

KONGU ENGINEERING COLLEGE, PERUNDURAI - 638 060

CONTINUOUS ASSESSMENT TEST – I

(Regulations 2020)

Month and Year	: September 2023	Roll Number	: 21ITR082
Programme	: B.Tech.	Date	: 01.09.2023
Branch	: IT	Time	: 02.30 pm to 04.00 pm
Semester	: V	Duration	: 1 $\frac{1}{2}$ Hours
Course Code	: 20ITT51	Max. Marks	: 50
Course Name	: Computer Networks		

PART - A (10 × 2 = 20 Marks)

ANSWER ALL THE QUESTIONS

1. Find out the characteristics of data communication. CO1 K1
2. A signal carrying data in which a data element is encoded as one signal element ($Y = 1$). If the bit rate is 10 Kbps, what is the average value of baud rate if $C = \frac{1}{2}$? CO2 K2
3. What are the advantages of a multipoint connection over a point-to-point one? CO1 K1
4. Show the layers associated with a router. CO1 K1
5. Identify the given link layer address types. CO2 K2
 - i)A7:40:34:13:93:F1
 - ii)A4:40:34:12:93:F1
6. Differentiate between parallel and serial transmissions CO1 K2
7. Define Baseline wandering problem in digital signal transmission CO1 K1
8. What is the Hamming distance for each of the following codewords? CO2 K1
 - a) d (10000, 00000) b. d (10101, 10000)
9. Sketch the graph of Manchester scheme for the following data: 1 0 1 1 0 0 1 1. CO1 K3
10. Tell the functions of data link layer. CO2 K1

Part – B (3 × 10 = 30 Marks)

ANSWER ANY THREE QUESTIONS

11. i) Illustrate the responsibilities of each layer of TCP/IP protocol suite with a neat diagram. (5) CO1 K2
- ii) Summarize the advantages and disadvantages of star and ring topologies. (5) CO1 K1
12. Apply the unipolar, polar and Bipolar line coding schemes for the given data 10111011. (10) CO1 K3
13. i) Given the dataword 101001111 and the divisor 10111, show the generation of the CRC codeword at the sender site (using binary division) and Check whether the given dataword is accepted or not. (5) CO2 K2
 - ii) Describe the functions of Block Coding techniques. (5) CO2 K2
14. Elaborate any three types of transmission medium, with neat diagrams. (10) CO1 K2

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	28	52	20	-	-	-

KONGU ENGINEERING COLLEGE, PERUNDURAI - 638 060
SEMESTER ODD | CONTINUOUS ASSESSMENT TEST - II
(Regulations 2020)

Month and Year	: October 2023	Roll Number	: Q1ITR082
Programme	: B.Tech.	Date	: 07.10.2023
Branch	: IT	Time	: 02.30pm - 04.00pm
Semester	: V	Duration	: 1½ Hours
Course Code	: 20ITT51	Max. Marks	: 50
Course Name	: Computer Networks		

PART - A (10 × 2 = 20 Marks)
ANSWER ALL THE QUESTIONS

- Bit-stuff the following frame payload:
000111111001111010001111111110000111 CO2 K2
- Name the two protocols used in PPP for authentication purpose. CO2 K1
- Define piggybacking and its benefit. CO2 K2
- Stations in a slotted Aloha network send frames of size 1000 bits at the rate of 1 Mbps. What is the vulnerable time for this network? CO2 K3
- In a Standard Ethernet LAN, the average size of a frame is 1000 bytes. If a noise of 2 ms occurs on the LAN, how many frames are destroyed? CO2 K3
- How is a hub related to a repeater? CO2 K2
- Find the class of the following classful IP addresses:
a. 130.34.54.12 b. 200.34.2.1 CO3 K2
- Which of the following cannot be a mask in CIDR?
a. 255.225.0.0 b. 255.192.0.0 c. 255.255.255.6 CO3 K3
- Why is flow control not available in Network layer of TCP/IP protocol suite? Give reasons. CO3 K2
- Can the value of the header length field in an IPv4 packet be less than 5? When is it exactly 5? CO3 K3

Part - B (3 × 10 = 30 Marks)
ANSWER ANY THREE QUESTIONS

- Explain how framing is done in HDLC protocol with neat diagrams. (10) CO2 K1
- i) Assume the propagation delay in a broadcast network is 5 microseconds and the frame transmission time is 10 microseconds.
a. How long does it take for the first bit to reach the destination?
b. How long does it take for the last bit to reach the destination after the first bit has arrived?
c. How long is the network involved with this frame (vulnerable to collision)?
ii) List and explain some strategies in CSMA/CA that are used to avoid collision. (5) CO2 K2
- An ISP is granted the block 16.12.64.0/20. The ISP needs to allocate addresses for 8 organizations, each with 256 addresses.
a. Find the number and range of addresses in the ISP block.
b. Find the range of addresses for each organization and the range of unallocated addresses.
c. Show the outline of the address distribution and the forwarding table. (10) CO3 K3
- Explain various congestion control mechanisms used in network layer. (10) CO3 K2

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	20	50	30			

KONGU ENGINEERING COLLEGE, PERUNDURAI - 638 060
CONTINUOUS ASSESSMENT TEST III
(Regulations 2020)

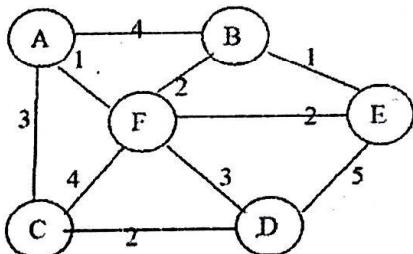
Month and Year : November 2023	Roll Number : 20ITR082
Programme : B.Tech.	Date : 16.11.2023
Branch : IT	Time : 02.30 pm to 04.30 pm
Semester : V	Duration : 1 ½ Hours
Course Code : 20ITT51	Max. Marks : 50
Course Name : Computer Networks	

