

Q. P. Code: 11246

(Time: 2 $\frac{1}{2}$ hours)

[Marks: 60]

Please check whether you have got the right question paper.

- N. B.:
- (1) All questions are compulsory.
 - (2) Make suitable assumptions wherever necessary and state the assumptions made.
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 - (4) Numbers to the right indicate marks.
 - (5) Draw neat labeled diagrams wherever necessary.
 - (6) Use of Non-programmable calculator is allowed.

1. **Attempt any two of the following:** 12
 - a. Write any two application that are benefited from wireless networks and mobile Communications.
 - b. What is the purpose of Antennas? Explain different types of Antennas.
 - c. Explain: i. hidden and exposed terminals ii. Near and far terminals
 - d. With neat diagram explain advanced phase shift keying.

2. **Attempt any two of the following:** 12
 - a. With suitable diagram explain the functional architecture of GSM.
 - b. Why handover is required in cellular system. Write four possible scenarios in GSM.
 - c. With neat diagram explain the following terms
 - i. inclination angle
 - ii. elevation angle
 - iii. footprint
 - d. Looking at the HLR/VLR database approach used in GSM – how does this architecture limit the scalability in terms of users, especially moving users?

3. **Attempt any two of the following:** 12
 - a. With suitable example explain the cyclic repetition of data in broadcast systems.
 - b. Explain the DAB frame structure.
 - c. Explain the protocol architecture of IEEE 802.11 protocol.
 - d. Write a short note on HIPERLAN.

4. **Attempt any two of the following:** 12
 - a. Write several reasons which led to the development of WATM.
 - b. Explain how packets are delivered to and from the mobile node.
 - c. Explain the registration process of a mobile node via the foreign agent or directly with the home agent.
 - d. Write a short note on mobile quality of service.

5. **Attempt any two of the following:** 12
 - a. How does I-TCP work? Write the disadvantages of I-TCP.
 - b. Explain the working of snooping TCP. Write its advantages.
 - c. How little Work system works? Explain.
 - d. What are the various components of WAP? Write the purpose of each.

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1. Attempt any two of the following: 12

- a. Explain the following:
 - i) Equal cost load sharing
 - ii) Non-equal load sharing
 - iii) Recursive table lookup
- b. Explain the problem of instability in RIP. How is it overcome?
- c. What is load balancing? What are the different types of load balancing?
- d. Explain different functions of EGP and EGP message types.

2. Attempt any two of the following: 12

- a. What are designated routers and backup designated routers? Explain the election procedure of designated and backup designated router. Which type of networks support and which type of networks do not support election of designated and backup designated routers? Why?
- b. What are stubby areas? What are the features of stubby area? What are types of stubby areas?
- c. How is the best OSPF route selected? How are metric and SPF calculated? Explain.
- d. Explain the concept of OSPF virtual link.

3. Attempt any two of the following: 12

- a. What is IP Server level agreement? Explain the concepts of IP service level agreement.
- b. What are the two classes of BGP neighbours? Explain.
- c. Explain the BGP best path algorithm.
- d. Explain the concept of IPv6 tunnelling encapsulation and decapsulation.

4. Attempt any two of the following: 12

- a. What is Etherchannel? What are the protocols involved in it? Explain.
- b. What is a summary route? In the context of static routing, how are summary routes useful? Explain with suitable examples.
- c. Discuss the use of route filtering in network design and different techniques to apply route filtering in various protocols.
- d. With the help on a neat diagram explain Metro-Ethernet Architecture.

5. Attempt any two of the following: 12

- a. Enumerate the benefits and drawbacks of Layer 3 access layer designs.
- b. Discuss High availability and failover times in data centers.
- c. Explain the SAN protocol stack.
- d. Explain IPSec virtual private networks.

M.Sc. 3-3 / Cloud Computing / 69

Q. P. Code: 50019

(2 ½ hrs)

Max Marks: 60

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(5) Draw neat labeled diagrams wherever necessary.
(6) Use of Non-programmable calculators is allowed.

