Nirma University

Institute of Technology

Semester End Examination (RPR), December - 2019

B. Tech. in 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.
5. Attempt questions in sequence only.

Section – I

Q-1. **Do as directed:** **[18]**

A **Answer the following with justification:** [12]

CO1BL3

i) Suggest a life cycle model for developing a new library automation software that would link various libraries in the city.

ii) Suggest an appropriate control model for a television controller that responds to signals from a remote-control unit.

iii) Suggest an appropriate structural model for an automated ticket issuing system used by passengers at the railway station.

iv) Suggest a life cycle model for a system to control anti-lock braking in a car.

v) Suggest an appropriate control model for a set of software tools that are produced by different vendors, but which must work together.

vi) Suggest an appropriate structural model for a computer-controlled video conferencing system that allows video, audio and computer data to be visible to several participants at the same time.

B **CO1BL1** Outline the software development life cycle. Briefly describe each of the stages, its relation to other stages and its overall importance. [06]

Q-2. **Do as directed:** **[16]**

A **CO2BL3** Determine the functional and non-functional requirements for library management system. [08]

B **CO2BL4** Identify possible objects in the following system and develop the class diagram for the following scenario:- [08]

A petrol (gas) station is to be setup for fully automated operation. Drivers swipe their credit card through a reader connected to the pump, the card is verified by communication with a credit company computer and a fuel limit is established. The driver may then take the fuel required. When fuel delivery is completed and the pump hose is returned to its holster, the driver's credit card account is

debited with the cost of the fuel taken. The credit card is returned after debiting. If the card is invalid, the pump returns it before fuel is dispensed.

OR

B CO2BL4 Develop the activity diagram for the following scenario:- A group diary and time management system are intended to support the timetabling of meetings and appointments across a group of co-workers. When an appointment is to be made that involve a number of people, the system finds a common slot in each of their diaries and arranges the appointment for that time. If no common slots are available, it interacts with the user to rearrange his or her personal diary to make room for the appointment. [08]

Q-3. Do as directed:

A CO4BL2 Differentiate between milestones and deliverables. Draw a diagram for signifying the milestones of every stage of software development life cycle. **[16]** [05]

B CO4BL1 Risk management is an important task that is being carried out by the project manager. Which are the important activities that are involved in the Risk Management Process? Explain in detail. [05]

OR

B CO4BL1 Discuss the various phases of CMMI model. [05]

C CO4BL4 A project consists of 8 activities named A to H. Consider the following table: [06]

Activity	Completion time (in days)	Immediate predecessor activities
A	3	-
B	6	A
C	7	A
D	5	A
E	13	B, C
F	8	C, D
G	11	D, F
H	6	G, E

i) Construct activity network so as to satisfy the scheduling requirements shown in the table.
ii) Find the least time required to complete the whole project.
iii) Identify the critical path.

Section – II

Q-4. Do as directed:

A CO3BL1 What are the benefits of decomposition, modularity, abstraction and encapsulation in software design? **[16]** [04]

B CO3BL2 Differentiate between bottom up and top down integration testing. [04]

C CO3BL2 In a distributed software architecture, represent the role of Object Request Broker using the architecture of CORBA. [04]

D CO3BL4 How boundary value analysis is related to equivalence partitioning? Also identify the valid and invalid equivalence 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. [04]

Q-5. Do as directed: **[16]**

A CO5BL2 Differentiate between maintainence and re-engineering? Also, illustrate the process of restructuring. [04]

B CO5BL2 Explain how baseline SCIs are established in software configuration management. Also, explain SCM features in detail. [06]

OR

B CO5BL2 Explain object-oriented metrics in software quality management in detail. [06]

C CO5BL1 Enumerate the advantages of service-oriented architecture in software engineering. Describe the architecture of SOA. [06]

OR

C CO5BL1 Describe mentioned agile process models in detail: [06]

a) Adaptive Software Development (ASD)
b) Scrum
c) Dynamic Systems Development Method (DSDM)

Q-6. Do as directed: **[18]**

A CO3BL3 Assume that the size of an organic type software product has been estimated to be 32,000 lines of source code. Assume that the average salary of software engineers be Rs.15,000/ per month. Determine the effort required to develop the software product, the nominal development time and the cost of development for the entire project. [06]

Software Project	a_b	b_b	c_b	d_d
Organic	2.4	1.05	2.5	0.38
Semi-detached	3.0	1.12	2.5	0.35
Embedded	3.6	1.20	2.5	0.32

B CO3BL4 Consider the following algorithm: [06]

```
A = 10
  IF B > C THEN
    A = B
  ELSE
    A = C
  ENDIF
Print A
Print B
Print C
```

Perform the following:

a) Design the control flow graph for the given code.
b) Determine cyclomatic complexity.

C CO3BL3 Discuss in detail how function point is calculated by means of an example. [06]