PART - A (10 × 2 = 20 Marks)
ANSWER ALL THE QUESTIONS

1. Name the categories of port numbers and provide the range for each category. CO4 K1
2. Expand the terms: HTTP, SMTP, SSH, SNMP. CO5 K1
3. Station A needs to send a message consisting of 9 packets to station B using a sliding window (window size 3) and go-back-N error control strategy. All packets are ready and immediately available for transmission. If every 5th packet that A transmits gets lost (but no acks from B ever get lost), then what is the number of packets that A will transmit for sending the message to B? CO4 K3
4. Distinguish between UDP and TCP. CO4 K2
5. List the three basic ideas applied for management with SNMP. CO4 K2
6. Differentiate between persistent and non-persistent connections in HTTP. CO5 K2
7. Host A is sending data to host B over a full duplex link. The transmission time for packet transmission is 50 µs and the propagation delay over the link is 200 µs. Calculate the round-trip time (RTT) for a packet? CO4 K3
8. The content of a UDP header in hexadecimal format is ABCI00AA01AA0000. Find the Destination and Source Port numbers. CO4 K3
9. Recall the services provided by Application Layer CO5 K2
10. Give the purpose of WWW. CO5 K1

Part - B (3 × 10 = 30 Marks)
ANSWER ANY FOUR QUESTIONS

11. Write the simplified version of Dijkstra's algorithms and apply this algorithm to find the shortest path tree and the forwarding table for node A in the figure given below (10) CO3 K3



12. Illustrate the significance of QoS and explain the various techniques to improve QoS. (10) CO4 K2
13. i) Elaborate the three-way hand shaking process that is used for TCP connection establishment. (5) CO4 K1
ii) With a neat diagram, explain the operations of Go-Back-N protocol used in transport layer. (5) CO4 K2
14. i) Discuss about various terminologies used for namespace in Domain Name System. (5) CO5 K2
ii) Using a common scenario, illustrate the architecture of e-mail. (5) CO5 K2

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	18	55	27	-	-	-

KONGU ENGINEERING COLLEGE, PERUNDURAI 638 060
 CONTINUOUS ASSESSMENT TEST - I
 (Regulations 2020)

Month and Year : September 2023		Roll Number: 21ITR082
Programme : B.Tech.		Date : 01.09.2023
Branch : Information Technology		Time : 9.15 am - 10.45 am
Semester : V		
Course Code : 20ITT52		Duration : 1 ½ Hours
Course Name : Operating Systems		Max. Marks : 50

PART - A (10 × 2 = 20 Marks)
ANSWER ALL THE QUESTIONS

1. The following C program is executed on a Unix/Linux system: [CO1] [K1]

```
#include <unistd.h>
int main ()
{
    int i ;
    for (i=0; i<10; i++)
        if (i%2 == 0) fork () ;
    return 0 ;
}
```

How many child processes are created?

2. Identify the modes of operations of OS and give their significance. [CO1] [K1]

3. List the roles of OS as a resource manager. [CO1] [K1]

4. Name the different operating system structures and distinguish between them. [CO1] [K2]

5. Distinguish between client-server and peer-to-peer computing. [CO1] [K2]

6. How Real time OS is different from other OS? [CO1] [K1]

7. What is the maximum number of processes that can be in the ready queue and running state in a single processor system with 'n' processes? [CO1] [K2]

8. Consider the 3 processes, P1, P2 and P3 shown in the table. [CO2] [K2]

Process	Arrival Time	Time Units Required
P1	0	5
P2	1	7
P3	3	4

Write the completion order of the 3 processes under the policies FCFS and RR2 (round robin scheduling with CPU quantum of 2 time units).

9. Consider the following four processes with arrival times (in milliseconds) and their length of CPU bursts (in milliseconds) as shown below: [CO2] [K1]

Process	P1	P2	P3	P4
Arrival time	0	1	3	4
CPU burst time	3	1	3	Z

These processes are run on a single processor using pre-emptive SJF scheduling algorithm. If the average waiting time of the processes is 1 millisecond, what is the value of Z?

10. Give two reasons why caches are useful. [CO1] [K1]

Part – B ($3 \times 10 = 30$ Marks)
ANSWER ANY THREE QUESTIONS

11. List the various operating system services and provide a brief overview of each of them. [CO1] [K2]
12. Classify the types of system calls. Also, list and explain any two types of system calls [CO1] [K2]
13. Consider the following set of processes, with the length of the CPU burst given in milliseconds [CO2] [K3]

Process	Execution Time	Arrival Time	Priority
P1	11	0	2
P2	3	0	1
P3	9	5	5
P4	4	2	4
P5	9	1	3

The processes are assumed to have arrived in the order P1, P2, P3, P4 and P5.

- i. Draw Gantt charts that illustrate the execution of the process using the following scheduling algorithms FCFS, SJF, SRTF, Pre-emptive Priority (larger priority implies highest priority) and RR (Quantum=3)
- ii. Calculate the turnaround time and waiting time of each process for the above algorithms.
- iii. Which scheduling algorithm results in minimal average waiting time?
- iv. Which scheduling algorithm results in minimal average turnaround time?
14. The following processes are being scheduled using a preemptive, round robin scheduling [CO2] [K3] algorithm.

