Roll no.: _____ Name: _____ Signature_____

**B. Tech. (ICT): Semester VII – MTech (CSE): Semester III**

**Course: 'Cloud Computing'**
**End-Semester Exam (Marks: 30, Weight: 30%)**

**Wednesday, December 8, 2021, Time: 15:00 – 16:30 (one hour thirty minutes)**

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**Instructions**

- **Write all your answers in the box given on these papers only and you should return question paper at the end of your exam. You can use any available space in this question paper for rough work, if required.**
- **Some questions have multiple correct answers and you MUST provide all correct answers.**
- **Your answers should be precise and not vague**

| Answers | Q – I [15] | Q - II [15] | Total Marks [30] |
|---|---|---|---|
| Correct | | | |
| Marks scored | | | |

**[Q.1] Write answers to this question in the table given on page number 4** [15]

1. HTTP is

A. Connection Less B. Connection Based C. Stateful D. Stateless E. Secured

2. In case of RPC, the stub takes care of

(a) locating server (b) formatting the data appropriately
(c) forwarding a response as return parameter of the procedure invoked by the client
(d) all of the above

3. Which of the following statements are true?

(a) Middleware offers programming abstraction that hides some of the complexities of building a distributed application.
(b) Both static and dynamic type of binding can be done in RPC
(c) In asynchronous RPC, the stub has two entry points to invoke the procedure.
(d) None of the above

4. What will be the default output of rpcgen? (Select all the answers applicable)

A. A header file of definitions common to the server and the client
B. A set of XDR routines that translate each data type defined in the header file
C. A stub program for the server
D. A stub program for the client

5. Which of the following features are essential to develop Distributed Applications?

A. Transaction Management B. Resource Pooling C. Threading D. All of above

6. Which is the correct answer for Service-Oriented Architecture?

(a) It is loosely coupled, (b) It is protocol independent,
(c ) It is standards-based, (d ) all of above

7. Which type of virtualization needs to modify the guest operating systems?

A. Full Virtualization B. Para-virtualization C. Emulator D. None of above

8. Which of the following justify the statement – "Linux based Clusters are good".

A. Low initial implementation cost
B. Free Software: Linux, GNU, MPI, PVM
C. Scalability: can grow and shrink
D. All of above

9. Which of the following are good programming paradigm to develop software code for cluster computing?

A. Shared memory model: Thread, OpenMP and Intel Threads
B. Message passing model: MPI and PVM
C. Data parallel model: HPF (High Performance Fortran)
D. All of above

10. What does para-virtualization provide for substantial OS modifications in user applications?

A. Kernel recompilation B. Micro-Kernel
C. Special APIs or Hyper Calls D. All of Above

11. Which service in Grid Computing provides information about the available resources within the grid and their status.

A. Broker B. Virtual Organization
C. Co-allocation D. Scheduling

12. Which is/are true regarding cloud computing?

(a) It does not provide ubiquitous access
(b) It provides on-demand network access
(c) Resources can be released with no management effort
(d) None of these

13. Which are essential characteristics of cloud computing?

(a) On-demand self service (b) Resource pooling
(c) Rapid elasticity (d) None of these

14. Amazon Web Services is an example of

(a) SaaS (b) PaaS
(c) IaaS (d) None of these

15. Email service on cloud is an example of

(a) SaaS (b) PaaS (c) None of these

16. What is the disadvantage of cloud computing?

(a) It requires continuous internet connection.
(b) It does not support group collaboration.
(c) It provides limited storage.
(d) None of these.