- Q1 Answer any two of the following:** 12
- a. Why cloud computing demands high-throughput computing instead of high-performance computing? 6
 - b. Explain how distributed systems emphasize high degree of parallelism. 6
 - c. Illustrate the architectures of the virtual machines (VM) configurations with a labeled diagram. 6
 - d. What are the various types of losses incurred due to system attacks and network threats? 6
- Q2 Answer any two of the following:** 12
- a. Discuss the various design issues in developing and using a cluster. 6
 - b. What are the advantages and disadvantages of Operating System(OS) Extensions in OS-level virtualization? 6
 - c. Enumerate on the design objectives for cloud computing. 6
 - d. Explain layered architectural development of the cloud platform with a labeled diagram. 6
- Q3 Answer any two of the following:** 12
- a. Explain functional modules and applications of Google App Engine. 6
 - b. Discuss how data coloring technique is used to preserve data integrity and user privacy. 6
 - c. What is Hadoop? Explain how Hadoop implements MapReduce with HDFS. 6
 - d. Illustrate MapReduce functions with a word-count problem. 6
- Q4 Answer any two of the following:** 12
- a. With the help of diagram, explain the architecture of Google File System(GFS). 6
 - b. Explain the following: 6
 - i) Amazon Elastic Block Store.
 - ii) Amazon SimpleDB service.
 - c. What are the three types of capabilities offered by Aneka to build, accelerate and manage clouds and its applications? 6
 - d. Draw a labeled diagram of OpenNebula architecture and explain its main components. 6
- Q5 Answer any two of the following:** 12
- a. Explain how system throughput and efficiency is evaluated for HPC and HTC systems. 6
 - b. What is Magellan? What are the varieties of research issues these systems address? 6
 - c. What is Twitter? With the help of a neat diagram, explain the architecture of Twitter and access protocol sequence control. 6
 - d. List and explain the properties of social network graph. 6

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1. **Attempt any two of the following:** 12
 - a. Enumerate the highlights of complex distributed system installations.
 - b. Write a short note on quality of service in distributed systems.
 - c. What are different types of models for developing distributed systems? Explain each model in brief.
 - d. Explain the failure model of distributed system in detail.

2. **Attempt any two of the following:** 12
 - a. What is Network Address Translation? Explain with an example.
 - b. Explain the IEEE 802.15.1 bluetooth wireless personal area network.
 - c. What is CORBA's common Data Representation? Explain.
 - d. What is network virtualization? What are overlay networks? What are advantages and disadvantages of overlay networks?

3. **Attempt any two of the following:** 12
 - a. What are the different styles of exchange protocols? Explain.
 - b. What are publish subscribe systems? What are their applications? Explain with an example.
 - c. Compare message passing and distributed shared memory approaches.
 - d. What is Service-Oriented Architecture? Explain.

4. **Attempt any two of the following:** 12
 - a. Explain different directory services.
 - b. Explain the Berkley algorithm.
 - c. Explain the ring based algorithm for mutual exclusion.
 - d. Define consensus problem. What are the requirements of consensus algorithm?

5. **Attempt any two of the following:** 12
 - a. How are transactions recovered in distributed systems? What are the tasks of recovery manager.
 - b. What are quorum consensus methods? Explain.
 - c. What are the issues to be dealt with in the design of discovery service? Explain.
 - d. Explain directed diffusion.

MLSCIT/

(Time: 2 $\frac{1}{2}$ hours)