Process	Priority	Burst	Arrival
P1	40	20	0
P2	30	25	25
P3	30	25	30
P4	35	15	60
P5	5	10	100
P6	10	10	105

Each process is assigned a numerical priority, with a higher number indicating a higher relative priority. In addition to the processes listed above, the system also has an **idle task** (which consumes no CPU resources and is identified as *Pidle*). This task has priority 0 and is scheduled whenever the system has no other available processes to run. The length of a time quantum is 10 units. If a process is preempted by a higher-priority process, the preempted process is placed at the end of the queue.

- Show the scheduling order of the processes using a Gantt chart.
- What is the turnaround time for each process?
- What is the waiting time for each process?
- What is the response time for each process?
- What is the CPU utilization rate?

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	20	47	33	-	-	-

Month and Year : October 2023	Roll Number : 21ITR082
Programme : B.Tech	Date : 07.10.2023
Branch : IT	Time : 9.15am to 10.45am
Semester : V	
Course Code : 20ITT52	Duration : 1 ½ Hours
Course Name : Operating Systems	Max. Marks : 50

PART - A (10 × 2 = 20 Marks)**ANSWER ALL THE QUESTIONS**

- Can a multithreaded solution achieve better performance on a multiprocessor system than a single processor system? Justify. [CO2,K2]
- List the different multithreading models. [CO2,K1]
- Define critical section problem. [CO3,K2]
- Consider three concurrent processes P1, P2 and P3 as shown below, which access a shared variable 'D' that has been initialized to 100. [CO3,K3]

P1	P2	P3
D = D + 20	D = D - 50	D = D + 10

The processes are executed on a uniprocessor system running a time-shared operating system. If the minimum and maximum possible values of D after the three processes have completed execution are X and Y respectively, find the value of Y-X?

- Find the value of 'x' when executing the following instructions: [CO3,K3]

No memory barrier instruction	memory barrier instruction
<pre>boolean flag = false; int x = 0; Thread 1 performs while (!flag); print x Thread 2 performs flag = true x = 100;</pre>	<pre>boolean flag = false; int x = 0; Thread 1 performs while (!flag); memory_barrier(); print x Thread 2 performs x = 100; memory_barrier(); flag = true</pre>

- Consider the methods used by processes P1 and P2 for accessing their critical sections whenever needed, as given below. The initial values of shared boolean variables S1 and S2 are randomly assigned. Identify the requirements satisfied by the above processes. [CO3,K3]

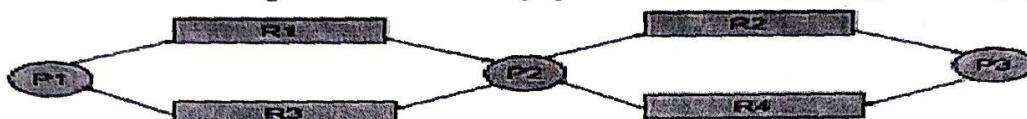
Method Used by P1	Method Used by P2
<pre>while (S1 == S2); Critical Section S1 = S2;</pre>	<pre>while (S1 != S2); Critical Section S2 = not (S1);</pre>

- Consider a non-negative counting semaphore S. The operation $P(S)$ decrements S, and $V(S)$ increments S. During an execution, 20 $P(S)$ operations and 12 $V(S)$ operations are issued in some order. Find the largest initial value of S for which at least one $P(S)$ operation will remain blocked.

8. The following two functions P1 and P2 that share a variable B with an initial value of 2 execute concurrently. Find distinct values that B can possibly take after the execution. [CO3,K3]

Process 1	Process 2
P10 { C = B - 1; B = 2*C; }	P20 { D = 2 * B; B = D - 1; }

9. Consider the following resource allocation graph. Draw the corresponding wait-for graph.(GATE) [CO3,K3]



10. How mutex lock protects critical section and prevents race condition? [CO3,K3]

PART - B (3 × 10 = 30 Marks)

ANSWER ANY THREE QUESTIONS

11. Illustrate two fundamental models of interprocess communication. (10) [CO2,K2]
12. Consider the following snapshot of a system (10) [CO3,K3]

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P ₀	0	0	1	2	0	0	1	2	1	5	2	0
P ₁	1	0	0	0	1	7	5	0				
P ₂	1	3	5	4	2	3	5	6				
P ₃	0	6	3	2	0	6	5	2				
P ₄	0	0	1	4	0	6	5	6				

With reference to Bankers algorithm,

- i) What is the content of the matrix need ?
ii) Is the system in a safe state?
iii) If a request from process P1 arrives for (0,4,2,0),can the request be granted immediately?

- 13 Demonstrate any two techniques of how Mutual-exclusion is implemented with hardware (10) [CO3,K1] instructions and software solutions.

- 14 Consider a system with 4 types of resources R1 (3 units), R2 (2 units), R3 (3 units), R4 (2 units). A non-preemptive resource allocation policy is used. At any given instance, a request is not entertained if it cannot be completely satisfied. Three processes P1, P2, P3 request the sources as follows if executed independently. (10) [CO3,K3]

Process P1:	Process P2:	Process P3:
t=0: requests 2 units of R2	t=0: requests 2 units of R3	t=0: requests 1 unit of R4
t=1: requests 1 unit of R3	t=2: requests 1 unit of R4	t=2: releases 2 units of R1
t=3: requests 2 units of R1	t=4: requests 1 unit of R1	t=5: releases 1 unit of R2
t=5: releases 1 unit of R2 and 1 unit of R1.	t=6: releases 1 unit of R3	t=7: requests 1 unit of R2
t=7: releases 1 unit of R3	t=8: Finishes	t=8: requests 1 unit of R3
t=8: requests 2 units of R4		t=9: Finishes
t=10: Finishes		

If all three processes run concurrently starting at time t=0, check the system is in safe state or deadlock state.

