



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

(An Autonomous Institution affiliated to VTU, Belagavi)

Second Semester, M.Tech - Computer Science and Engineering (MCSE)

Semester End Examination; May/June - 2018

Multicore 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. i) Explain parallel computing in microprocessor 10
 ii) Define Amdahl's law.
- b. How multicore architecture is different from hyper threading technology? 10
- 2 a. Distinguish between singlecore, multicore, multiprocessor, hyper threading technology and multicore with hyper threading technology with suitable diagram. 10
- b. i) State Gustafson's law 10
 ii) Write a program to show how threads can be used in program?

UNIT - II

- 3 a. i) Give a brief note on common parallel programming patterns 10
 ii) What is synchronization? Give a generic representation of synchronization block inside source code.
- b. Explain data flow decomposition and task decomposition of a program. 10
- 4 a. Define lock, its operation types and also explain with a program how lock used inside a critical section? 10
- b. i) What is message? Explain the message passing model with suitable diagram. 10
 ii) Explain Fence and Barrier with its mechanism.

UNIT - III

- 5 a. Write a note on thread priority and processor affinity. 10
 b. How threads are created and maintained in windows operating system? 10
- 6 a. How threads are synchronized in POSIX and created? Explain with Pthread API's creation and signaling. 10
 b. Discuss any one method of thread synchronization along with windows API available for it. 10

UNIT - IV

- 7 a. Explain four schedule schemes in Open MP also write code that converts a color image to black and white. 14
 b. Explain Task queuing execution model with suitable representation. 6

- 8 a. Explain most heavily used Open MP library functions with description. 10
- b. Explain debugging also provide guidelines for debugging Open MP programs. 10

UNIT - V

- 9 a. i) List the conditions which hold true for deadlocks and also give atleast three ways where we can avoid deadlock. 10
- ii) What are non-blocking algorithms? Explain different non-blocking guarantees.
- b. Explain current IA-32 Architecture. 10
- 10 a. Describe the heavily contented locks with solutions. 10
- b. Explain the concept of false sharing and define the different memory consistency techniques. 10

* * * *