# Nirma University

## Institute of Technology

Semester End Examination (IR), May - 2017

B. Tech. in Computer Engineering / Information Technology, Semester-VI

IT601 Software Engineering

Roll / Exam No. _____ Supervisor's initial with date _____

Time: 3 Hours Max. Marks : 100

Instructions:
1. Attempt all questions.
2. Figures to right indicate full marks.
3. Use section-wise separate answer book.
4. Draw neat sketches wherever necessary.

**SECTION – I**

**Q-1. Answer the following** **[18]**

**A** From the table given below which sets out a number of activities, duration and dependencies. Draw an activity network which shows the project schedule. [06]

| Activity ID | Duration (days) | Dependencies / Predecessor |
|---|---|---|
| A | 7 | - |
| B | 2 | - |
| C | 15 | - |
| D | 8 | E |
| E | 10 | A, B |
| F | 2 | D, G |
| G | 5 | E |
| H | 8 | G |
| I | 2 | C, F |
| J | 3 | I |

Identify the critical path and the total number of days for project completion. Also calculate the float time for each and every activity.

**B** You work for a large "social networking" company which has recently introduced a one-to-one chat mechanism, promising that they will never censor conversations. Users are now reporting that their friends' computers are being compromised by malicious software. When users click on links within messages sent by this malicious software, their machine is also compromised, and spreads the infection still further. [06]

A crisis meeting has decided that the chat software must be modified to block this "worm" behaviour. As manager of this project, how will you approach the development, how will you estimate how long the task will take, and how will you establish that your solution is safe to deploy?

**C** Justify with an example the difference between Verification and Validation. Also, explain various processes involved in it. [06]

**Q-2. Answer the following** **[16]**

**A** List various stakeholders for Management Information System of Nirma University. Classify those stakeholders under different view-points and Identify the principal viewpoints which might be taken into account in the specification of this system. [04]

**B** Sketch Use case diagram(s) for the scenario given: [06]
A library lends books and magazines to members, who are registered in the system. Also it handles the purchase of new titles for the library. Popular titles are bought in multiple copies. Old books and magazines are removed when they are out of date or in poor condition. A member can reserve a book or magazine that is not currently available in the library, so that when it's returned or purchased by the library, that person is notified. The library can easily create, update and delete information about the titles, members, loans and reservations in the system.

**C** Differentiate between milestones and deliverables. Also, Prepare a set of task list stating dependencies and milestones for a project for developing Attendance Management System for Nirma University. [06]

**OR**

**C** An analysis rule of thumb is that the model "should focus on requirements that are visible within the problem or business domain." What type of requirements are not visible in these domains. Provide a few examples. [06]

**Q-3. Answer the following** **[16]**

**A** i. Suggest an appropriate structural model/architectural model for Online MCQ based Examination System for a University. [04]
ii. Give an example for a system that supports interrupt driven control model. Justify.

**B** Sketch a neat diagram representing Requirement Engineering Process. Why proper requirement specification and requirement validation is required before actually starting the development for any project? [06]

**C** Manisha is a project manager in a software firm and handles a project for developing assistive technologies for elderly people. Some months into the project, Manisha notices that Kiran, the hardware design expert starts coming into work late, the quality of her work deteriorates and, increasingly, she does not appear to be communicating with other members of the team. Manisha talks about the problem with other team members to try to find out if Kiran's personal circumstances have changed and if this might be affecting her work. They don't know of anything so Manisha decides to talk with Kiran to try to understand the problem. After denying that there is a problem, Kiran admits that she seems to have lost interest in the job. She expected a job where she would develop and use her hardware interfacing skills. However, she is basically working as a C programmer with other team members in this project and she is concerned that she is not developing her interfacing skills. She is worried that she will find it difficult to find a job after this project that involves hardware interfacing.
Being a Project Manager what decision should Manisha take for motivating Kiran? What factors should be taken into account while deciding strategies to motivate team and team members involved in project? [06]

**OR**

C Outline Software Myths. Give two examples each for myths and the corresponding realities for Management Myths, Customer Myths and Practitioners Myths. [06]