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	20	20	60	-	-	-

KONGU ENGINEERING COLLEGE, PERUNDURAI - 638 060
CONTINUOUS ASSESSMENT TEST – III

(Regulations 2020)

Month and Year : November 2023	Roll Number : 21ITR082
Programme : B.Tech.	Date : 15.11.2023
Branch : IT	Time : 02.30pm - 04.00pm
Semester : V	Duration : 1½ Hours
Course Code : 20ITT52	Max. Marks : 50
Course Name : Operating Systems	

PART - A (10 × 2 = 20 Marks)

ANSWER ALL THE QUESTIONS

- Given memory partitions of 100K, 500K, 200K, 300K, and 600K (in order), the First-fit memory management algorithm (search always starts from the beginning) places the following processes of size 212K, 417K, 112K, and 426K (in order). What is the amount of external fragmentation and internal fragmentation? (GATE) CO4 K3
- Suppose in a three-level paging scheme with 64-bit logical address space, and the page size is 4KB. The second outer page table size is 16MB, the first outer page table size is 4MB, and the inner page table is 4KB. Assuming that each entry in the page table consists of 4 bytes. Find the bits required for the second outer page table, outer page table, inner page table, and page offset.(GATE) CO4 K3
- Suppose in a three-level paging scheme with 64-bit logical address space, and the page size is 4KB. The second outer page table size is 16MB, the first outer page table size is 4MB, and the inner page table is 4KB. Assuming that each entry in the page table consists of 4 bytes. If 100ns is needed for memory access, what is the Effective Access Time (EAT) if the hit ratio is 80% (The percentage of times that a particular page number is found in the TLB)? (GATE) CO4 K3
- Assume that a computer system uses hashed page tables for memory management. The system has a virtual address space of 16 bits and a physical address space of 12 bits. The hash function used is: (GATE) CO4 K3

$$\text{hash}(\text{virtual_page_number}) = (\text{virtual_page_number} + 3) \bmod 17$$

Find the size of the hash table (number of entries), and each entry in the hash table (in bits).

- Assume that a computer system uses an inverted page table for memory management. The system uses a 16-bit virtual address, and each virtual address is of the form <process id, virtual page number, offset>. The size of process id, virtual page number, and offset are 4 bits, 6 bits, and 6 bits, respectively. Assume that system uses the physical address of 9 bits. The page table of the system is given as follows. CO4 K3

Index (3 bits)	Process id (4 bits)	Virtual page number (6 bits)
000	0000	000000
001	1001	000001
010	0010	000010
011	1011	000011
100	0100	000100
101	1101	000101
110	0110	000110
111	1111	000111

If the CPU generates the virtual address 1101000101111111, what is the corresponding physical address? (GATE)

- The index node (inode) of a Unix-like file system has 12 direct, one single-indirect and one double-indirect pointer. The disk block size is 4kB and the disk block addresses 32-bits long. Find the maximum possible file size is (rounded off to 1 decimal place) in GB.(GATE) CO5 K3

7. List any four file attributes. CO5 K1
 8. In UNIX/Linux operating systems, what does the 'x' permission allow for a directory? CO5 K3
 9. Consider a disk where blocks 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 17, 18, 25, 26, and 27 are free and the rest of the blocks are allocated. Find the free-space bitmap CO5 K3
 10. List the details present in File Control Block (FCB). CO5 K1

Part - B (3 × 10 = 30 Marks)
ANSWER ANY THREE QUESTIONS

11. Consider the following page reference string: (10) CO4 K3
 1, 5, 2, 3, 4, 5, 1, 2, 5, 1, 2, 3, 4, 5, 4
 i. How many page faults would occur for the following replacement algorithms, assuming three, and four Remember all frames are initially empty, so your first unique pages will all cost one fault each.
 a. FIFO replacement
 b. Optimal replacement
 c. LRU
 ii. Does this example exhibit Belady's anomaly?
12. i) Explain about Segmentation architecture. (5) CO4 K2
 ii) Illustrate any two techniques of LRU implementation with suitable diagram. (5) CO4 K2
13. Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order, is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests, For each of the following disk-scheduling algorithms a. FCFS b. SSTF c. SCAN d. LOOK e. C-SCAN f. C-LOOK (10) CO5 K3
14. List the various file allocation methods. With a neat sketch, describe how each method allocates file. (10) CO5 K1

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	20.00	20.00	60.00			

KONGU ENGINEERING COLLEGE, PERUNDURAI 638 060

CONTINUOUS ASSESSMENT TEST - I

Regulations 2020

Month and Year :September 2023	Roll Number : <u>2IITR082</u>
Programme : B.Tech	Date : 02.09.2023
Branch : IT	Time : 9.15 am - 10.45 am
Semester : V	
Course Code : 20ITT53	Duration : 1 ½ Hours
Course Name : Software Engineering	Max. Marks: 50

PART - A (10×2 = 20 Marks)