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1. Attempt any two of the following: 12
- a. Explain the function of different components of an embedded system.
 - b. Explain internal and external communication interface.
 - c. What is the requirement of the firmware for embedded systems? Explain the process of embedded firmware development.
 - d. Give brief idea of different phases of EDLC.
2. Attempt any two of the following: 12
- a. Explain the fundamental issues in hardware and software co-design.
 - b. Explain High level language to machine language conversion process.
 - c. What are different processor IC Packages available.
 - d. Explain Task Scheduling for embedded systems performed by embedded systems.
3. Attempt any two of the following: 12
- a. What are the factors that should be considered when designing a memory map for an embedded system?
 - b. Explain Read and Write operation of DRAM with timing diagram.
 - c. Explain an Associative Mapping Cache implementation.
 - d. What do understand by memory testing? Explain RAM and ROM memory testing methods.
4. Attempt any two of the following: 12
- a. How C/C++ is useful in embedded system programming? State the advantages of high-level programming for embedded system.
 - b. Illustrate the use of Infinite loops with example in embedded system design.
 - c. Explain the steps to use a function in an embedded program. Explain reentrant function.
 - d. Explain with example multiple function calls in the main program.
5. Attempt any two of the following: 12
- a. What are the open standards, frameworks and alliances presents in the market?
 - b. Explain the function of each bit of Status register of PIC microcontroller.
 - c. Draw the block diagram of AVR microcontroller and explain each unit.
 - d. Explain different processing modes of ARM.

(Time: $2\frac{1}{2}$ hours)

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1. **Attempt any two of the following:** 12
a. What is data mining? What are the basic data mining models? Explain.
b. Define mean, median and mode. Compute mean, median and mode for (15, 10, 18, 20, 28, 32)
c. Explain different categories of knowledge representation.
d. What are Rough sets? Explain.
2. **Attempt any two of the following:** 12
a. What is noisy data? Explain the various data smoothing technique used to handle noise.
b. Discuss the various issues to consider during data integration.
c. State the relationship between frequent patterns and association rules.
d. Suppose a group of 12 sales price records has been recorded as follows:
5, 10, 11, 13, 15, 35, 50, 55, 72, 92, 204, 215.
Partition them into three bins by each of the following methods
i) equal- frequency ii) equal-width iii) clustering
3. **Attempt any two of the following:** 12
a. Give comparison between supervised learning and unsupervised learning.
b. Explain how support vector machines helps in classification.
c. What is boosting? State why it may improve the accuracy of decision tree induction.
d. Explain training Bayesian Belief Network.
4. **Attempt any two of the following:** 12
a. Write an algorithm for k-medoids partitioning algorithm.
b. Explain Divisive hierarchical clustering method.
c. State the relationship of binary variable with nominal variable.
d. Describe the following approaches to clustering: density-based methods and model-based methods. Give examples for each.
5. **Attempt any two of the following:** 12
a. What is Graph mining? Explain the Apriori-based approach algorithm.
b. Write a short note on text mining.
c. What is Information Retrieval? How can one assess the accuracy and correctness of the system?
d. State differences between Multimedia and Spatial data mining.

(Time: $2\frac{1}{2}$ hours)

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1. Attempt **any two** of the following:

- Explain advanced phase shift keying. 12
- Discuss any two applications where wireless technology can be used.
- Write any two scenario where MAC scheme from wired network fails in a wireless.
- Explain the working of classical and slotted aloha.

2. Attempt **any two** of the following:

- With neat diagram explain the following terms 12
 - Inclination angle
 - Elevation angle
 - Footprint
- Write a short note on security in GSM.
- Write the basic reasons for handover of cellular system.
Write four possible scenarios in GSM.
- List and explain different types of satellite orbits.

3. Attempt **any two** of the following:

- What is the purpose of Multimedia Object Transfer Protocol? 12
- With neat diagram explain the DAB frame structure.
- Write the advantages of WLAN.
- Write a short note on Hiperlan.

4. Attempt **any two** of the following:

- Write a short note on mobile quality of service. 12
- List various entities involved in mobile IP. Explain in short.
- Write a short note on broadband radio access networks (BRAN).
- Explain dynamic source routing.

5. Attempt **any two** of the following:

- Write the working of snooping TCP. 12
- Write the advantages and disadvantages of M-TCP.
- Write a short note on Little Work.
- Explain the working of Wireless Datagram Protocol.

M.Sc.

