Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

II SEMESTER M.TECH.(SOFTWARE ENGINEERING) END SEMESTER EXAMINATIONS, APRIL/MAY 2019

SUBJECT: SOFTWARE ARCHITECTURE AND TESTING [ICT 5222]

REVISED CREDIT SYSTEM

(26/04/2019)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data if any, may be suitably assumed.

1A. Consider the following program for the determination of division of a student. Its input is a triple of positive integers (mark1, mark2, mark3) and values are from interval [0, 100]. The output may be one of the following categories: First division with distinction, First division, Second division, Third division, Fail, Invalid marks. Draw the data flow graph and derive data flow test cases. **5**

```
1. void main( )
2. {
3. int mark1, mark2,mark3,avg;
4. clrscr();
5. printf("Enter marks of 3 subjects (between 0-100)\n");
6. printf("Enter marks of first subject:");
7. scanf("%d", &mark1);
8. printf("Enter marks of second subject:");
9. scanf("%d", &mark2);
10. printf("Enter marks of third subject:");
11. scanf("%d",&mark3);
12. if(mark1>100||mark1<0||mark2>100||mark2<0||mark3>100||mark3<0) {
13. printf("Invalid Marks! Please try again");
14. }
15. else {
16. avg=(mark1+mark2+mark3)/3;
17. if(avg<40) {
18. printf("Fail");
19. }
20. else if(avg>=40&&avg<50) {
21. printf("Third Division");
22. }
23. else if(avg>=50&&avg<60) {
24. printf("Second Division");
25. }
26. else if(avg>=60&&avg<75) {
27. printf("First Division");
```

```
28. }
29. else {
30. printf("First Division with Distinction");
31. }
32. }
33. getch( );
34. }
```

1B. How do you relate reference models, architectural patterns, reference architectures, and software architectures? Explain. **3**

1C. What is integration testing? Specify the guidelines for selection of an appropriate integration testing. **2**

2A. Explain the Architecture Business Cycle (ABC) by identifying the influences to and from architectures. **5**

2B. Explain the typical elements that are extracted during software architecture reconstruction. Also show the relationships among them. **3**

2C. How do the domain analysis help in software testing? Discuss with a suitable example. **2**

3A. For the pseudo code below, write the test cases for Path coverage testing and Condition coverage testing. **5**

```
IF (TempSensor1 – TempSensor2)<= 40
Then Heater1 = OFF;
Else.IF
TempSensor2>= 70 AND TempSensor1 < 30 AND Valve1 =1
Valve2 = OFF;
ENDIF
IF VolumeSensor< 1000 AND Valve2 = ON AND heater1 = ON AND (Heater2 = OFF
OR TempSensor2>=50)
Valve1 = OFF;
ENDIF
```

3B. The state transition diagram for an object Account is given in Fig.Q.3B. The legend for the Fig.Q.3B is as follows: **3**
S1 – Account Open, S2 – Account Overdrawn, b- Balance.
List out all possible test cases including null transitions.

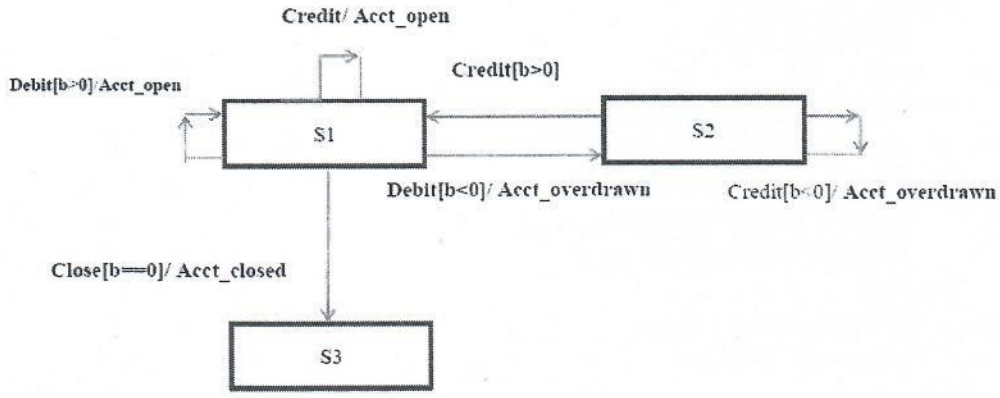

Fig.Q.3B

3C. To ensure quality, a good software architecture is necessary, but not sufficient. Justify this statement. **2**

4A. Discuss the software architectural tactics with suitable examples to control the modifiability. **5**

4B. With respect to the various aspects of testing, compare functional and non-functional system testing. **3**

4C. Discuss the issues relevant to the Verification and Validation (V&V) in any four software life cycle models. **2**

5A. Distinguish between architectural views and viewpoints. Explain the architectural viewpoints. **5**

5B. A life insurance company has base premium of \$0.50 for all ages. Based on the age group, an additional monthly premium has to be paid that is as listed in the table below. For example, a person aged 34 has to pay a premium = base premium + additional premium = \$0.50 + \$1.65 = \$2.15. **3**

Age Group	Additional premium
Under 35	\$ 1.65
35-59	\$ 2.87
60 +	\$ 6

Derive equivalence class test cases for the above specification.

5C. What is an interface? How can an interface be documented? Explain with a template. **2**