ANSWER ALL THE QUESTIONS

1. Specify the umbrella activities of a software process [CO1,K1]
2. If you have to develop a word processing software product, what process model will you choose? Justify your answer. [CO1,K2]
3. List the two deficiencies in waterfall model. Which process model that you suggest that can overcome the deficiencies of the model. [CO1,K2]
4. Mention the advantages and disadvantages of iterative software development model. [CO1,K1]
5. Paraphrase the XP story. [CO1,K1]
6. An SRS is traceable? Comment. [CO2,K1]
7. Classify the following as functional / non-functional requirements for a banking system? [CO2,K2]
 - (a) Verifying bank balance
 - (b) Withdrawing money from the bank
 - (c) Completion of transaction in less than 1 sec
 - (d) Extending system by providing more tellers for customers
8. Differentiate between normal and exciting requirements. [CO2,K2]
9. State the problem that occur in elicitation of requirement process. [CO2,K1]
10. Tell about I/O structure of domain analysis. [CO2,K1]

PART – B (3 × 10 = 30 Marks)
ANSWER ANY THREE QUESTIONS

11. For the scenario described below, Suggest life cycle model you would choose? Examine the reason why you would choose this model. (10) [CO1,K3]

You are interacting with the MIS department of a very large oil company with multiple departments. They have a complex legacy system. Migrating the data from this legacy system is not an easy task and would take a considerable time. The oil company is very particular about processes, acceptance criteria and legal contracts.
12. Make use of scrum model for online pizza ordering system and summarize the pros and cons of the model while adapting for the above system. (10) [CO1,K3]
- 13.(i) Bring out the difference between requirement inception and elicitation phase. (5) [CO2,K2]
 - (ii) Express the different types of check list that should be carried out for requirement validation process. (5) [CO2,K2]
- 14.(i) Develop an online railway reservation system, which allows the user to select route, book/cancel tickets using net banking/credit/debit cards. The site also maintains the history of the passengers. For the above system, list and draw the use case scenario and model the above specification. (7) [CO2,K3]
 - (ii) Elucidate the activities and steps used for negotiating software requirements system. (3) [CO2,K3]

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	20.00	30.00	50.00			

KONGU ENGINEERING COLLEGE, PERUNDURAI - 638 060
SEMESTER ODD | CONTINUOUS ASSESSMENT TEST - II
(Regulations 2020)

Month and Year	: October 2023	Roll Number	: Q1ITR082
Programme	: B.Tech.	Date	: 09.10.2023
Branch	: IT	Time	: 09.15am - 10.45am
Semester	: V	Duration	: 1½ Hours
Course Code	: 20ITT53	Max. Marks	: 50
Course Name	: Software Engineering		

PART - A (10 × 2 = 20 Marks)
ANSWER ALL THE QUESTIONS

- | | |
|---|--------|
| 1. Compare static and dynamic model in UML. | CO3 K2 |
| 2. What is the significance of system boundary in a use case diagram? | CO3 K1 |
| 3. Apply UML Use Case Diagrams to model the interactions in a library management system. Include at least three actors. | CO3 K3 |
| 4. List the essential components of a sequence diagram, and how are they represented? | CO3 K1 |
| 5. Discuss the role of generalization in UML class diagrams and provide an example. | CO3 K2 |
| 6. How do you represent concurrent actions in an activity diagram? | CO3 K1 |
| 7. Differentiate between Deployment diagram and Component diagram in UML. | CO3 K2 |
| 8. Outline the architectural design elements. | CO4 K2 |
| 9. Define refactoring. | CO4 K1 |
| 10. What is an archetype? Give an example. | CO4 K1 |

Part - B (3 × 10 = 30 Marks)
ANSWER ANY THREE QUESTIONS

- | | |
|---|-------------|
| 11. i) Draw a Collaboration diagram for a banking system, showcasing the user registration and new account creation process. | (5) CO3 K3 |
| ii) Create a UML sequence diagram that illustrates the interaction between a Customer, Cart and Product. Include key lifelines, messages, and activations. | (5) CO3 K3 |
| 12. i) Design a UML class diagram for a simple e-commerce system that includes classes for customers, products, and orders. Show the associations and multiplicity between these classes. | (10) CO3 K3 |
| 13. i) Develop an activity diagram depicting the process of withdrawing cash from an ATM, taking into account multiple scenarios, such as checking the balance, verifying the PIN, and executing the cash withdrawal. Provide explanations for each step and decision point in the diagram. | (10) CO3 K3 |
| 14. i) Write short notes on the design model. | (5) CO4 K2 |
| ii) Summarize the Data-Centered and the Layered architectures within the context of architectural styles. | (5) CO4 K2 |

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	17	30	53			

KONGU ENGINEERING COLLEGE, PERUNDURAI - 638 060

CONTINUOUS ASSESSMENT TEST - III

(Regulations 2020)

Month and Year	November 2023	Roll Number	21ITR082
Programme	B.Tech.	Date	17-11-2023
Branch	IT	Time	02.30pm - 04.00pm
Semester	V	Duration	1½ Hours
Course Code	20ITT53	Max. Marks	50
Course Name	Software Engineering		

PART - A (10 × 2 = 20 Marks)

ANSWER ALL THE QUESTIONS

1. Illustrate on data model in user interface design. CO4 K2
2. Provide the syntax for defining an attribute in the component-level design. CO4 K1
3. Differentiate on Traditional and process-level view of component. CO4 K2
4. Mention the 3 golden rules of Interface design. CO4 K1
5. Compare top-down and bottom-up integration testing approaches CO5 K2
6. List the type of system testing CO5 K1
7. Define Debugging. CO5 K2
8. Outline the steps involved in alpha testing. CO5 K2
9. Provide an example of a test case for a login feature of a website, including the test inputs and expected outcomes. CO5 K3
10. What is SCI? CO5 K1

Part - B (3 × 10 = 30 Marks)

