

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2024

B.Tech-5 Semester (CSE/IT)

COURSE CODE (CREDITS): 20B1WCI532 (2)

MAX. MARKS: 25

COURSE NAME: Cloud Computing: Concepts, Technology & Architecture

COURSE INSTRUCTORS: Mr. Aayush Sharma & Ms. Nitika Ratan

MAX. TIME:

1 Hour 30 Minutes

*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	<p>Consider a scenario where Company Y enters into a service-level agreement (SLA) with a cloud provider. The terms of the SLA are as follows:</p> <p>Availability Guarantee: 99.7% over a 90-day period.                      Service Period: 90 days.                      Maximum Service Hours per Day: 20 hours.                      Cost: USD 60,000 per day.                      Service Credits: Customers receive credits if the availability does not meet the SLA.                      The monthly uptime and corresponding service credits are defined as:</p> <table border="1"> <thead> <tr> <th>Monthly Uptime Percentage</th> <th>Service Credit</th> </tr> </thead> <tbody> <tr> <td>&lt;99.7%</td> <td>10%</td> </tr> <tr> <td>&lt;99.0%</td> <td>20%</td> </tr> <tr> <td>&lt;98.5%</td> <td>30%</td> </tr> <tr> <td>&lt;98.0%</td> <td>40%</td> </tr> </tbody> </table> <p>During the service period, Company Y experienced seven outages as follows:</p> <p>5 hours 10 minutes                      3 hours 50 minutes                      2 hours 30 minutes                      1 hour 45 minutes                      4 hours 20 minutes                      2 hours 15 minutes                      30 minutes</p> <p>Based on the above information, calculate the following:</p> <p>1) Total outage time in minutes.</p>	Monthly Uptime Percentage	Service Credit	<99.7%	10%	<99.0%	20%	<98.5%	30%	<98.0%	40%	[CO-2] [CO-3]	[5]
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	<p>2) Total availability in minutes over the service period.</p> <p>3) The total cost of the service if SLA terms are violated.</p> <p>4) The service credits based on the monthly uptime table.</p> <p>5) The effective cost payable after applying the service credits.</p>		
Q2	<p>Explain the role of each of the following cloud mechanisms and discuss how they contribute to the reliability, performance, and cost-effectiveness of cloud services with proper diagrams:</p> <p>1) Automated Scaling</p> <p>2) Load Balancer</p>	[CO-1] [CO-2]	[5]
Q3	<p>Propose a system architecture using SOA, identifying key components required for its implementation. Explain how these components work together in a multi-tenant environment.</p>	[CO-1] [CO-3]	[5]
Q4	<p>Compare the functionalities of a monitoring agent, a resource agent, and a polling agent.</p>	[CO-1]	[5]
Q5	<p>A company is running a datacenter and is focused on improving its energy efficiency. You are tasked with analyzing its current power consumption and proposing ways to improve it.</p> <p>Given:</p> <ul style="list-style-type: none"> <li>• The datacenter has <b>500</b> servers, each consuming <b>450</b> watts of power.</li> <li>• The Power Usage Effectiveness (<b>PUE</b>) of the datacenter is currently <b>1.8</b>.</li> <li>• The datacenter operates <b>24</b> hours a day and <b>365</b> days a year.</li> <li>• Electricity costs <b>Rs.0.10</b> per kWh.</li> </ul> <p>Questions:</p> <ol style="list-style-type: none"> <li>1. Calculate the total energy consumption of the servers (<b>in kilowatt-hours, kWh</b>) over a year.</li> <li>2. Calculate the total energy consumption of the datacenter (including cooling, lighting, etc.) using the <b>PUE value</b>.</li> <li>3. Determine the annual electricity cost for the datacenter.</li> <li>4. Propose a way to reduce the <b>PUE to 1.5</b> and calculate the new annual electricity cost after this improvement.</li> <li>5. How much money would the company save annually by improving the <b>PUE from 1.8 to 1.5</b>?</li> </ol>	[CO-2] [CO-4]	[5]