National Institute of Technology, Rourkela

Name of the Examination: M. Tech./PhD End-Semester (Autumn 2020-21)

Branch : CS **Semester : I**

Title of the Course : Advanced Software Engineering

Course Code : CS6401

Time : 2 Hours **Maximum Marks: 50**

General Instruction :

1. Attempt all questions in **Section B.**
2. Attempt any one-part in **OR-type** of questions.

Section-A **(50 x 0.5 = 25)**

(Attempt all of the MCQ questions)

1. This section contains 50 Multiple Choice Questions. Each question carries 0.5 Marks.

Section-B **(6 x 3 +7 x 1= 25)**

(Attempt all from the following questions)

1. Consider that you have been asked to develop a system that will help with planning large-scale events and parties such as weddings, graduation celebrations, birthday parties, etc. Using an activity diagram, model the process context for such a system that shows the activities involved in planning a party (booking a venue, organizing invitations, etc.) and the system elements that may be used at each stage. **(6 Marks)**

2. Bank teller machines rely on using information on the user's card giving the bank identifier, the account number and the user's personal identifier. They also derive account information from a central database and update that database on completion of a transaction. Using your knowledge of ATM operation, write Z schemas defining the state of the system, card validation (where the user's identifier is checked) and cash withdrawal. **(6 Marks)**

OR

Suppose that a certain software product for business application costs Rs. 50,000 to buy off-the-shelf and that its size is 40 KLOC. Assuming that in-house developers cost Rs. 6000 per programmer-month (including overheads), would it be more cost-effective to buy the product or build it? Which elements of the cost are not included in COCOMO estimation model? What additional factors should be considered in making the buy/build decision? **(6 Marks)**

3. Draw a UML class diagram for a Music Collection database system that expresses the following relationships and constraints:

- The Music Collection maintains a collection of Musical Recordings
- A Musical Recording can be either a Record, CD, Cassette or MP3 CDR- each of these will be a specialization of a Musical Recording
- Each specialized kind of Musical Recording will maintain a list of songs
- Provide appropriate attributes for each of the classes you represent in your class diagram

(i) Indicate the appropriate relationships among the classes
(ii) Include the correct cardinalities with the relationships.
If you make any assumptions about the description above, be sure to indicate the assumptions you made on your diagram. **(6 Marks)**

4.

(a) Most agile process models recommend face-to-face communication. Yet today, members of a software team and their customers may be geographically separated from one another. Do you think this implies that geographical separation is something to avoid? Can you think of ways to overcome this problem? **(2 Marks)**

(b) What are the important responsibilities of a Scrum Master and Product Owner in software product development using Scrum process model? **(5 Marks)**

OR

(a) What is Façade pattern? What is the problem solved using this pattern? **(3 Marks)**

(b) Briefly highlight the difference between code inspection and code walkthrough. Compare the relative merits of code inspection and code walkthrough. **(4 Marks)**