



Bhartiya Vidya Bhavan's  
**Sardar Patel Institute of Technology**  
 (Autonomous Institute Affiliated to University of Mumbai)  
Department of Master of Computer Application

		<b>MSE</b>		
Max. Marks: 20			Duration: 1 hr	
Class: FYMCA			Semester: II	
Course Code: MA503			Date: 08 / 05 /2023	
Subject: Probability and Statistics			Time: 10.30-11.30	
	Instructions:	(1) Attempt any <b>FOUR</b> questions. (2) Use of non-programmable scientific calculator is allowed. (3) Assume any necessary data but justify the same.		

Q.N		Marks	CO																									
1.	The probability that a certain film gets award for its story is 0.23, it will get award for its music is 0.15 and it will get award for both is 0.07. What is the probability that film will get award for exactly one of the two.	[5]	3																									
2.	In the year 2021 there were three candidates for the position of principal, Mr. Chatterji, Mr. Iyangar and Mr. Wagh. Their chances of getting the appointment are in the proportion 4:2:3 respectively. The probability that Mr. Chatterji is selected would introduce computer education in the college is 0.3. the probability of Mr. Iyangar and Mr. Wagh doing the same are respectively 0.5 and 0.8. What is the probability that there was computer education in the college in 2006.	[5]	3																									
3	Two discrete random variables X and Y have joint pmf given by the following table. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center; padding: 5px;">Y</td> <td style="padding: 5px;"></td> <td style="padding: 5px;">1</td> <td style="padding: 5px;">2</td> <td style="padding: 5px;">3</td> </tr> <tr> <td style="text-align: center; padding: 5px;">X</td> <td style="padding: 5px;"></td> <td style="padding: 5px;">1</td> <td style="padding: 5px;">2</td> <td style="padding: 5px;">3</td> </tr> <tr> <td style="text-align: center; padding: 5px;">1</td> <td style="padding: 5px;">2/16</td> <td style="padding: 5px;">2/16</td> <td style="padding: 5px;">1/16</td> <td></td> </tr> <tr> <td style="text-align: center; padding: 5px;">2</td> <td style="padding: 5px;">3/16</td> <td style="padding: 5px;">2/16</td> <td style="padding: 5px;">1/16</td> <td></td> </tr> <tr> <td style="text-align: center; padding: 5px;">3</td> <td style="padding: 5px;">2/16</td> <td style="padding: 5px;">1/16</td> <td style="padding: 5px;">2/16</td> <td></td> </tr> </table> Compute the probability that: (i) $X \leq 1\frac{1}{2}$ (ii) XY is even	Y		1	2	3	X		1	2	3	1	2/16	2/16	1/16		2	3/16	2/16	1/16		3	2/16	1/16	2/16		[5]	3
Y		1	2	3																								
X		1	2	3																								
1	2/16	2/16	1/16																									
2	3/16	2/16	1/16																									
3	2/16	1/16	2/16																									
4	Let X be a random variable for which $E(X)=24$ and $V(X)=16$ . Find the values of a and b such that $Y=aX-b$ has expectation zero and variance 2.	[5]	3																									
5	If hens of a certain breed lay eggs on 5 days a week on an average; find on how many days during a season of 100 days, a poultry keeper with 5 hens of this breed, will expect to receive exactly 4 eggs?	[5]	4																									

---X---X---X



**BHARATIYA VIDYA BHAVAN'S**

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MUNSHI NAGAR, ANDHERI (WEST), MUMBAI – 400 058, India  
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**Mid Semester Examination**

Max. Marks: 20

Class: FY MCA

Course Code: MC506

Subject: JAVA Programming

Semester: II

Date: 08/05/2023

Time: 60 minutes

Instructions: (1) All questions are compulsory.

(2) Assume any necessary data but justify the same.

