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

(An Autonomous Institution affiliated to VTU, Belagavi)

Second Semester, M. Tech - Computer Engineering (MCEN)

Semester End Examination; June - 2017

**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. Mention and explain Flynn's taxonomy. 10
- b. Distinguish between single core, multi core, multi processor and multi programming with suitable diagram. 10
- 2 a. State Amdahl's law, Amdahl's law to fit HT, Gustafson's law. 10
- b. Explain thread life cycle with the help of state diagram. 10

## UNIT - II

- 3 a. Explain data flow decomposition of task decomposition of a program. 10
- b. Explain any five parallel program patterns. 10
- 4 a. What is dead lock? Discuss three different dead locks which can occur in a system. 10
- b. Explain how semaphores can be used to overcome deadlock problem in producer consumer problem? 10

## UNIT - III

- 5 a. With the help of an example, illustrate the usage of pthread\_create() to create a thread. 10
- b. Explain with an example, how thread synchronization is achieved in POSIX? 10
- 6 a. Explain Create\_Thread () API of Microsoft. 10
- b. Discuss thread synchronization as part of WIN 32 API. 10

## UNIT - IV

- 7 a. Write different cases of loop-carried dependencies. 10
- b. Explain the four schedule schemes in OpenMP. 10
- 8 a. Explain the four clauses provided by OpenMP standard to accomplish data copy-in and copy-out operations. 10
- b. With a block diagram, explain task queuing execution model. 10

## UNIT - V

- 9 a. Write four necessary and sufficient conditions for a dead lock to occur. Also explain how to avoid dead lock? 10
- b. Explain the concept of false sharing and define the different memory consistency techniques. 10
- 10a. Explain with an example, why relaxed consistency breaks Dekker's algorithm? 10
- b. Write a note on Itanium architecture. 10