



# The National Institute of Engineering

## Department of CS&E / IS&E / AI&ML

Course: Operating Systems		Course Code: BCS303
Max Marks: 25	TEST -I	Time: 9.15 – 10.15
Date: 09/01/2024		Semester: 3 <sup>rd</sup>

Note: All the questions are compulsory

Question Number	Bloom's Level	Course Outcome	Questions	Marks															
1a	L3	CO1	<p>Predict the total number of times each letter (A, B, C, D, E) is printed when executing the provided code snippet. Explain the reasoning behind the count for each letter, considering the behavior of fork() and the sequence of printf() statements.</p> <pre>#include &lt;stdio.h&gt; #include &lt;unistd.h&gt; int main() {     printf("A\n");     fork();     printf("B\n");     printf("C\n");     fork();     fork();     printf("D\n");     printf("E\n");     fork();     return 0; }</pre>	3															
1b	L2	CO1	List the four principal events that cause process to be created.	2															
2.	L2	CO1	Explain the different transitions that are possible among the different states of process with a neat illustration.	5															
3.	L3	CO1	<p>Consider the following table with arrival time and burst time for 4 processes P1,P2, P3, P4 and time quantum= 2ms. Calculate the average turnaround time and average burst time with the help of Gantt chart.</p> <table border="1"> <thead> <tr> <th>Process</th> <th>Arrival Time</th> <th>Burst Time (in ms)</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td>0</td> <td>3</td> </tr> <tr> <td>P2</td> <td>0</td> <td>5</td> </tr> <tr> <td>P3</td> <td>0</td> <td>2</td> </tr> <tr> <td>P4</td> <td>0</td> <td>4</td> </tr> </tbody> </table>	Process	Arrival Time	Burst Time (in ms)	P1	0	3	P2	0	5	P3	0	2	P4	0	4	5
Process	Arrival Time	Burst Time (in ms)																	
P1	0	3																	
P2	0	5																	
P3	0	2																	
P4	0	4																	
4.	L2	CO1	Define the following terms: i) Race condition ii) Critical section. Write the pseudocode to demonstrate strict alternation using turn variable.	4															
5.	L2	CO1	Define producer-consumer problem. Give the pseudocode for the same using sleep() and wakeup() primitives.	6															



# The National Institute of Engineering

## Department of CS&E / IS&E / AI&ML

Course: Digital Design & Computer Organization

Max Marks: 25

Date: 08-01-2024

Course Code: BCS302

Time: 3:30 - 4:30 PM

Semester: 3<sup>rd</sup>

TEST -I

Note: All the questions are compulsory

Question Number	Bloom's Level	Course Outcome	Questions	Marks
1	L3	CO1	Simplify the following Boolean function F, together with the don't-care conditions d, and then express the simplified function in sum-of-minterms form: $F(A, B, C, D) = \sum m(0, 6, 8, 13, 14) + d(2, 4, 10)$	5
2	L3	CO1	Design BCD adder with truth table and a neat logic circuit.	8
3	L2	CO1	Explain the working of Full adder with suitable circuit and truth table.	6
4	L2	CO2	Explain the working of a Clocked RS Flip-Flop with a circuit diagram, characteristics table and characteristic equation.	6

