Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY, MANIPAL 576104

(Constituent College of Manipal University)

FIRST SEMESTER M.Tech (Network Engg.)DEGREE END SEMESTER EXAMINATION DECEMBER – 2015
SUBJECT: SOFTWARE ENGINEERING (ICT-503)
(REVISED CREDIT SYSTEM)
3/12/2015

TIME: 3 HOURS **MAX. MARKS: 50**

Instructions to candidates

- Answer any **FIVE FULL** questions.
- Missing data, if any, may be suitably assumed.

1A. Explain the unified approach to software development. Discuss the merits and demerits of this approach

1B. With a detail list of errors focussed on by unit and integration testing, explain the generic software testing strategy.

1C. Consider a project to develop a full screen editor. The major components are Screen Edit, Command Language Interpreter, File input and output, Cursor Movement and Screen Movement. The sizes for these are estimated to be 4K, 2K, 1K, 2K and 3K delivered source code lines. Use COCOMO model to determine: Overall effort and development time. [5+3+2]

2A. Explain the following with suitable examples.
i. Relationships in a class diagram
ii. Includes and extends in a use case diagram
iii. Stubs and drivers used in unit testing

2B. Elicitation is a task in the Requirement Engineering Process. Write an activity diagram to model this elicitation task.

2C. Compare and contrast the following:
i. Quality Assurance and Quality Control ii. Known and Predictable risk [5+3+2]

3A. A home appliance control system (HACS) is a system which provides various services to remote systems such as a mobile phone, desktop and palm-top, to control, monitor and coordinate home appliances such as microwave oven, entertainment system, security system, air conditioning system, Sprinklers, Pet Feeder etc. The Home appliance control system is controlled either by a cell phone or a by palm top or by a PC. It controls various appliance such as a microwave, sprinklers etc. The HACS system receives signals from the user either through wireless application protocol (WAP) or through Internet. The system in turn gives command to respective appliances.

The system administrator of the HACS system has the ability to add or delete a new appliance and its operations. Also the system administrator can add or delete user. The user can give commands to existing device, get the status of a device and set the operation of a specific appliance. For example if the user wants to operate Microwave then he can give commands like Cook, Warm or Defrost.

If the user wants to change his previously specified operation for a particular appliance he simply proceeds with his request. The HACS system in turn stops the current ongoing operation and processes the new request.

The HACS system is highly adaptable to changes in environment. For example user can request through system administrator to add a new device to the existing system. He can operate the system using various remote devices, for example when he is out of the house, he can use a cell phone, when at home he can use a simple remote or there will be one remote system near each family member.

i. Draw a use case diagram for the above problem statement.
ii. Write the use case specification for any one use cases of the use case diagram drawn in Q.3A(i).

3B. Specify which of the following statements are functional requirements and which are non-functional requirements.

i. The Airline reservation application must be written in Java.

ii. The Airline reservation application must be easy to use.

3C. SoftwareTech is a software company. It has a team of 25 programmers. Mr.X has recently established a dental clinic in Manipal and asked SoftwareTech to develop a management system for his dental clinic. X's request was to develop a system to electronically manage patient records and perform administrative functions similar to 'what is being used in other clinics ' but within a budget of Rs.50k and delivered within 2 months.

SoftwareTech adopts an ad hoc approach to software development and has not worked on large scale projects before. What problems do you anticipate in this project? [5+3+2]

4A. Block handler is part of the filing sub system in an operating system. The filing subsystem maintains files created by users. Files in the file store are composed of blocks of storage that are held on a file storage device. During the operation of the computer, files will be created and deleted, requiring the acquisition and release of blocks storage. To cope with this, the filing subsystem will maintain a reservoir of unused (free) blocks and keep track of blocks that are currently in use. When blocks are released from a deleted file they are normally added to a queue of blocks waiting to be added to the reservoir of unused blocks. This is shown in the Figure Q.4A. In this figure, a number of components are shown: the reservoir of unused blocks, the blocks that currently make up the files administered by the OS, and those blocks that are waiting to be added to the reservoir. The waiting blocks are held in a queue, with each element of the queue containing a set of blocks from a deleted file.

Write the formal specifications for the above block handler using mathematical notations or any formal specification language.

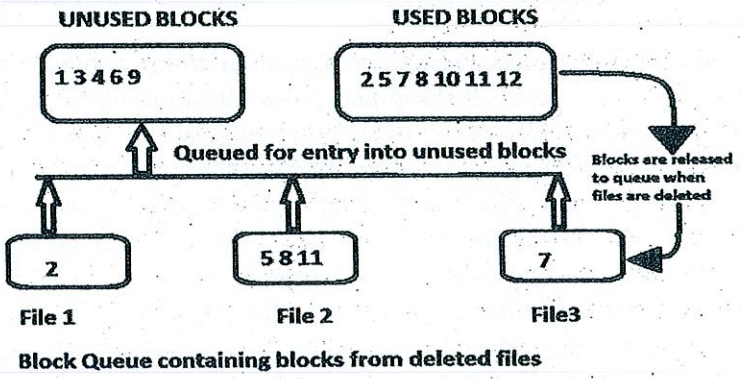

Figure Q4A.

4B. Explain the importance of the following.

i. SCM activities

ii. Risk Projection

iii. Functional independence in design

4C. What is the objective and importance of requirement elicitation? Also, mention why elicitation is difficult. [5+3+2]

5A. Write a class diagram for the below described system of a movie shop used to handle ordering of movies and browsing of the catalogue of the store, 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.

5B. Explain the following terms in the context of software design.

i. Abstraction ii. Functional Independence iii. Modularity

5C. Explain the widely used strategy for statistical Quality Assurance in the industry today. [5+3+2]

6A. Write a state transition diagram to model the simple calculator application. The calculator supports four basic operations +, - , *, /. To support these operations the interface of the calculator is composed of 10 buttons with digits (0 to 9) and four buttons for basic operations (+, -, *, /). A button 'C' to reset the display and '=' button to display the result along with 'ON' and 'OFF' buttons. The sequence to be followed for performing the basic operation is "operand1 entry, operator entry, operand2 entry, and result display". Other relevant transitions can be assumed.

6B. Design the test cases based on Basis Path Testing technique for a program which displays the largest of three numbers.

6C. Suggest the most appropriate generic software process model that might be used as a basis for managing the development of the following systems. Justify your answer.

i. A system to control anti-lock braking in a car

ii. An interactive travel planning system that helps users plan journeys with the lowest environmental impact. [5+3+2]