

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2025

B.Tech-V Semester (CSE/IT)

COURSE CODE (CREDITS): 25B11CI513 (3)

MAX. MARKS: 35

COURSE NAME: Cloud Computing and Security

COURSE INSTRUCTORS: ARV*

MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	CO	Marks
Q1	(i) A cloud-based healthcare company uses RBAC. After organizational restructuring, several employees now have access to medical records even though they no longer require it for their new roles. What access control problem is occurring, and which strategy should be implemented to prevent it? (ii) A SaaS provider experiences a security incident where an attacker gains access to an employee's password through phishing, giving them access to confidential customer data. Which access control mechanism could have minimized the impact, and why?	3	5
Q2	(i) Why is multi-factor authentication (MFA) more secure than single-factor authentication? (ii) Why Secure Remote Access is Important? Discuss the various Key Secure Remote Access Technologies	3	5
Q3	A multinational company has expanded remote work capability after the pandemic. Currently, they use a traditional IPsec VPN solution. As the number of remote employees grows, IT notices: <ul style="list-style-type: none"> • Reduced network performance • Increased latency • Users accessing more internal resources than necessary • Difficulty managing access rights for temporary staff and contractors The security team is considering shifting to a Zero Trust model. What are the primary limitations of the current VPN approach, and how would adopting ZTNA address these challenges?	4	5
Q4	(i) A company report: Breach likelihood with VPN per year: 12%, Breach likelihood with ZTNA per year: 2.5%. Calculate the relative improvement in security when switching to ZTNA. (ii) A VPN tunnel forces all traffic through the corporate datacentre, consuming 250 GB/day. ZTNA uses direct-to-cloud routing,	4	5

	reducing traffic to 95 GB/day . By what percentage is network load reduced using ZTNA?		
Q5	<p>(i) Why are Type 1 hypervisors considered more secure than Type 2? What is VM escape, and why is it a security concern?</p> <p>(ii) An organization uses VirtualBox for initial development, then shifts to VMware ESXi in production. Explain why.</p>	4	5
Q6	<p>(i) A Type 1 hypervisor setup improves CPU utilization from 35% to 82% using virtualization. Calculate the improvement percentage.</p> <p>(ii) A VM consumes 450 IOPS (Input/Output operations/sec). The hypervisor supports a maximum of 5000 IOPS. How many such VMs can run before performance degrades?</p> <p>(iii) A cloud provider charges:</p> <ul style="list-style-type: none"> • \$0.05 per vCPU/hour • \$0.01 per GB RAM/hour <p>A VM has 4 vCPUs and 16 GB RAM and runs for 200 hours.</p> <p>Calculate the cost.</p> <p>(iv) A physical host uses hypervisor-based consolidation to replace 25 physical servers. If maintaining each physical server costs \$850/year, calculate annual savings.</p> <p>(v) A server has 128 GB RAM. The admin wants to run virtual machines with memory allocations:</p> <ul style="list-style-type: none"> • VM1: 24 GB • VM2: 32 GB • VM3: 20 GB • VM4: 18 GB • VM5: 16 GB <p>Can all VMs run simultaneously without memory overcommitment and why?</p>	4	10