21

(2½ Hours)

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1. Attempt any two of the following: 12
- a. Define Distributed system and state the different type of application domains in distributed systems.
 - b. Write a short note on resource sharing in distributed systems.
 - c. Explain the failure model and security model of distributed systems.
 - d. Write a short note on Architectural Model and Interaction Model of distributed systems.
2. Attempt any two of the following: 12
- a. What is Network Address Translation? Explain with an example.
 - b. What is mobile IP? How does Mobile routing take place? Explain in detail.
 - c. What is network virtualization? What are overlay networks? What are advantages and disadvantages of overlay networks?
 - d. What is marshalling? Define object serialization. How does Java serialize objects?
3. Attempt any two of the following: 12
- a. Explain the request reply protocol along with its operations and message structure.
 - b. What is Remote Procedure Call? Discuss the design issues for RPC.
 - c. What are publish subscribe systems? Explain the characteristics of publish subscribe systems.
 - d. Explain Web Service Description Language Request and Reply messages.
4. Attempt any two of the following: 12
- a. Explain the terms:
i) Clocks ii) Clock Skew iii) Clock Drift iv) Co-ordinated Universal Time
 - b. Explain Cristian's method for synchronizing clocks.
 - c. Explain FIFO ordering of multicast messages.
 - d. Write and explain the algorithm for consensus in synchronous system.
5. Attempt any two of the following: 12
- a. Explain two-phase commit protocol for nested transactions.
 - b. What is distributed deadlock? Explain with example.
 - c. Explain the passive replication model and the active replication model for fault tolerance.
 - d. What is location sensing? Discuss different location sensing technologies.

MSc

84

(2½ Hours)

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1. **Attempt any two of the following:** 12
 - a. Explain the risk management hierarchy with neat diagram.
 - b. Explain proactive approach to risk management. Write benefits over reactive approach.
 - c. Write a short note on OCTAVE.
 - d. Explain any two risk models.

2. **Attempt any two of the following:** 12
 - a. Write various policies based on protocols.
 - b. What things should be considered in the planning stages of a Web server?
 - c. Explain the following firewall technologies.
 - i. Packet Filtering
 - ii. Stateful inspection
 - iii. Application firewall
 - d. Explain the anomaly-based detection methodology.

3. **Attempt any two of the following:** 12
 - a. Write the challenges in log management.
 - b. List and explain various forms of malware.
 - c. Write a note on sandboxing.
 - d. Explain the two basic data structures used in PKIs.

4. **Attempt any two of the following:** 12
 - a. Write the phases of a disaster recovery plan.
 - b. Explain the various backup and recovery techniques for applications.
 - c. Explain the system-level, application level and user audit trails.
 - d. Write the principles of Auditing.

5. **Attempt any two of the following:** 12
 - a. Write a note on forensic toolkit.
 - b. Explain the two techniques used to copy files from media.
 - c. With neat diagram explain the forensic process.
 - d. What is the functionality of NMAP tool?

max (1)

22

(Time: 2 $\frac{1}{2}$ hours)

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1. **Attempt any two of the following:** 12
 - a. What is fundamental test process? Discuss the major tasks of test planning and control.
 - b. How to evaluate Exit Criteria. Discuss in detail.
 - c. What are safety-critical systems? List all the characteristics and discuss the different aspects that can be implemented in such systems?
 - d. What are the activities to be carried out during test closure?

2. **Attempt any two of the following:** 12
 - a. Explain the terms Test Policy, Test strategy and FMEA.
 - b. What is test estimation? State all the factors that should be considered in test estimation that can influence cost, effort, and duration of the testing activities.
 - c. Explain with examples the four categories which determine the cost of quality.
 - d. Explain failure mode and effect analysis.

3. **Attempt any two of the following:** 12
 - a. What is dynamic analysis? Discuss the benefits and limitations of dynamic analysis.
 - b. What are software attacks? Explain with examples.
 - c. Explain the terms memory leak detection, wild pointers and call graph.
 - d. What are the different types of specification based testing techniques? Explain each in detail.

4. **Attempt any two of the following:** 12
 - a. What is domain testing? List all the quality attributes for domain testing? Explain each in brief.
 - b. What is a review? Explain formal and informal reviews.
 - c. Define the terms maintainability testing, incident management and root cause analysis.
 - d. Describe incident management? How to communicate the incidents?