17. Virtual machines are example of

(a) SaaS (b) PaaS (c) IaaS (d) None of these

18. Adding more resources to a single computation unit is known as

(a) Vertical scale up (b) Horizontal scale out (c) None of these

19. Services to support Database Management System in any cloud-based system should be part of

(a) Software as a Service (SaaS) (b) Platform as a Service (PaaS)
(c ) Infrastructure as a Service (IaaS) (d ) Enterprise as a Service (EaaS)

20. Which among the following is/are IaaS?

(a) Load balancer (b) Data storage (c) CRM (d) Office suites

21. Which of these is/are managed by the user in PaaS?

(a) Data (b) Application (c) Runtime (d) All of these

22. Metrics used for monitoring and auditing of SLA guarantees is/are

(a) Throughput (b) Availability
(c) Reliability (d) All of above

23. When load decreases, VM management can be done by

(a) Shutdown unused nodes (b) Live migration of VMs to more utilized nodes (c) None of these

24. Which of the following is/are the performance metrics for resource management?

(a) Control overhead (b) Ease of deployment (c) Delay (d) None of these

25. In mobile cloud computing all the computations are done at

A Cloud data center B Mobile phone C. Middleware D. None of above

26. The key challenges for Mobile Cloud Computing are

(a) Low bandwidth (b) Service availability
(c) Heterogeneity (d) None of these

27. Security responsibilities of a SaaS cloud provider is typically upto which level?

a) Hypervisor b) Application
c) Solution Stack d) Operating System

28. Virtual machine can't be migrated from one physical server to another physical server.

(a) True (b) False

29. SaaS is useful in case of applications where extremely fast processing of real time data is needed.

(a) True (b) False

30. VM image should be as small as possible to reduce network latency.

(a) True (b) False

31. Two CPU intensive VMs with isolated CPU resources on the same physical server will incur performance interference with each other. Is this statement True or False?

(a) True (b) False

**Note: Write answers of question – 1 here only and write all correct options:**

| Question | Answer | Question | Answer |
|---|---|---|---|
| 1 | | 17 | |
| 2 | | 18 | |
| 3 | | 19 | |
| 4 | | 20 | |
| 5 | | 21 | |
| 6 | | 22 | |
| 7 | | 23 | |
| 8 | | 24 | |
| 9 | | 25 | |
| 10 | | 26 | |
| 11 | | 27 | |
| 12 | | 28 | |
| 13 | | 29 | |
| 14 | | 30 | |
| 15 | | 31 | |
| 16 | | | |

Section II

[A] Write answers of following qquestions in one or two sentences [Attempt any ten] [5]

1. What is the "equivalence" property of a virtual machine monitor?

2. What are shadow page tables?

3. What is hybrid virtual machines (HVM)?

4. What is hypercall?

5. What command is used to list the virtual machines available on the XenServer?

6. What is binary translation?

7. What is the major difference between emulation and virtualization?

8. What is Ring Aliasing?

9. What is VMCS?

10. What is the purpose of dd command on unix?

11. What is the specific role of 'Domain 0' in Xen Architecture?

[B] Write answers to following questions in 100 to 200 words [Attempt any five]: [10]

1. Differentiate among emulation, para-virtualization, full-virtualization and hardware assisted virtualization. Also, provide name of at least one example tool using each one of these techniques.

2. What equation is useful for web-based businesses while taking cloud adoption decision? Describe with an example of a startup considering choosing between onsite vs cloud infrastructure. A comparison of different costs involved may be used to explain the adoption decision.

3. What are the formal properties of VMM as per Goldberg and Popek? Why are these properties considered as essential requirements? Why do third generation architectures do not follow these properties completely?

4. Virtualization comes with lot of features but also brings performance overhead. What are the overheads in CPU scheduling, Memory allocation and the disk allocation in virtualized environment in comparison with non-virtualized environments?

5. What are various steps of Live Migration of VMs? What is specific hardware requirements to achieve a rapid migration (in < 1 second)? What is managed migration and how does it differ from self-migration?

6. What are different levels of scheduling in virtualization? How is it different than scheduling in non-virtualized environments?

7. How is memory virtualization implemented in virtualized environments? I/O devices have multiple issues related to heterogeneity, device drivers and control. How is device I/O handled in hypervisors such as Xen?

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