Q. No.	Questions	Max Marks	CO	BL
Q. 1	Identify the output of the java program and state the reason. public class First { public static void main(String[] args) { final int i; i = 20; int j = i+20; i = j+30; System.out.println(i + " " + j); } }	2	CO 1	L2
Q. 2	Java is a platform neutral language, so why?	2	CO 2	L4
Q. 3	<p>Packagel</p> <p>Class A   Class B</p> <p>Package2</p> <p>Class C</p> <p>← Visible</p> <p>Using above diagram explain different access specifiers used in JAVA w.r.t Packages. (Note : Ans. In Tabular format will be advisable)</p>	4	CO 1	L3
Q. 4	A single try block and multiple catch blocks can co-exist in a Java Program. Explain.	4	CO 2	L3
Q. 5	Write a Java Program for the interface Area with method Compute. Show Class Circle, Triangle, Rectangle implementing this interface	4	CO 2	L4
Q. 6	Write a program to find the Second Highest number in an Array	4	CO1	L4



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**Mid Semester Examination**

Max. Marks: 20

Class: FYMCA

Course Code: MC507

Subject: Design and Analysis of Algorithms

Duration: 1 hr.

Semester: II

Date: 09/05/2023

Time: 12.00to 1.00

**Instructions:**

- (1) All questions are compulsory.
- (2) Use of scientific calculator is allowed.
- (3) Assume any necessary data but justify the same.

<b>Q. No.</b>		<b>Max. Marks</b>	<b>CO</b>															
Q. 1	Explain the Roles of Algorithms in Computing.	5	CO1															
Q. 2	Find the multiplication of matrices using Strassen's algorithm. $A = \begin{bmatrix} 6 & 9 \\ 8 & 7 \end{bmatrix}$ , $B = \begin{bmatrix} 3 & 4 \\ 6 & 5 \end{bmatrix}$	5	CO2															
Q. 3	a) The capacity of the knapsack is $W = 60$ and the list of provided items are shown in the following table. Find the maximum profit earned and items selected.  <table><thead><tr><th>Item</th><th>B</th><th>A</th><th>C</th><th>D</th></tr></thead><tbody><tr><th>Profit</th><td>100</td><td>280</td><td>120</td><td>120</td></tr><tr><th>Weight</th><td>10</td><td>40</td><td>20</td><td>24</td></tr></tbody></table> OR Consider the string1: ABCDABBCADD, String2: ACABBDDABCZ. Find Longest Common Subsequence with its length. Track the multiple solutions if any	Item	B	A	C	D	Profit	100	280	120	120	Weight	10	40	20	24	5	CO3
Item	B	A	C	D														
Profit	100	280	120	120														
Weight	10	40	20	24														
Q. 4	Draw the state space tree generated by recursive backtracking algorithm for sum of subsets problem for following example. $A = \{1, 2, 3, 4, 5, 8\}$ $M = 10$	5	CO4															



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Bhavan's Campus, Munshi Nagar, Andheri(West), Mumbai 400058-India  
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**Mid Semester Examination**

**Max. Marks: 20**

**Class: FYMCA**

**Course Code: MC508**

**Course: Process Automation**

**Duration: 1 Hour**

**Semester: II**

**Date: 9/5/23**

**Time: 2 to 3**

**Instructions:**

- (1) All Questions are Compulsory.
- (2) Draw neat diagrams.
- (3) Assume suitable data if necessary.

No	Question	Max. Marks	CO	BL
Q1	Analyze the following scenario of company's process(Excel) to be automated by considering initial RPA cost as 1.5L and then Monthly cost as 1.2L and working time as 8 hours per day. Consider working days are 5 days a week.  Calculate the Return on Investment for following scenario.  Number of FTE= 1, Number of Task=2, Time Taken = 20 mins, Task growth rate=5%, Average Fully loaded cost (hourly)=Rs. 500	7	2	4
Q2	Illustrate different types of Robotic Process Automation approaches with the help of an example.	6	1	2
Q3	Identify the motive of using Lean Six Sigma with Robotic Process Automation. List and explain the steps required for the same with the help of an example.	7	2	4



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**Mid Semester Examination**

Max. Marks: 20

Class: FYMCA

Course Code: MC511

Subject: Machine Learning

Duration: 1 hr

Semester: II

Date: 10/5/23

Time: 10:30am-11:30am

Instructions: (1) All questions are compulsory.  
(2) Use of scientific calculator is allowed.  
(3) Assume any necessary data but justify the same.