## SECTION – II

**Q-4. Answer the following:** **[18]**

A Analyze the differences between reverse engineering and forward engineering. Explain how cost benefit analysis model results in the decision of performing reengineering or maintenance. [06]

B What do you mean by Aspect Oriented Software Engineering (AOSE)? Justify the significance of Cross cutting concerns in AOSE. [06]

C Deliberate about the conversion of object oriented analysis model to object oriented design model. Justify the need of shifting of paradigms from analysis to design. [06]

**Q-5. Answer the following:** **[16]**

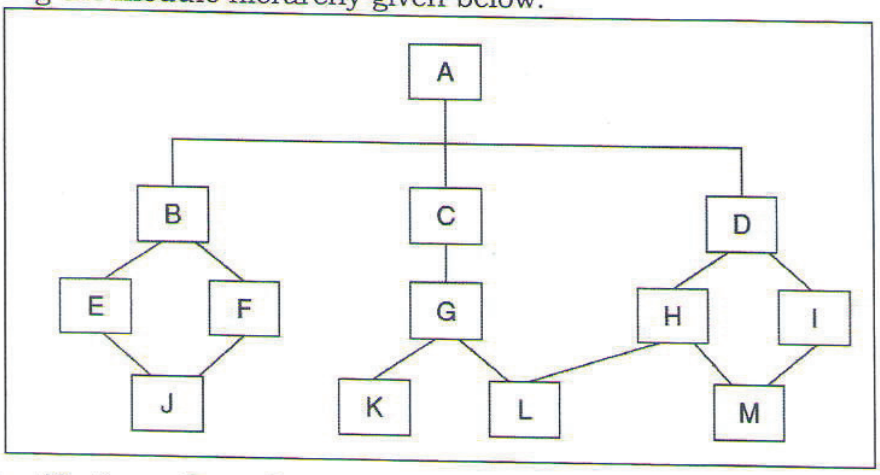
A Discuss the various phases of CMMI model. What is the difference between generic and specific goals in CMMI? [04]

B Consider a traffic light system at a four-way crossroads (e.g., two roads intersecting at right angles). Assume the simplest algorithm for cycling through the lights (e.g., all traffic on one road is allowed to go through the crossroad while the other traffic is stopped). Identify the states of this system and sketch a state diagram describing them. Remember that each individual traffic light has three states (i.e. green, yellow, and red). Label all components clearly. [06]

**OR**

B Assume that a complex project of size LOC=33000 is given for development, the productivity of team is 10000 LOC/year. Calculate the project effort for developing this project with a deadline for completion being 1.45 years. However, if the deadline is extended to 1.75 years what will be the project effort? [06]

C Using the module hierarchy given below: [06]




Identify the orders of module integration for the top-down and bottom-up integration testing approaches. Estimate the number of stubs and drivers needed for each of the approach.

**Q-6. Answer the following** **[16]**

A Develop a complete set of CRC model index cards for Online Library Management System for Nirma University. Also explain the need of CRC index cards in software development. [04]

B With an example discuss, how boundary value analysis is related to equivalence partitioning? Also identify the valid and invalid equivalence [06]

classes for one of the fields on a form that contains a text box, which accepts numeric values in the range of 10 to 28.

**OR**

**B** Consider the following pseudo code: [06]

```
[0]          int function sdivisor (int n)
[1]          int d, r;
             Begin
[2]          if not odd(n) then
[3]             sdivisor = 2;
             else
                begin
[4]                r = trunc(sqrt(n));
[5]                d = 3;
[6 and 7]          while (n mod d<>0) and (d< r)
                   do
[8]                   d = d+2;
[9]                   if n mod d =0 then
[10]                     sdivisor = d
                      else
[11]                     sdivisor = 1
[12]              End
[13]           End
```

Do the following:

i) Derive the control flow graph for the given pseudo code.

ii) Apply basis path testing to develop test cases that will guarantee that all statements in the program have been tested. Find the cyclomatic complexity and find out the independent paths.

**C** What do you mean by Quality Assurance, Quality Planning and Quality Control? Discuss the same in detail. [06]