ANSWER ANY THREE QUESTIONS

11. Given a scenario of developing an online bookstore system, identify at least three distinct components, outline their responsibilities, and explain how they interact to achieve the system's functionality. (10) CO4 K3
12. i) Explain the concept of system testing in detail. identify at least three common performance-related issues. (5) CO5 K2
ii) Write short notes on Software Configuration Management. (5) CO5 K2
13. Your team is preparing for beta testing of a mobile application. Outline the steps you would take to select beta testers, distribute the application, and collect feedback. Explain how you would prioritize and address reported issues. (10) CO5 K3
14. What is regression testing, and why is it important in software development? Explain how it helps in maintaining software quality. (10) CO5 K3

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	13.33	33.33	53.33			

Month and Year	: September 2023	Roll Number	: <i>21ITE08</i>
Programme	: B.Tech.	Date	: 02.09.2023
Branch	: IT	Time	: 2:30PM to 4:00PM
Semester	: V	Duration	: 1 ½ Hours
Course Code	: 20ITE03	Max. Marks	: 50
Course Name	: User Interface Design		

PART - A (10 × 2 = 20 Marks)**ANSWER ALL THE QUESTIONS**

1. List out the advantages of React. CO1 K1
2. Write the syntax of writing Arrow function with two parameters. Give Example. CO1 K2
3. Compare DOM with Virtual DOM. CO1 K2
4. Recall the purpose of render() in React. CO1 K1
5. Write a program for creating an h1 element that displays “Hello” using JSX. CO1 K3
6. Write a program for creating an element that displays “Welcome to react” by applying inline styles. CO1 K3
7. Create an array of fruits containing Apple, Mango, Orange, Melon and Grapes. Write a ReactJS program to display only the fruits name that starts with “a” using filter function. CO2 K3
8. Create a component that renders an ordered list that denotes different categories of books with necessary list items. CO2 K1
9. Specify the need for fragments in ReactJS? Give an example. CO2 K2
10. List out the parameters used in ReactDOM.Render statement. CO1 K1

Part – B (3× 10 = 30 Marks)**ANSWER ANY THREE QUESTIONS**

11. i) Create a JavaScript Object to store Employee information (Employee id, Employee Name, Designation, salary) and write a functional component to display the Employee information. (6) CO1 K3
- ii) Write a JavaScript code to read an input string and display the characters at odd position of that string. (4) CO1 K3
12. Illustrate the different ways of applying styles to react components. Give suitable example with necessary files. (10) CO1 K2
13. i) Describe about functional components and class components in detail. (5) CO2 K2
- ii) Create a class component for storing product information and initialize constructor to retrieve product id. Use props to display the product information. (5) CO2 K3
14. i) Create a ReactJS based web application for online shopping system and include the necessary components. Show index.js, App.css and necessary components file with required styling features. (10) CO2 K3

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	14.00	35.00	51.00			

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SEMESTER ODD | CONTINUOUS ASSESSMENT TEST - II
(Regulations 2020)

Month and Year : August2023	Roll Number : Q1ITR082
Programme : B.Tech.	Date : 09.10.2023
Branch : IT	Time : 02.30pm - 04.00pm
Semester : V	Duration : 1½ Hours
Course Code : 20ITE03	Max. Marks : 50
Course Name : User Interface Design	

PART - A (10 × 2 = 20 Marks)
ANSWER ALL THE QUESTIONS

1. Consider the following reusable component

CO2 K3

```
// Task.js
import React from 'react';
const Task = ({ title, description }) => {
  return (
    <div className="task">
      <h3>{title}</h3>
      <p>{description}</p>
    </div>
  );
}
export default Task;
```

Provide a TaskList component which reuses the above Task Component.

2. Give an Example for styled-components.

CO2 K1

3. Tell the tag which is used to display the web pages in mobile devices.

CO2 K1

4. Mention the purpose of using PropTypes in React, and what types of validation can you perform with them?

CO3 K1

5. Compose a simple profile components using props(Minimum 3 Components must be nested all with Props)

CO3 K2

6. Compare this.state with useState.

CO3 K1

7. Draw flow of sequence on react lifecycle components

CO3 K1

8. Identify the need of state in reactjs and say how it differs from props with example.

CO3 K1

9. Extract a simple login component with name and role, Based on the role(admin,user) necessary component can be called(Conditional Rendering).

CO2 K2

10. Create a ReactJS program to increment a counter by 5 whenever a button is clicked.

CO3 K3

Part - B (3 × 10 = 30 Marks)
ANSWER ANY THREE QUESTIONS

11. Illustrate following types of styling components with example

(10) CO2 K2

- (i)Inline
- (ii)Internal
- (iii)External
- (iv) Module based CSS

12. Build a quiz application using ReactJS for an online learning platform. The application (10) CO3 K3 should allow users to take quizzes on various topics. Each quiz consists of multiple-choice questions, and users can select answers for each question. After completing the quiz, users should see their score.