\*\*\*\*\* Good Luck\*\*\*\*\*

**The National Institute of Engineering  
Department of Mathematics  
(An Autonomous Institution under VTU)**

Mysuru- 570018

**Mathematics for Computer Science Engineering Stream - III**

**Sub Code: BCS301**

**Semester: III (CSE/ISE/AI & ML)**

**Program: UG**

**TEST- I**

**Date: 08/01/2024**

**Max. Marks: 25**

**Duration: 1 Hour**

**Note: Answer all the questions**

<b>Cos</b>	<b>Cognt. Level</b>	<b>Q. No.</b>	<b>Questions</b>	<b>Marks</b>
CO1	L2	1	<p>A random variable <math>X</math> has the probability density function <math>f(x) = \begin{cases} kx^2, &amp; -3 \leq x \leq 3 \\ 0, &amp; \text{otherwise} \end{cases}</math>. Find</p> <p>i) <math>k</math>, ii) <math>P(x \leq 2)</math>, iii) <math>P(1 \leq x \leq 3)</math></p>	7
CO1	L3	2	<p>Suppose 300 misprints are randomly distributed throughout a book of 500 pages, find the probability that a given page contains</p> <p>i) Exactly 3 misprints ii) Less than 3 misprints iii) 4 or more misprints</p>	6
CO2	L2	3	<p>A population consists of values 3, 6, 9. Take all possible samples of size 3 with replacement and obtain the mean and standard deviation of the sampling distribution of means.</p>	7
CO2	L3	4	<p>The life of certain computer is approximately normally distributed with mean 800 hours and standard deviation of 40 hours. If a random sample of 30 computers has an average life of 788 hours, test the hypothesis that mean=800 is acceptable at</p> <p>i) 5% level of significance ii) 1% level of significance</p> <p>Also establish 99% confidence limits for mean.</p>	5

# TEST 1

Course name and Code:  
**Data Structures and Applications**  
**(BCS304)**

Date: 09-01-2024

Semester: 3

Time: 03.30 – 04.30 pm

Max. Marks: 25

Q. No	COs	Cognitive Domain	Answer all questions	Marks
1	CO1	L3	<p>Imagine you are developing a system for managing a library's book inventory. Each book is represented by the following structure:</p> <pre>struct Book {     char title[50];     char author[50];     int year;     float price; };</pre> <p>Create a 'C' function to sort by the price of the book in ascending order and display all information of the sorted 'n' books.</p>	05
2	CO1	L3	Demonstrate Passing Structures to a function through Pointers with example.	05
3	CO2	L3	<p>Assume we have a linked list that was created using the following structure.</p> <pre>struct student {     name char[20];     marks int;     struct student *next; };</pre> <p>Because of a system error, the marks entered by the teacher has been reduced by 5 for all students.</p> <p>Write a 'C' function to increase the marks of all students by 5. Also display the count of students present in the list.</p>	05
4	CO2	L3	Write a 'C' function for inserting a node at the beginning of a circular linked list.	05
	CO2	L3	Write a 'C' function for deleting a user specified key node in a doubly linked list.	05



**The National Institute of Engineering**  
**Department of Computer Science and Engineering,**  
**Information Science and Engineering**

Course:	Object Oriented Programming with Java	Course Code: BCS306A
Max Marks:	25 Marks	Time: 9:15am-10:15am
Date:	10-01-2024	Semester: III

**Note: All the questions are compulsory**

Question Number	Bloom's Level	Course Outcome	Questions	Marks
1	L2	CO1	<p>Explain the following Buzz words in Java.</p> <p>(i) Platform Independent (ii) Robust (iii) Interpreted</p>	5M
2	L3	CO1	<p><b>Print the value m?</b></p> <pre>class Test {     public static void main(String args[])     {         int [][]m=new int[4][3];         for(int r=0;r&lt;m.length;r++){             for(int c=0;c&lt;m[0].length;c++){                 if(r&lt;c) { m[r][c]=1; }                 else if(r==c) { m[r][c]=2; }                 else m[r][c]=3;             }         }     } }</pre> <p><b>Predict the value of v?</b></p> <pre>public class matr {     public static void main(String args[])     {         int [][]m=         {{1,1,1,1},{1,2,3,4},{2,2,2,2},{2,4,6,8}};         int v=0;         for(int k=0;k&lt;m.length;k++)             v=v+m[m.length-1-k][1];         System.out.println("v is : "+v);     } }</pre>	4M
3	L3	CO1	<p><b>Predict the Output of <del>the method name</del> ?</b></p> <pre>class A {     public int i;     protected int j; } class B extends A {     int j;     void display()     {         super.j = 3;         System.out.println(i + " " + j);     } }</pre> <div style="border: 1px solid black; padding: 10px;"> <pre>class Output {     public static void main(String args[])     {         B obj = new B();         obj.i=1;         obj.j=2;         obj.display();     } }</pre> </div>	5M