

SVKM'S NMIMS

MUKESH PATEL SCHOOL OF TECHNOLOGY MANAGEMENT & ENGINEERING

Academic Year: 2022-2023

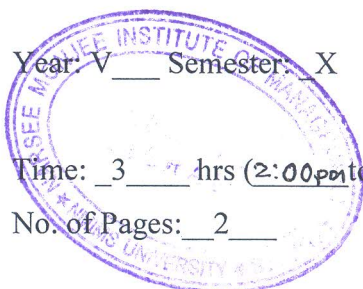
Program: B Tech (Integrated)

Stream ; Computer Engineering _____

Subject: Operating Systems and Database Security

Date: 26 / Apr / 2023

Marks: 100



Final Examination

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) Question No. 1 is compulsory.
- 2) Out of remaining questions, attempt any 4 questions.
- 3) **In all 5 questions to be attempted.**
- 4) All questions carry equal marks.
- 5) **Answer to each new question to be started on a fresh page.**
- 6) **Figures in brackets on the right hand side indicate full marks.**
- 7) **Assume Suitable data if necessary.**

Q1		Answer briefly:	[20]
CO-1 ; SO-1 ; BL-1	a.	Describe the treat model of the Operating System	[5]
CO-2 ; SO4 ; BL-2	b.	Discuss the role of authorization module of a reference monitor in brief	[5]
CO-2 ; SO-6 ; BL-5	c.	Justify the importance of segment descriptor word (SDW) in the Multics system	[5]
CO-4 ; SO-1 ; BL-2	d.	Discuss in brief about any two database vulnerabilities	[5]
Q2	a.	What is Virtual Machine Lifecycle? Explain Type-I and Type-II Hypervisor in detail	[10]
CO-1; SO7 ; BL-2			
CO-2; SO-4 ; BL-4	b.	Distinguish between Windows and Unix protection system	[10]
Q3	a.	Discuss any four security techniques for operating systems	[10]
CO-1; SO7 ; BL-2			

CO-3; SO-6; BL-3	b.	State the need for Mandatory protection system and discuss its structure in detail	[10]																				
Q4 CO-2; SO-4; BL-4	a.	Explain the categories of information flow models? Give the steps for constructing an information flow graph and for the given access matrix, draw the information flow graph. <table border="1"><tr><th><div>Object ↓ Domain</div></th><th>File-1</th><th>File-2</th><th>File-3</th><th>File-4</th></tr><tr><td>D1</td><td>read write</td><td>read</td><td>read</td><td>read</td></tr><tr><td>D2</td><td>read</td><td>write</td><td>--</td><td>execute</td></tr><tr><td>D3</td><td>write</td><td>--</td><td>write</td><td>execute</td></tr></table> <p style="text-align: center;">Access Matrix</p>	<div>Object ↓ Domain</div>	File-1	File-2	File-3	File-4	D1	read write	read	read	read	D2	read	write	--	execute	D3	write	--	write	execute	[10]
	<div>Object ↓ Domain</div>	File-1	File-2	File-3	File-4																		
	D1	read write	read	read	read																		
	D2	read	write	--	execute																		
D3	write	--	write	execute																			
CO-4; SO-6; BL-4	b.	Justify the need for Database security and Explain the database security lifecycle.	[10]																				
Q5 CO-2; SO-4; BL-1	a.	Explain the different models of Multics protection system in detail?	[10]																				
CO-4; SO-6; BL-3	b.	Apply data risk assessment for a Cloud based Financial application by defining the scope of the application.	[10]																				
Q6 CO-3; SO-4; BL-2	a.	Discuss various Windows vulnerabilities	[10]																				
CO-4; SO-4; BL-2	b.	Explain Buffer Overflow attack with an example? Discuss the ways to prevent and mitigate an Buffer Overflow attack	[10]																				
Q7 CO-2; SO-6; BL-4	a.	Analyze the properties of a secure operating system that satisfies reference monitor concept	[10]																				
CO-2; SO-4; BL-1	b.	Write a note on Security Kernel	[10]																				