K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

April – May 2023
(B.Tech.) Program: **Information Technology** Scheme: **II**
Examination: **LY** Semester: **VIII**
Course Code: **ITDLC8024** and Course Name: **High Performance Computing**

Date of Exam: **16/05/2023** Duration: **2.5 Hours** Max. Marks: **60**

Instructions:
(1)All questions are compulsory.
(2)Draw neat diagrams wherever applicable.
(3)Assume suitable data, if necessary.

		Max. Marks	CO	BT level
Q 1	**Solve any six questions out of eight:**	**12**		
i)	What are the four types of parallel computing?	2	CO1	Understand
ii)	Explain Classification of interconnection networks.	2	CO2	Understand
iii)	Explain task-dependency graph.	2	CO3	Understand
iv)	Explain Task Generation with types.	2	CO3	Understand
v)	Explain gather operations.	2	CO4	Understand
vi)	Explain Total Parallel Overhead.	2	CO4	Understand
vii)	What is complete graph.	2	CO5	Understand
viii)	What are some CUDA applications?	2	CO6	Understand
Q.2	**Solve any four questions out of six.**	**16**		
i)	What do you mean by NUMA and UMA? Explain with Diagram.	4	CO1	Understand
ii)	Draw A complete omega network connecting eight inputs and eight outputs.	4	CO2	Apply
iii)	Explain Parallel Algorithm Models.	4	CO3	Understand
iv)	Explain Gustavson's Law.	4	CO4	Understand
v)	Explain Handshake for a blocking non-buffered send/receive operation.	4	CO5	Understand
vi)	Compare OpenGL and OpenCL.	4	CO6	Analyze
Q.3	**Solve any two questions out of three.**	**16**		
i)	Describe SIMD and MIMD with block diagram.	8	CO1	Understand

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ii)	Explain Recursive Decomposition with example.	8	CO3	Understand
iii)	Construct Splitting a Cartesian topology of size 2 x 4 x 7 into (a) four subgroups of size 2 x 1 x 7, and (b) eight subgroups of size 1 x 1 x 7.	8	CO5	Create
Q.4	**Solve any two questions out of three.**	**16**		
i)	Construct of 4D hypercubes from hypercubes of lower dimension.	8	CO2	Create
ii)	Explain Amdahl's law.	8	CO4	Understand
iii)	Explain with a CUDA architecture. Give advantages and disadvantages.	8	CO6	Understand