Total No. of Questions : 8]

SEAT No. :

**P3973**

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# [5561]-677
# B.E. (Computer Engineering)
# HIGH PERFORMANCE COMPUTING
# (2015 Pattern) (Semester - I) (410241)

*Time : 2½ Hours]* *[Max. Marks : 70*

***Instructions to the candidates:***

1) ***Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn whenever necessary.***
4) ***Make suitable assumptions whenever necessary.***

***Q1)*** a) Explain Store - and - Forward and packet routing with its communication cost. **[6]**

b) Differentiate between Static and Dynamic mapping techniques for load balancing. **[6]**

c) Explain Circular shift operation on mesh and hypercube network. **[8]**

OR

***Q2)*** a) Discuss the applications that benefit from multi - core architecture. **[6]**

b) Define and explain the following terms. **[6]**

i) Granularity

ii) Task interaction graph

iii) Degree of Concurrency

c) How to improve speed of communication operations? **[8]**

***Q3)*** a) Explain performance matrices of parallel systems. **[8]**

b) Explain the effects of granularity on the performance of a parallel system. **[8]**

OR

***Q4)*** a) Explain Matrix - matrix multiplication in detail. **[8]**

b) Write a note on minimum and cost optimal execution time. **[8]**

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***Q5)*** a) Explain compare - exchange and compare - split operation on parallel computers. **[8]**

b) Explain odd - even transportation on bubble sort using parallel formulation. **[8]**

OR

***Q6)*** a) Explain parallel Depth First Search for solving 8 puzzle problem. **[8]**

b) Explain Dijkstra's algorithm in parallel formulation. **[8]**

***Q7)*** a) What is CUDA? Draw and explain CUDA architecture in detail. **[9]**

b) Explain how the CUDA C program executes at the kernel level with example. **[9]**

OR

***Q8)*** a) Describe CUDA communication and synchronization along with CUDA C functions. **[9]**

b) Write a short note on: Managing GPU memory. **[9]**

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