Reg. No. ☐☐☐☐☐☐☐☐

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

I SEMESTER M.TECH. (COMPUTER NETWORKING AND ENGINEERING)
END SEMESTER EXAMINATIONS, NOV 2018
SUBJECT: SOFTWARE ENGINEERING [ICT 5102]
(22/11/2018)

Time: 3 Hours

MAX. MARKS: 50

> **Instructions to Candidates:**
> ❖ Answer **ALL** the questions.
> ❖ Missing data if any, may be suitably assumed.

1A. Consider the description of a movie booking management given below.   5
The movie booking management system supports movie ordering and browsing of the movie catalogue, and user subscriptions with rechargeable cards. Only subscribers are allowed hiring movies with their own card. Credit is updated on the card during rent operations. Both users and subscribers can buy a movie and their data are saved in the related order. When a movie is not available it is ordered.
Draw the use case diagram for the above problem statement with detailed specification for any TWO of the use cases.

1B. Design test cases using basis path testing for the following pseudocode.   3
procedure sort

```
1 :             while records remain
                    read record ;
2 :             if record field1 = 0
3 :                     then process record ;
                            store in buffer ;
                            increment counter ;
4 :             elseif record field2 = 0
5 :                     then reset counter ;
6 :                     else process record ;
                            store in file ;
7a:             endif
                endif
7b:         endwhile
8 :     end
```

1C. Explain the following with suitable example: 2
    i. role name in class diagram   ii. includes and extends in use case diagram

2A. Draw a UML Class Diagram representing the following elements from the problem domain   5
for a hockey league. A hockey league is made up of at least four hockey teams. Each hockey team is composed of six to twelve players, and one player captains the team. A team has a name and a record. Players have a number and a position. Hockey teams play games against each other. Each game has a score and a location. Teams are sometimes lead by a coach. A

coach has a level of accreditation and a number of years of experience, and can coach multiple teams. Coaches and players are people, and people have names and addresses.

2B. Look at the following class diagram in Fig. Q2B and operational sequence description given below. With regard to those, model sequence diagrams according to all possible interaction sequences. 3

In the rentVideo method an examination of the age against the age limit takes place. Afterwards the video is checked for not being rented. If everything is ok, the video is rented otherwise the method just stops.

In the returnVideo method an examination of the return date against the current date takes place after the video is checked for being rented by the returning person. If everything is ok, the video is returned otherwise the method stops immediately if the return is requested by the wrong person or sets the fee necessary to be paid by the customer (5 Indian Rupee per day beyond the return date).
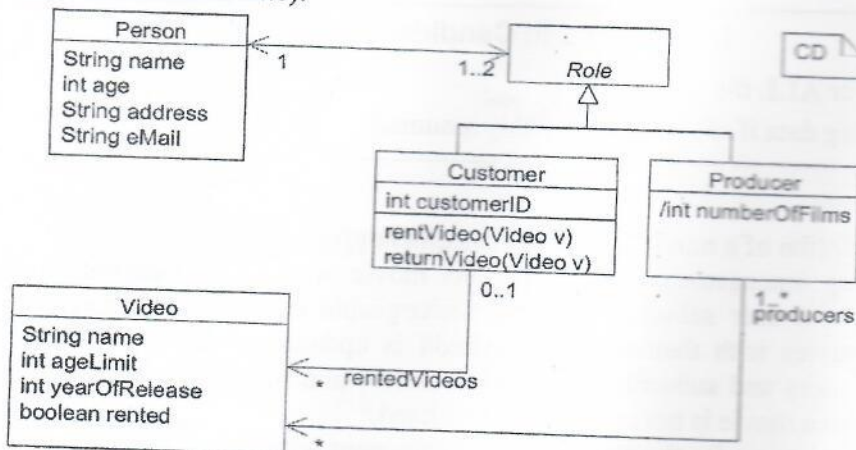

Fig.Q.2B

2C. Propose a life cycle model suited to changes in:
User requirements, Customer business models, Technology, In-house environment. 2

3A. What do you mean by agility? Explain the agile software development process. Also, identify the advantages and disadvantages of the same. 5

3B. Write the difference for the following: 3
   i. Quality Assurance and Quality Control
   ii. Verification and Validation
   iii. White box and Black box testing

3C. What are risks? Explain the sub categories of business risk. 2

4A. Write a swim lane diagram for the description of a sign on activity Single Sign-On (SSO) to Google Apps given below. 5

When a user attempts to use some hosted Google application, such as Gmail, Google generates a SAML authentication request and sends redirect request back to the user's browser. Redirect points to the specific identity provider. SAML authentication request contains the encoded URL of the Google application that the user is trying to reach. The partner identity provider authenticates the user by either asking for valid login credentials or by checking for its own valid authentication cookies. The partner generates a SAML response and digitally signs it. The response is forwarded to Google's Assertion Consumer Service (ACS). Google's ACS verifies the SAML response using the partner's public key. If the response is valid and user identity was confirmed by identity provider, ACS redirects the user to the destination URL. Otherwise user will see error message.

4B. The table given in Table Q.4B. describes the required behaviour of a car's cruise control system. Draw a UML statechart diagram to show the same information. 3

ICT 5102

Old Mode	Ignition	Cruise Switch	Running	Brake	Accelerator	Too Fast?	New Mode
Off	@ T	-	-	-	-	-	Inactive
Inactive	@ F	-	-	-	-	-	Off
	T	@ T(cruise)	T	F	F	F	Cruise
Cruise	@ F	-	-	-	-	-	Off
	-	-	-	-	-	@ T	Inactive
	-	-	@ F	-	-	-	Inactive
	-	-	-	@ T	-	-	Override
	-	-	-	-	@ T	-	Override
	-	@ T(cancel)	-	-	-	-	Override
Override	@ F	-	-	-	-	-	Off
	T	-	@ F	-	-	-	Inactive
	T	@ T(resume)	T	F	F	F	Cruise
	T	@ T(cruise)	T	F	F	F	Cruise

4C. What problems arise if two modules have high coupling? Explain. 2

5A. Explain the layered and object oriented architectural style with suitable illustrations. Also, list 5 their pros and cons.

5B. The following is the comment written for a C function. 3

/* This function computes the roots of a quadratic equation $a.x^2 + b.x + c = $. The function stores two real roots in *root1 and *root2 and returns the status of validity of roots. It handles four different kinds of cases.

    (i) When coefficient a is zero irrespective of discriminant

    (ii) When discriminant is positive

    (iii) When discriminant is zero

    (iv) When discriminant is negative.

Only in case (ii) and (iii) the stored roots are valid. Otherwise 0 is stored in roots. The function returns 0 when the roots are valid and -1 otherwise. The function also ensures root1 >= root2

int get_QuadRoots(float a, float b, float c, float *root1, float *root2);   */

Design a set of non-redundant tests using equivalence class partitioning approach from input perspective for black box testing

5C. Why is maintenance of a software important? Mention the types of software maintenance 2 with an example for each.