Q. No.	Questions	Max. Marks	CO-BL																					
Q.1	a) Given a problem statement(consider any problem statement of your choice), how will you decide which machine learning type and algorithm to use, give explanation about your logic and general steps to solve the given problem with machine learning  b) What is inferential statistics? Explain any 3 sampling techniques used in machine learning with example?  OR  b) What are the different types of data preprocessing techniques? Explain any three with suitable example.	05 05	1-2 1-2																					
Q. 2	a) Find linear regression equation and coefficient of correlation for the following two sets of data:  <table border="1" style="margin-left: auto; margin-right: auto;"><tr><td>X</td><td>3</td><td>4</td><td>6</td><td>9</td></tr><tr><td>Y</td><td>4</td><td>6</td><td>9</td><td>10</td></tr></table> Predict Y, if X=11  b) Apply KNN algorithm on given dataset to predict possibility of Disease given the two parameters as P1=43.6 & P2=40, Disease=? Training examples are as follows:	X	3	4	6	9	Y	4	6	9	10	06	2-3											
X	3	4	6	9																				
Y	4	6	9	10																				
	<table border="1" style="margin-left: auto; margin-right: auto;"><thead><tr><th>P1</th><th>P2</th><th>Disease</th></tr></thead><tbody><tr><td>33.6</td><td>50</td><td>1</td></tr><tr><td>26.6</td><td>30</td><td>0</td></tr><tr><td>23.4</td><td>40</td><td>0</td></tr><tr><td>43.1</td><td>67</td><td>0</td></tr><tr><td>35.3</td><td>23</td><td>1</td></tr><tr><td>35.9</td><td>67</td><td>1</td></tr></tbody></table>	P1	P2	Disease	33.6	50	1	26.6	30	0	23.4	40	0	43.1	67	0	35.3	23	1	35.9	67	1	04	2-3
P1	P2	Disease																						
33.6	50	1																						
26.6	30	0																						
23.4	40	0																						
43.1	67	0																						
35.3	23	1																						
35.9	67	1																						



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**Mid Semester Examination**

Max. Marks: 20  
Class: FYMCA  
Course Code: MC510  
Subject: Operating System

Duration: 1 hr  
Semester: II  
Date: 10 / 5 / 23  
Time: : 200 to 3:00 pm

Instructions: (1) All questions are compulsory.  
(2) Use of scientific calculator is allowed.  
(3) Assume any necessary data but justify the same.

Q. No.	Questions	Max. Marks	CO-BL																																			
Q.1	a) Illustrate types of system calls <b>OR</b> Classify different OS based on their functions  b) Demonstrate process state diagram.	05	1-2																																			
Q. 2	a) Suppose there are four processes with process ID's P1, P2, P3, and P4 and they enter into the CPU as follows:  <table border="1"><thead><tr><th>Process ID</th><th>Arrival Time (milliseconds)</th><th>Burst Time (milliseconds)</th></tr></thead><tbody><tr><td>P1</td><td>0</td><td>5</td></tr><tr><td>P2</td><td>2</td><td>3</td></tr><tr><td>P3</td><td>6</td><td>2</td></tr><tr><td>P4</td><td>7</td><td>3</td></tr></tbody></table> Draw Gantt chart, Find average waiting time, average turnaround time for First Come First Serve(FCFS) algorithm  b) Consider the following set of processes. Draw Gantt chart, Find average waiting time using non-preemptive Priority scheduling Algorithm  <table border="1"><thead><tr><th>Process No</th><th>Arrival Time</th><th>Priority</th><th>Burst Time</th></tr></thead><tbody><tr><td>P1</td><td>0</td><td>4(Low)</td><td>6</td></tr><tr><td>P2</td><td>0</td><td>1 (High)</td><td>8</td></tr><tr><td>P3</td><td>0</td><td>3</td><td>7</td></tr><tr><td>P4</td><td>0</td><td>2</td><td>3</td></tr></tbody></table>	Process ID	Arrival Time (milliseconds)	Burst Time (milliseconds)	P1	0	5	P2	2	3	P3	6	2	P4	7	3	Process No	Arrival Time	Priority	Burst Time	P1	0	4(Low)	6	P2	0	1 (High)	8	P3	0	3	7	P4	0	2	3	06	2-3
Process ID	Arrival Time (milliseconds)	Burst Time (milliseconds)																																				
P1	0	5																																				
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P4	0	2	3																																			
		04	2-3																																			