Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

V SEMESTER B.TECH (COMPUTER SCIENCE AND ENGINEERING)
END SEMESTER EXAMINATIONS, NOV/DEC 2015

SUBJECT: SOFTWARE ENGINEERING [CSE 305]
REVISED CREDIT SYSTEM

Time: 3 Hours   Date: 02/01/2016   MAX. MARKS: 50

Instructions to Candidates:

- ❖ Answer **ANY FIVE FULL** questions.
- ❖ Missing data, if any, may be suitably assumed.
- ❖ Provide examples wherever applicable.
- ❖ Answer all the sub questions of a main question in a continuous sequence.

1.A Suppose you are involved in a large project concerning the development of a patient planning system for a hospital. You may opt for one of two strategies. The first strategy is to start with a thorough analysis of user requirements, after which the system is built according to these requirements. The second strategy starts with a less complete requirements analysis phase, after which a pilot version is developed. This pilot version is installed in a few small departments. Further development of the system is guided by the experience gained in working with the pilot version. What is lifecycle model being adopted for each approach? Discuss the salient features of both strategies. Which strategy do you favour and why?   **5M**

1.B List the principles defined by the Agile Alliance to achieve agility?   **5M**

2.A Describe Hatley-Pirbhai Modeling. Draw a Hatley-Pirbhai Model based System Context Diagram for an Automobile Management System (A.M.S) that takes all the driver inputs (Gear Shaft, Brake etc.) and controls throttle of the engine. A.M.S also takes inputs (Driver Commands) through the user interface and displays status messages on the driver's dashboard.   **5M**

2.B Discuss Boehm's W^5HH principle in detail.   **3M**

2.C What are the preparation principles for coding practice?   **2M**

3.A Library Automation System (L.A.S):   **5M**
The system allows library clients to borrow and return books. It also reports to library management about how the library is used by its clients (for example, the average number of books on loan and authors much in demand). A client request is first analyzed [Preliminary Processing] and either 'borrow title' or 'return title' is selected. Both these processes update the 'administration catalog'. After Preliminary Processing, client request are logged in a log file.
Preliminary Processing: involves 'Checking Client Data' which compares the client request and information from the Client Database and decides if request can be processed [Ok]. If the request is Ok, then 'Process Request' will sort it as borrow request or return request along with a log file update.
Draw Level 1 DFD for L.A.S and Level 2 DFD for Preliminary Process.

3.B Draw a Sequence diagram for 'customer ordering in a restaurant' activity as listed below: **3M**
    Customer reads the menu.
    Customer places order.
    Order is sent to the kitchen for preparation.
    Customer requests for the bill.
    Bill is prepared.
    Customer is given the bill.
    Customer pays for the bill.

3.C List all the distinct functions in Requirements Engineering Task? **2M**

4.A Draw the diagram depicting the translation of Analysis Model into the Design Model. **3M**

4.B Discuss briefly the concept of Modularity in Design Engineering with suitable graphs. **4M**

4.C For practical purposes, is exhaustive testing of a program possible? Explain your answer with an example. **3M**

5.A Find the cyclomatic complexity of the program in Fig 5A by drawing a control flow graph. **4M**

```
1    parent:= k; child:= k + k; Ak:= A[k]; insert:= Ak;
     loop
2    if child > n
             then exit
         end
3       if child < n then
4           if A[child] > A[child+1]
5           then child:= child + 1
            end
        end;
6       if insert <= A[child] then
             exit else
7           A[parent]:= A[child]; parent:= child; child:= child + child
        end
     end;
8    A[parent]:= Ak
```

Fig 5A

5.B For the program in Q 5.A, find all the definition-clear paths for the variable 'child'. **4M**

5.C With an example for each, define Ordinal Scale Type and Interval Scale Type. **2M**

6.A The following table in Fig 6A lists the activities involved in a new information system project.

    i) Draw a Gantt chart to represent the project schedule in Fig 6A. **3M**

Task	Length	Prerequisite
A. High level analysis	**1 week**	
B. Selection of server hosting	**1 day**	**A**
C. Configuration of server	**2 weeks**	**B**
D. Detailed analysis of core modules	**2 weeks**	**A**
E. Detailed analysis of supporting modules	**2 weeks**	**D**
F. Development of core modules	**3 weeks**	**D**
G. Development of supporting modules	**3 weeks**	**E**
H. Quality assurance of core modules	**1 week**	**F**
I. Quality assurance of supporting modules	**1 week**	**G**
J. Initial client internal training	**1 day**	**C,H**
K. Development and QA of accounting reporting	**1 week**	**E**
L. Development and QA of management reporting	**1 week**	**E**
M. Development of management information system	**1 week**	**L**
N. Client internal user training	**1 week**	**I, J, K, M**

Fig 6A

ii) List the earliest starting time for the tasks below based on the project schedule in Fig 6A. **2M**

E. Detailed analysis of supporting modules
F. Development of core modules
G. Development of supporting modules
M. Development of management information system

6.B   With a table, explain the different categories of risk in a project and the order in which they should   **3M**
be handled.

6 C   What are the four approaches suggested by Putnam and Meyers for the sizing problem?   **2M**

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