Maximum Marks: 60  
Credits: 04  
Duration: Three Hours

Answer all the questions.  
Assume suitable data if missing.  
Notations used have their usual meaning.

Q. No  
Question  
M.M.  

1(a)  
Clearly define the 4P’s in project management.  
[03]

1(b)  
Consider a project that has uncertain requirements and a deadline so tight that full functionality cannot be reasonably delivered. Which process model is best suited for such a project and why?  
[06]

1(c)  
Briefly discuss all the tasks and outcomes carried out by the project manager in planning phase.  
[06]

OR

1(e)  
What are the factors taken into consideration by a project manager to manage a team?  
[06]

2(a)  
What is a software development process model? Why is this model needed during project development?  
[03]

2(b)  
What are the steps in requirement engineering? Mention the guidelines for requirements elicitation.  
[06]

2(c)  
What do you mean by cleanroom strategy? List the tasks that are performed in cleanroom strategy?  
[06]

OR

2(e)  
Why is the box structure specification used in cleanroom strategy? Explain in detail.  
[06]

3(a)  
What is reverse engineering? What is its role in software engineering?  
[03]

3(b)  
Write a short note on BPR model.  
[06]

3(c)  
Explain the tasks that are carried out under risk management process.  
[06]

OR

3(e)  
Briefly explain how SCIs are baselined within a project database.  
[06]

4(a)  
What are the drawbacks of COCOMO model in estimating the size of software?  
[03]

4(b)  
Categorize and define the different types of maintenance activities.  
[06]

4(c)  
How to measure customer problems using metrics? Explain in detail.  
[06]

OR

4(e)  
How to measure customer satisfactions using metrics? Explain in detail.  
[06]
2013-14
M.TECH. (WINTER SEMESTER) EXAMINATION
COMPUTER SC & ENGINEERING
OBJECT ORIENTED ANALYSIS AND DESIGN
CO604

Maximum Marks: 60 Credits: 04 Duration: Three Hours

Answer all the questions.
Assume suitable data if missing.
Notations used have their usual meaning.

Q.No. Question M.M.
1(a) Construct class diagram based on following information - A cricket team consists of [06]
eleven players. A player plays one or more roles in his team such as batsman, bowler, fielder and wicketkeeper.
1(b) Give an example to show that folding attribute of an association into a class is not [06]
desirable.

OR

1'(a) Construct class diagram based on following information - Department consists of [06]
faculty members and students. Department has following committees -
Curriculum Committee - Consists of all faculty members and chaired by Chairman.
Grievance Committee - Consists of two faculty members and six students. It is also [06]
chaired by Chairman.
1'(b) Differentiate between static scope and object scope. How are they represented in [06]
UML.
2(a) Construct class diagram based on following information - Customer holds account [06]
in bank. Passbook is issued for an account. Passbook contains list of transaction done in the account.
2(b) What is multiple inheritance? Give an example of multiple inheritance with [06]
overlapping classes.

contd...
3(a) Construct state diagram for a washing machine. Washing is done in two major stages - WASH and RINSE. Washing machine has three buttons - Wash Button - Initiates WASH stage. Rinse Button - initiates RINSE stage. Stop Button - Stops machine.
In WASH stage, following activities are performed in sequence - i) Fill water ii) Tumble for 10 minutes iii) Drain water. In RINSE stage, following activities are performed in sequence - i) Fill water ii) Tumble for 2 minutes iii) Drain water and spin for 2 minutes in parallel.

3(b) How is a state in state diagram characterised? Give an example.

OR

3'(a) Construct state diagram for landline phone.

3'(b) What is one shot state diagram? Give a suitable example.

4(a) Consider a system for room booking in a hotel. Some of use cases for this are listed below (you may add more use cases to the given list). Prepare a use case diagram. Incorporate appropriate relationship between use cases.
i) Book a room ii) Cancel booking iii) Check-in v) Check-out
vi) Make payment vii) Refund

4(b) What are different notations used for representing lifecycle of an object in sequence diagram.

5(a) Differentiate between domain class model and application class model.

5(b) List issues which are considered and handled during system design
2013-14
M.TECH. (WINTER SEMESTER) EXAMINATION
COMPUTER ENGINEERING
ADVANCED COMPUTER NETWORKS
CO611

Maximum Marks: 60 Credits: 04 Duration: Three Hours

Answer all the questions.
Assume suitable data if missing.
Notations used have their usual meanings.

“Students governed by the old ordinance will be examined out of 75 marks and their marks shall be proportionately raised”

Q.No.          Question                      M.M.
1(a) What are the characteristics of wireless links? With the help of suitable diagrams, [05]
discuss hidden terminal problem, exposed terminal problem, and fading.

1(b) With the help of suitable diagrams, describe the sender encoding and receiver [07]
decoding in case of Code Division Multiple Access (CDMA) for a single sender,
and two senders.

OR

1’(a) Describe 802.15 used in Wireless Personal Area Networks (WPAN). Draw a [04]
diagram showing an 802.15 piconet.

1’(b) Unlike the IEEE 802.3 Ethernet protocol, IEEE 802.11 MAC protocol does not [08]
implement collision detection. What are the reasons for doing so? With the help of
suitable diagrams, describe IEEE 802.11 CSMA/CA protocol.

2(a) Suppose there are two ISPs providing Wi-Fi access in a particular café, with each [06]
ISP operating its own AP and having its own IP address block.

