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BTECH
(SEM VII) THEORY EXAMINATION 2023-24
DISTRIBUTED SYSTEMS

TIME: 3 HRS

M.MARKS: 100

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief.

2 x 10 = 20

| Q no. | Question |
|-------|---|
| a. | Describe distributed systems. Give some examples. |
| b. | Illustrate that the vector clocks are more suitable than Lamport's logical clock for a Distributed system. |
| c. | Explain the token based algorithm. |
| d. | Differentiate between resource and communication deadlock. |
| e. | Explain different Fundamental models in distributed system. |
| f. | Define Global State and Synchronization. |
| g. | Describe deadlock resolution. |
| h. | Discuss forward and backward recovery in distributed systems. |
| i. | List basic, multi version and conservative timestamp ordering algorithm in increasing order of transaction abort. |
| j. | Differentiate between flat and nested transactions. |

SECTION B

2. Attempt any *three* of the following:

10x3=30

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|----|---|
| a. | Explain the limitations of distributed system. Describe major problems encountered due to these limitations. |
| b. | Describe phantom deadlock. Describe the algorithm which can detect phantom deadlock. |
| c. | Compare various concurrency control techniques for transactions. |
| d. | Illustrate agreement protocols. Discuss the general system model where agreement protocols are used. Give the applications of agreement protocol. |
| e. | Differentiate between forward and backward recovery. Explain Orphan message and Domino effect with example. |

SECTION C

3. Attempt any *one* part of the following:

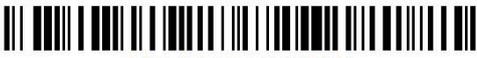
10x1=10

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| a. | Discuss fundamental and architectural model of distributed system. |
| b. | Discuss the concepts in Message Passing Systems. Describe and compare causal order, total order, total causal order. |

4. Attempt any *one* part of the following:

10x1=10

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| a. | Explain various deadlock handling strategies in distributed system. Also differentiate among centralized, distributed and hierarchical deadlock detection strategies in distributed system. |
| b. | Explain the path pushing algorithm for distributed deadlock detection algorithm. |



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(SEM VII) THEORY EXAMINATION 2023-24
DISTRIBUTED SYSTEMS

TIME: 3 HRS**M.MARKS: 100****5. Attempt any one part of the following:****10x1=10**

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| a. | Describe Byzantine agreement problem, and explain its solution. Show that Byzantine agreement cannot always be reached among four processors if two processors are faulty. |
| b. | Write the algorithm for implementation of distributed shared memory. Explain various design issues in distributed shared memory. |

6. Attempt any one part of the following:**10x1=10**

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|----|---|
| a. | Describe recovery. Differentiate between fault and failure. Explain various problems in a fault tolerant system. |
| b. | Describe Checkpoints. Explain the methods of obtaining consistent Checkpoints. Discuss the requirement of inserting checkpoints in message passing in distributed system. |

7. Attempt any one part of the following:**10x1=10**

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|----|--|
| a. | Describe various methods of concurrency control. Compare the methods of concurrency Control. |
| b. | Illustrate the following (i) Transaction Recovery (ii) Highly Available Services |

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