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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; Dec - 2017 / Jan - 2018

Multi-core Architecture and Parallel Programming

Time: 3 hrs *Max. Marks: 100*

***Note**: Answer **FIVE** full questions, selecting **ONE** full question from each unit.*

UNIT - I

1 a. Distinguish between the following :
i) Single-core processors and Multi-core processor
ii) Multi-core Architecture and Hyper Threading technology
iii) Shared memory and Distributed memory system
iv) Symmetric multi-core and Asymmetric multi-core processor. 10

b. Enlist the different motivation for multi-core concurrency in software. 4

c. Describe Briefly Gustafson's law. 6

2 a. Discuss the four types of problems to be addressed when multithreading is used in programs. 4

b. Explain the various mapping models used between threads and processors. 8

c. Write the difference between run time virtualization and system virtualization. 8

UNIT - II

3 a. Explain the common parallel programming patterns. 10

b. Describe the implications and challenges of decomposition. 10

4 a. Explain message passing model. 8

b. Describe Implementation-Dependent threading features in parallel programming concepts. 8

c. Explain any one flow control-based concepts in parallel computing. 4

UNIT - III

5 a. Write a program in C# language to read a file and signals another thread to print the count of bytes read. 10

b. What is a condition variable? With a program, describe how it works by showing two threads waiting on a condition variable? 10

6 a. Write a program in C# to abort a thread in parallel programming. 10

b. Write a short notes on the following :
i) Thread synchronization
ii) Win32/MFC thread APIs. 10

Contd…2

UNIT - IV

7	a.	With a neat diagram, describe task queuing execution model.	10
	b.	List the factors that threaded application performance with Open MP is largely depended upon.	7
	c.	Write a short note on Open MP environment variables.	3
8	a.	Discuss the different compiler switches for Open MP.	10
	b.	Explain critical and atomic programs supported by Open MP standard with an example.	10

UNIT - V

9	a.	Discuss lockless implementation of a linked stack that may suffer from ABA problem.	10
	b.	Explain briefly about Data organization for high performance.	10
10	a.	Describe briefly the three types of IA-32 fence instructions.	6
	b.	Explain convoying and priority inversion in parallel programming.	6
	c.	With a neat diagram, describe the Race-conditions hiding behind language syntax.	8

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