Each question will have the following structure:

```
{  
  "id": 1,  
  "question": "What is the capital of France?",  
  "options": ["Berlin", "Madrid", "Paris", "Rome"],  
  "correctAnswer": "Paris"  
}
```

13. i) Demonstrate extracting components with props with suitable examples. (5) CO3 K2
ii) Demonstrate note on props, state initialization and update with examples. (5) CO3 K2
14. Illustrate on React Lifecycle with Application. (10) CO3 K3

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	20	40	40			

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SEMESTER ODD | CONTINUOUS ASSESSMENT TEST - III

(Regulations 2020)

Month and Year	: November2023	Roll Number	: Q1ITR082
Programme	: B.Tech.	Date	: 18.11.2023
Branch	: IT	Time	: 02.30pm - 04.00pm
Semester	: V	Duration	: 1½ Hours
Course Code	: 20ITE03	Max. Marks	: 50
Course Name	: User Interface Design		

PART - A (10 × 2 = 20 Marks)

ANSWER ALL THE QUESTIONS

1. Mention the role of onClick event handler in react. CO4 K2
2. Compare 'onClick' and 'onChange' event handlers in react. CO4 K2
3. Define Uncontrolled Component. CO4 K1
4. State the primary purpose of 'useRef' hook in react. CO4 K1
5. Construct a React component that takes an array of course names as a prop and renders an unordered list () with list items () for each course. Make sure to assign a unique key to each list item. Additionally, add a button that allows the user to add a new course to the list. CO4 K3
6. Compare 'useState' hook and 'useEffect' hook in react. CO5 K2
7. Identify an example of how to use the 'useEffect' hook to fetch and display a list of students from an API when the component mounts. CO5 K3
8. Tell the significance of the dependency array in the 'useEffect' hook CO5 K1
9. Recall the basic rule for using hooks in React and provide an example of a built-in hook that follows this rule. CO5 K1
10. What is Redux? Why it is used in react applications? CO3 K1

Part - B (3 × 10 = 30 Marks)

ANSWER ANY THREE QUESTIONS

11. i) Summarize the key differences between controlled components and uncontrolled components in React. (4) CO4 K2
- ii) Illustrate the purpose of keys in React when rendering lists. Why are they important, and what problems do they help solve? Provide an example to illustrate their usage. (6) CO4 K2
12. Develop and implement controlled components for a user registration form for an online learning platform. The form collects essential information from users, such as their name, email, password, and a few preferences for customizing their learning experience. Create controlled components for each form field, include the use of state variables, event handlers, and any data validation. (10) CO4 K3
13. Demonstrate a React component that includes a login form with email and password input fields. When the user submits the form, it should send a POST request to an authentication API with the provided credentials. If the authentication is successful, display a "Welcome, [user's name]" message; otherwise, show an error message. (10) CO5 K2
14. Construct a React component that utilizes the useEffect hook to set up an event listener for the mousemove event on the window object. When the mouse is moved, the component should update the state with the current mouse position (x and y coordinates) and display them on the screen in real-time. Ensure that you remove the event listener when the component unmounts. (10) CO3 K3

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	17	43	40			

CONTINUOUS ASSESSMENT TEST I

(Regulations 2020)

Month and Year : SEPTEMBER 2023	Roll Number: 21ITR082
Programme : B.Tech Branch : IT, AI-ML & AI-DS Semester : V	Date : 04.09.2023 Time : 9.15 am - 10.45 am
Course Code : 20MAO08 Course Name : Numerical Computing	Duration : 1.30 Hours Max. Marks : 50

PART - A (10 × 2 = 20 Marks)
ANSWER ALL THE QUESTIONS

- Find the first two roots of $f(x) = 3x^3 + 5x - 40 = 0$ by bisection method. [CO1] [K3]
- State the condition for the convergence of Iteration method. [CO1] [K1]
- Write the formula for finding approximate root of $f(x) = 0$ by Regula-Falsi method [CO1] [K1] with its order of convergence.
- Establish an iteration formula to find the reciprocal of a positive number 'N' by [CO1] [K2] Newton's method.
- How will you find the numerically smallest eigen value of a matrix A by Power [CO1] [K1] method?
- Compute the Rotation matrix for the matrix $A = \begin{pmatrix} 2 & 3 \\ 3 & 2 \end{pmatrix}$. [CO1] [K2]
- Compare Power Method and Jacobi method for finding Eigen values. [CO1] [K2]
- Solve the system of equations $2x + y = 3, 7x - 3y = 4$ by Gauss elimination method. [CO2] [K3]
- Explain the process of finding the solution of simultaneous linear algebraic equations [CO2] [K2] by Gauss Jordan method.
- Distinguish between Gauss elimination and Gauss Jordan method. [CO2] [K2]

Part - B (3 × 10 = 30 Marks)
ANSWER ANY THREE QUESTIONS

- Find the root of the equation $x^3 - 5x - 7 = 0$ correct to 4 decimal places by (10) [CO1] [K3] iteration method.
- Find the real positive root of $\cos x = xe^x$ by Newton-Raphson method. (10) [CO1] [K3]
- Find the dominant eigen value and the corresponding eigen vector of (10) [CO1] [K3] $A = \begin{bmatrix} 1 & 6 & 1 \\ 1 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$ by Power method.
- Solve the following system by LU decomposition method. (10) [CO2] [K3]

$$x + 5y + z = 14, 2x + y + 3z = 13, 3x + y + 4z = 17$$

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	10	16.7	73.3			

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CONTINUOUS ASSESSMENT TEST II

(Regulations 2020)

Month and Year : OCTOBER 2023	Roll Number: Q1ITR082
Programme : B.Tech Branch : IT, AI-ML & AI-DS Semester : V	Date : 10.10.2023 Time : 9.15 am – 10.45 am
Course Code : 20MA008 Course Name : Numerical Computing	Duration : 1.30 Hours Max. Marks : 50

**PART - A (10 × 2 = 20 Marks)
ANSWER ALL THE QUESTIONS**

1. Compute the values of u_{12}, u_{13} of the derived matrix of the following system by [CO2] [K3] Crout's method.

$$2x + 3y + z = -1; \quad 5x + y + z = 9; \quad 3x + 2y + 4z = 11.$$

2. Perform two iterations in solving the system of equations $6x + 3y + 12z = 35$; $8x - 3y + 2z = 20$; $4x + 11y - z = 33$ by Gauss – Jacobi method.

