



**V SEMESTER B.TECH. (INFORMATION TECHNOLOGY/COMPUTER AND  
COMMUNICATION ENGINEERING)**

**END SEMESTER EXAMINATIONS, NOVEMBER 2019**

**SUBJECT: PROGRAM ELECTIVE-1 CLOUD COMPUTING [ICT 4017]**

**REVISED CREDIT SYSTEM**

**(27/11/2019)**

Time: 3 hours

MAX. MARKS: 50

**Instructions to Candidates:**

- ❖ Answer **ALL** the questions.
- ❖ Missing data may be suitably assumed.

- 1A.** Explain the detailed steps involved in configuring Virtual Local Area Network (VLAN). Draw a neat diagram for the scenario given below to demonstrate VLAN trunking. Consider a scenario where an organization has three physical servers with the hypervisor. Virtual machine VM<sub>1</sub>, VM<sub>2</sub>, and VM<sub>3</sub> reside in a physical server PS1, virtual machine VM<sub>4</sub> and VM<sub>5</sub> are hosted on physical server PS2 and virtual machine VM<sub>6</sub> is placed on physical server PS3. Each physical server has a virtual switch. These virtual switches are connected to a common physical switch to enable network traffic flow between them. VMs are connected to the respective virtual switches. The organization has to set up four functional groups, each group with a unique VLAN ID.
- Production group: Includes VM<sub>1</sub>, VM<sub>4</sub>, and VM<sub>6</sub>  
 Sales group: Includes VM<sub>2</sub>, VM<sub>3</sub>, and VM<sub>6</sub>  
 Service group: Includes VM<sub>2</sub> and VM<sub>5</sub>  
 Finance group: Includes VM<sub>3</sub> **5**
- 1B.** What are the IT challenges that made organizations think about cloud computing? **3**
- 1C.** Explain the characteristics of cloud computing defined by the NIST standard. **2**
- 2A.** What are the single point of failure that needs to be identified by the administrator for effective business continuity in a cloud platform? Also, with a neat diagram, explain different types of compute based virtual machine replication methods. **5**
- 2B.** Two hosts transfer the data with an average rate of 12 Kbps bandwidth at 10 AM. After one minute bandwidth is increased more than an average rate to 20 Kbps. Further at 10:12 AM for three minutes bandwidth at peak 30 Kbps. What is the burst size at 10:14 AM? So how long the burst can stay if the data rate is 3.0 Kbps? **3**
- 2C.** How extra-territorial access and data residency issues affect cloud data? **2**
- 3A.** Write a Python/Java program and explain the handlers to display the welcome message along with current time for developing and hosting a web application in Google App Engine. Such deployed application should accept the connection only from \*.edu **5**

- 3B. List the key components of Physical to Virtual Machine converter. With the help of neat diagrams, explain the working of the cold conversion process. 3
- 3C. Explain the significance of the following two components in CloudSim.  
 i) Cloudlet  
 ii) DatacenterBroker 2
- 4A. What are the key measures for hardening a virtual machine, guest operating system and application in the cloud platform? 5
- 4B. Consider the following binary matrix, which represents user-permission assignments, where  $U_i$  and  $P_j$  represent user and permission respectively. Apply the simple role mining algorithm to generate RBAC configuration.
- | Assignments | $P_1$ | $P_2$ | $P_3$ | $P_4$ | $P_5$ | $P_6$ | $P_7$ | $P_8$ | $P_9$ | $P_{10}$ |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| $U_1$       | 1     | 1     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0        |
| $U_2$       | 1     | 0     | 1     | 0     | 0     | 0     | 0     | 0     | 0     | 1        |
| $U_3$       | 1     | 0     | 1     | 0     | 0     | 0     | 0     | 0     | 0     | 0        |
| $U_4$       | 0     | 0     | 0     | 0     | 0     | 0     | 1     | 1     | 0     | 0        |
| $U_5$       | 0     | 0     | 0     | 0     | 0     | 1     | 1     | 1     | 1     | 0        |
| $U_6$       | 0     | 0     | 1     | 1     | 1     | 0     | 1     | 1     | 0     | 0        |
| $U_7$       | 1     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0        |
| $U_8$       | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 1        |
- 3
- 4C. Identify and explain any two application migration strategies in the cloud adoption phases. 2
- 5A. What is the significance of virtual infrastructure management? With a suitable example, explain the key functions of unified management software to create cloud services. 5
- 5B. Explain the significance and features of Enterprise service bus in service-oriented architecture. 3
- 5C. List out any four dimensions, whose main focus is to protect cloud networks. 2