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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Seventh Semester, B.E. - Computer Science and Engineering

Semester End Examination; February - 2022

Multicore Architecture and Parallel Programming

Time: 3 hrs *Max. Marks: 100*

Course Outcomes

The Students will be able to:
CO1: Analyze the salient features of different multicourse architectures.
CO2: Define fundamental concepts of parallel programming and its design issues.
CO3: Compare the different threading API'S.
CO4: Demonstrate the role of OpenMP and programming concept.
CO5: Analyse and Implement MPI programs.

Note: *I) **PART - A** is compulsory. **Two** marks for each question.*
*II) **PART - B**: Answer any **Two** sub questions (from a, b, c) for Maximum of **18 marks** from each unit.*

Q. No.		Questions	Marks	BLs	COs	POs
		I : PART - A	**10**			
I	a.	Define concurrency.	2	L2	CO1	PO1,2
	b.	What is synchronization?	2	L2	CO2	PO1,2
	c.	Define POSIX threads.	2	L2	CO3	PO1,2
	d.	List the different OpenMP environment variables.	2	L1	CO4	PO1,2
	e.	Define message passing interface.	2	L2	CO5	PO1,2
		II : PART - B	**90**			
		UNIT - I	**18**			
1	a.	With a suitable diagram, explain the relationships between processors, processes and threads in modern operating system. Also discuss the various mapping models used.	9	L4	CO1	PO1,2,3
	b.	Explain briefly Amdahl's law applied to hyper threading technology and Gustafson's law.	9	L3	CO1	PO1,2
	c.	What is virtualization? Describe the different virtualization used in modern computers.	9	L3	CO1	PO1,2
		UNIT - II	**18**			
2	a.	Explain the steps involved in error diffusion algorithm. Write a C language implementation of error diffusion algorithm.	9	L3	CO1	PO1,2
	b.	Explain the concept of message passing model.	9	L3	CO2	PO1,2
	c.	Explain the concepts of Fence and barrier in flow control based concepts.	9	L3	CO2	PO1,2

Contd... 2

	UNIT - III	**18**			
3 a.	Describe the various atomic operations performed by interlocked function.	9	L3	CO3	PO1,2
b.	With example, analyze the use of call back in thread pool to wait on events.	9	L4	CO3	PO2,3
c.	With an example, explain the use of Pthreads with semaphores.	9	L3	CO3	PO1,2
	UNIT - IV	**18**			
4 a.	With a suitable diagram, explain the concept of task queuing execution model.	9	L3	CO4	PO1,2
b.	List and explain the clauses provided by OpenMP standard to accomplish the data copy in and copy out operations.	9	L3	CO4	PO1,2
c.	What are the difficulties in debugging an OpenMP program? Mention the guideline for debugging OpenMp program.	9	L2	CO4	PO1,2
	UNIT - V	**18**			
5 a.	Discuss buffered blocking message passing operations with neat sketch.	9	L4	CO5	PO1,2
b.	Explain briefly about overlapping communication with computation.	9	L3	CO5	PO1,2
c.	Write a note on groups and communicators.	9	L5	CO5	PO1,2

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