3. Why Gauss-Seidel method is better than Gauss-Jacobi Method? [CO2] [K2]

4. Define interpolation. [CO3] [K1]

5. Fit a second degree polynomial which takes the values as given in the table by [CO3] [K2] Newton's forward interpolation formula.

x	1	2	3	4
y	-1	-1	1	5

6. State Gauss backward difference formula. [CO3] [K1]

7. When will you apply Gauss forward and backward formulas for interpolating [CO3] [K1] values?

8. Find the parabola passing through the points (0,1),(1,3) and (3,55) using [CO3] [K2] Lagrange's interpolation formula.

9. If $f(x) = \frac{1}{x^2}$, find $f(a, b, c)$ by using divided differences. [CO3] [K2]

10. Construct Newton's divided difference table for the following data: [CO3] [K2]

x	5	7	11	13	21
f(x)	150	392	1452	2366	9702

**Part - B (3 × 10 = 30 Marks)
ANSWER ANY THREE QUESTIONS**

11. Solve the following system of equations by Gauss-Seidel method correct to four [CO2] [K3] decimal places.

$$x + y + 54z = 110, \quad 27x + 6y - z = 85, \quad 6x + 15y + 2z = 72.$$

[CO3] [K3]

12. The following data are taken from the steam table.

Temp °C	140	150	160	170	180
Pressure kgf/cm ²	3.685	4.854	6.302	8.076	10.225

Find the pressure at temperature $t = 142^\circ$ and $t = 175^\circ$.

13. Apply Gauss's forward formula to compute $y(16)$ from the following data.

[CO3] [K3]

14. Use Lagrange's interpolation formula to find y when $x = 5$ from the following data.

[CO3] [K3]

x	0	1	3	8
y	1	3	13	123

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	10	16.7	73.3			

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CONTINUOUS ASSESSMENT TEST III

(Regulations 2020)

Month and Year : NOVEMBER 2023		Roll Number: <i>Q1ITR082</i>
Programme : B.Tech		Date : 20.11.2023
Branch : IT, AI-ML & AI-DS		Time : 2.30 pm – 4.00 pm
Semester : V		
Course Code : 20MA008		Duration : 1.30 Hours
Course Name : Numerical Computing		Max. Marks : 50

**PART - A (10 × 2 = 20 Marks)
ANSWER ALL THE QUESTIONS**

1. Write Newton's backward difference formula to compute $\frac{dy}{dx}$ at $x = x_{n-1}$. [CO4] [K1]

2. Given the following data with $f(x_0) = 2$, $f(x_0, x_1) = 1$, $f(x_0, x_1, x_2) = 4$, [CO4] [K2] and $f(x_0, x_1, x_2, x_3) = 1$, find $y'(4)$.

x	0	1	2	5
y	2	3	12	147

3. Mention the order of error in trapezoidal and Simpson's rule. [CO4] [K1]

4. Evaluate $\int_0^1 \frac{dx}{1+x^2}$ by using Trapezoidal rule with $h = 0.2$. [CO4] [K2]

5. A river is 80 metres wide. The depth 'd' in metres at a distance 'x' metres from one bank is given by the following table. Apply Simpson's one-third rule to calculate $\int_0^{80} f(x)dx$. [CO4] [K2]

x	0	10	20	30	40	50	60	70	80
d = f(x)	0	4	7	9	12	15	14	8	3

$y_0 \quad y_1 \quad y_2 \quad y_3 \quad y_4 \quad y_5 \quad y_6 \quad y_7 \quad y_8$

6. Write the Taylor's series formula for solving the first order ODE $\frac{dy}{dx} = f(x, y)$. [CO5] [K3]

7. Use Euler's method to compute $y(0.1)$, given $\frac{dy}{dx} = x + xy, y(0) = 1$ with [CO5] [K3] $h = 0.05$.

8. Apply Modified – Euler's method to determine $y(0.25)$, given $y' = 2xy, y(0) = 1$. [CO5] [K3]

9. Compare single step and multi-step methods. [CO5] [K2]

10. State Adam-Basforth predictor and corrector formula. [CO5] [K1]

Part - B ($3 \times 10 = 30$ Marks)
ANSWER ANY THREE QUESTIONS

11. The specific heat of Silica glass at various temperature are as follows: (10) [CO4] [K3]

x ($^{\circ}$ C):	100	200	300	400	500
s (in calories/ $^{\circ}$ C/gm)	0.2372	0.2416	0.2460	0.2504	0.2545

Find the rate of change of specific heat with respect to temperature at 100°C and 500°C .

12. Evaluate $\int_1^{1.4} \int_2^{2.4} \frac{1}{xy} dx dy$ using Trapezoidal and Simpson's rules with $h = k = 0.1$. (10) [CO4] [K3]

13. Using Runge-Kutta method of fourth order, find $y(0.8)$ correct to 4 decimal places if $y' = y - x^2$, $y(0.6) = 1.7379$. (10) [CO5] [K3]

14. Compute $y(2)$ by Milne's method if $y(x)$ is the solution of $\frac{dy}{dx} = \frac{1}{2}(x + y)$, (10) [CO5] [K3] given $y(0) = 2$, $y(0.5) = 2.636$, $y(1) = 3.595$ and $y(1.5) = 4.968$.

Bloom's Taxonomy Level	Remembering (K1)	Understanding (K2)	Applying (K3)	Analysing (K4)	Evaluating (K5)	Creating (K6)
Percentage	10	13.3	76.7			