

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2023

B.Tech-V Semester (CSE/IT/ECM)

COURSE CODE (CREDITS): 20B1WCI532 (02)

MAX. MARKS: 35

COURSE NAME: Cloud Computing: Concepts, Technology & Architecture

COURSE INSTRUCTORS: ARV

MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

(b) Marks are indicated against each question in square brackets.

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

1. Describe the key steps/algorithm involved in implementing word count using Map Reduce. How does Map Reduce ensure fault tolerance in the word count example?
[CO-3][5]
2. Discuss the several phases of SecSDLC. Write down the key components of data centre physical security.
[CO-4][6]
3. What are some prominent cloud-based messaging standards used in modern communication systems? How do cloud communications adhere to security standards such as OAuth and OpenID Connect?
[CO-4][6]
4. Mention the twelve factor methodology that can be applied to the development of cloud apps written in any programming language.
[CO-4][6]
5. Solve the following questions: [CO-2,3]
 - a. A physical server in a data center has 128 GB RAM and hosts 16 VMs. If each VM is allocated an equal amount of RAM, how much RAM does each VM get? [1]
 - b. If a hypervisor introduces a 5% overhead on CPU utilization, and a VM uses 90% of the CPU resources allocated, what is the effective CPU utilization within the VM? [1]
 - c. A cloud provider offers a virtual machine (VM) instance with 4 CPU cores and charges \$1 per CPU-hour. If a user runs this VM continuously for 15 days and utilizes 75% of CPU capacity on average, what will be the total cost? [2]

- d. A company is planning to use virtualization to consolidate servers. If 20 physical servers with 16 GB RAM each are consolidated into VMs on three physical servers, each with 64 GB RAM, how much total RAM is saved after consolidation? [2]
- e. A Hadoop cluster has 20 nodes, and each node has a processing capacity of 100 tasks per hour. If a Map Reduce job requires 2000 tasks to be processed and the job is executed on this cluster, how long will it take to complete the job? [3]
- f. A Hadoop cluster consists of 10 nodes, each with 4 CPU cores and 16 GB RAM. If a Map Reduce job is executed on this cluster, and the job requires 512 MB of RAM per task and utilizes 80% of CPU cores, how many tasks can run concurrently in this scenario? [3]

JUIT TEST-3 EXAMINATION- DEC 2023