explain with an example?
27. Explain single vs multi-GPU processing.
28. Write a CUDA program for adding two numbers.
29. Write a note on: Von Neumann Architecture.
30. Write a CUDA program for "Hello World" with steps of compilation process.
31. Discuss various application areas of GPU computing and why CPU computing fails for those applications?

32. Write a detail note on GPU profiling tools.
33. Explain CUDA program structure with compilation process.
34. Explain Memory Allocation and Memory copying across devices with suitable example.
35. Write a detail note on texture memory.
36. Write a detail note on dynamic memory allocation in GPU.
37. Discuss Host Function and Kernel Function.
38. What are “thread blocks”, “warps” and “grids”? How are they related?
39. Illustrate the difference between following: (a) CPU and GPU architecture (b) global and local memory.
40. List and discuss the components of streaming multiprocessors.
41. How heterogeneous computing and parallel programming is done in CUDA? Give an example.
42. Explain various tools and techniques available for debugging GPU programs.
43. What is Flynn's taxonomy?
44. What is multi node computing?
45. What are the limitations of the current GPU computing software frameworks?
46. “Thrust provides a large number of common parallel algorithms”. Illustrate any one algorithm provided by Thrust with suitable example.
47. Explain kernel function in CUDA.
48. Write short notes on the following: (a) GPGPU (b) Warps (c) Thread mapping
49. Write short notes on the following:  
(a) Cell processor (b) Constant memory (c) Fork and Join Pattern (d) Connection Machine
50. Write short notes on the following:  
(a) Block (b) Warp (c) Thread mapping (d) Grid