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Exam. Code : 206702

Subject Code : 3524

M.Sc. (Computer Science) Semester—II

FORMAL SPECIFICATION AND VERIFICATION

Paper—MCS-204

Time Allowed—3 Hours] [Maximum Marks—100

Note :— (1) There are total **EIGHT** questions. Candidates are required to attempt any **FIVE** questions. All questions carry equal marks.

(2) The students can use only Non-programmable and Non-storage type calculator.

1. (a) What are pre and post conditions ? Explain with the help of suitable examples or case studies.

   (b) Discuss knowledge engineering in first order logic. 14+6

2. What is need of First Order Logic (FOL) ? Write the syntax and basic elements of FOL. How the evaluation of first order sentences is done ? How FOL is different from propositional logic ? 20

3. What is Hoare logic ? Is there any relationship between Hoare logic and FOL ? Discuss with an example that how Hoare logic is used to prove the correctness of non-deterministic programs ? 20

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4. Write a detailed case study which describes the use and need of specification languages. 20

5. What is the need of Abstract Data Types (ADT) ? How are these different from primitive data types ? Discuss the structure and implementation of any two ADTs. 20

6. How automatic verification of finite state systems is done ? Discuss in detail. 20

7. Discuss the temporal logic for specifying safety and liveness properties. What are the techniques for proving safety and liveness properties ? 20

8. Write short notes on the following :

   (a) Benefits of formal specifications.

   (b) Partial and total correctness of sequential programs. 10+10

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