(i) Further suppose that by accident, each ISP has configured its AP to operate over channel 11. Will the 802.11 protocol completely breakdown in this situation? Discuss what happens when two
stations, each associated with a different ISP, attempt to transmit at the same time.

(ii) Now suppose that one AP operates over channel 1 and other over channel 11.

2(b) Suppose an 802.11b station is configured to always reserve the channel with the RTS/CTS sequence. Suppose this station suddenly wants to transmit 1000 bytes of data, and all other stations are idle at this time. As a function of SIFS and DIFS, and ignoring propagation delay and assuming no bit errors, calculate the time required to transmit the frame and receive the acknowledgement.

3(a) With the help of suitable diagrams, describe mobility management in cellular networks including (i) how calls are routed to a mobile user, and (ii) how handoffs are carried out in GSM.

OR

3(a') What are the elements of mobile network architecture? With the help of suitable diagrams, describe in detail the indirect and direct routing to a mobile node.

3(b) Consider an indirect routing from a correspondent to a mobile user. Suppose that the correspondent is also mobile. Sketch the network layer infrastructure that would be needed to route the datagram from the correspondent to the mobile user, and from the mobile user to the now mobile correspondent. Use indirect routing.

4(a) How jitter can be removed at the receiver for audio? Describe two playout strategies: fixed playout delay, and adaptive playout delay.

4(b) Consider the adaptive playout delay scheme to estimate the network delays. Let $d_i$ be an estimate of the average network delay upon reception of the $i$th packet, which is governed by the following expression.

$$d_i = (1-u)d_{i-1} + u(r_i - t_i)$$

where, $t_i$ is the timestamp of the $i$th packet (i.e. the time the packet was generated by the sender), $r_i$ is the time packet $i$ is received by the receiver, and $p_i$ is the time
the packet is played at the receiver. Suppose that \( u = 0.1 \). Let \( r_1 - t_1 \) be the most recent sample delay, let \( r_2 - t_2 \) be the next most recent sample delay, and so on.

(i) For a given audio application, suppose four packets have arrived at the receiver with sample delays \( r_4 - t_4, r_3 - t_3, r_2 - t_2, \) and \( r_1 - t_1 \). Express the estimate of the delay \( d \) in terms of the four samples.

(ii) Generalize your formula for the \( n \) sample delays.

OR

4(b') Consider two forward error correction (FEC) schemes for Internet phone. The first scheme sends a redundant encoded chunk after every \( n \) chunks. The second scheme sends a lower resolution audio stream as the redundant information. Suppose the first scheme generates a redundant chunk for every four original chunks. Suppose the second scheme uses a low-bit rate encoding whose transmission rate is 25% of the transmission rate of the nominal stream.

(i) How much additional bandwidth does each scheme require? How much playback delay does each scheme add?

(ii) How do the two schemes perform if the first packet is lost in every group of five packets? Which scheme will have better audio quality?

(iii) How do the two schemes perform if the first packet is lost in every group of two packets? Which scheme will have better audio quality?

5(a) Consider the leaky bucket policer that polices the average rate and burst size of a packet flow. We now want to police the peak rate, \( p \), as well. Show how the output of this leaky bucket policer can be fed into a second leaky bucket policer so that the two leaky buckets in series police the average rate, peak rate, and burst size. Be sure to give the bucket size and token generation rate for the second policer.

5(b) Show that as long as \( r_1 < R \frac{w_1}{\sum_{j=1} w_j} \), then \( d_{\text{max}} \) is indeed the maximum delay that any packet in flow 1 will ever experience in the Weighted Fair Queuing (WFQ).
2013-14
M.TECH. (WINTER SEMESTER) EXAMINATION
COMPUTER ENGINEERING
DIGITAL SYSTEM DESIGN
CO-623

Maximum Marks: 60 Credits: 04 Duration: Three Hours

Answer all the questions.
Assume suitable data if missing.
Notations used have their usual meaning.

Q.No.  Question  M.M.
1(a)  Construct a 3-bit counter with use of J-K flip-flops. Give the state diagram, Truth 09

<table>
<thead>
<tr>
<th>011</th>
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<tbody>
<tr>
<td>111</td>
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<tr>
<td>010</td>
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OR

1(a')  Design a sequence generator for following sequence diagram with T Flip-Flops. 09

1(b)  Differentiate between:
1) Mealy and Moore Machine
2) Synchronous Circuit and Asynchronous Circuit.
3) Combinational Circuit and Sequential Circuit

OR

1(b')  Explain Implication Table Method and State Assignments Method. 06

Fig. 1
2(a) Explain the different abstraction levels of system implementation. [05]
2(b) Explain “Regularity”, “Modularity” and “Locality” concept in digital system design. [06]
2(c) Differentiate Top-down and Bottom-up approach. [04]

OR

2(c') Differentiate Standard Cell Based Design and Full-Custom Design style. [04]

3(a) Write separate VHDL code for odd parity generator (Fig 2) using behavioral and structural modeling concept. [4+6]

![Circuit Diagram](image)

Fig. 2

3(b) How will you define a package file in VHDL? Describe the use and scope of “use” clause in VHDL. [05]

4(a) Design a control circuit for a binary serial adder using J-K flip flop. (State diagram, state table-maps and logic circuit diagram). [08]
4(b) Prepare separate ASM chart for Mealy and Moore state graph for sequence detector. (Show state graph and ASM chart both). [07]

OR

4(a') Design a control circuit for a binary multiplier. (Design must have corresponding state diagram for add-shift control, excitation or truth table). [08]
4(b') Describe the design of a vending Machine with a suitable example. [07]