5. **Attempt any two of the following:** 12
 - a. What are the risks associated with the introduction of automated testing tool in an organization?
 - b. What are the different automation architectures?
 - c. Explain key-word driven architecture.
 - d. How can performance testing be automated? Explain with examples.

Msc (IT)

80

(2½ Hours)

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1. Attempt any two of the following: 12
a. Discuss the motives, goal and objectives of information security attack.
b. What is vulnerability scanning? What can it detect? What is the benefit of drawing network diagrams?
c. Compare hacking and ethical hacking. What are the effects of hacking on business?
d. Discuss the different IPV6 security threats.
2. Attempt any two of the following: 12
a. Explain the Kerberos authentication process.
b. What is steganography? How does it work?
c. Explain the Infection phase and Attack phase in working of viruses.
d. What are the countermeasures against different types of keyloggers?
3. Attempt any two of the following: 12
a. What is DHCP starvation attack? What is rogue DHCP attack? How can we defend against these attacks?
b. What is Social Engineering? What type of behaviours can be vulnerable to social engineering attacks?
c. What is a botnet? What is the purpose of botnet? Explain the botnet propagation technique.
d. Explain the different techniques of denial of service attacks. What are the symptoms of denial of service attacks?
4. Attempt any two of the following: 12
a. How security misconfiguration can make web applications vulnerable? Explain with examples.
b. Explain the web application vulnerability stack
c. How can SQL injection be used for the following: Transfer database to attacker's machine, Interact with the operating system, Interact with the file system, Network reconnaissance.
d. What are the different authentication attacks that can be launched on wireless networks?
5. Attempt any two of the following: 12
a. What are different types of firewalls? Explain in detail.
b. What is intrusion detection system? How does it work?
c. What is buffer overflow? Explain with example.
d. What is cryptography? Why is it used? What are the objectives of cryptography? Explain the cryptography process.

(Ans 2)

Q.P. Code: 50020

(Time: 2 $\frac{1}{2}$ hours)

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1. **Attempt any two of the following:** 12
 - a. Explain concept of Specialization and Generalization.
 - b. Explain the concept of subclasses and super-classes with respect to EER model.
 - c. Explain the concept of Hierarchy, Lattice and Category with respect to EER model.
 - d. Explain the concept of Weak Entity Set.

2. **Attempt any two of the following:** 12
 - a. Give an account of the Object Oriented concepts with respect to OODBMS
 - b. Explain the concept of object persistence.
 - c. Write short notes on Version and Configurations.
 - d. Write short notes on Type Hierarchies and inheritance.

3. **Attempt any two of the following:** 12
 - a. Explain the concept of user defined ADT.
 - b. Explain the Nested Relational Model.
 - c. Distinguish between OODBMS and ORDBMS.
 - d. What are the implementation issues regarding the support of an extended type system?

4. **Attempt any two of the following:** 12
 - a. Define parallel and Distributed databases. Explain the architectures for parallel databases.
 - b. Explain the different types of fragmentations in a distributed database.
 - c. Write short note on client server architecture with respect to distributed databases.
 - d. Give an account of Concurrency Control based on voting.

5. **Attempt any two of the following:** 12
 - a. Explain the concept of Indexing for Text data
 - b. Define XML. Explain how XML is different from HTML
 - c. Explain in detail the concept of Deductive Databases
 - d. Explain the concept of Temporal Databases.

M. S. C.

Q. P. Code: 11244

(Time: 2 $\frac{1}{2}$ hours)

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1. **Attempt any two of the following:** 12
 - a. Explain High Throughput Computing (HTC) and High Performance Computing (HPC).
 - b. Explain the architecture of Computer Clusters.
 - c. What are Internet clouds? State and explain the different types of deployment models in cloud computing.
 - d. Explain the Parallel and Distributed programming models.

2. **Attempt any two of the following:** 12
 - a. Explain the three classes of computer clusters based on application demand.
 - b. What is Operating System Virtualization? State the advantage of OS Extensions.
 - c. Explain the six design objectives for cloud computing.
 - d. Explain the Platform as service (PaaS) with an example.

3. **Attempt any two of the following:** 12
 - a. With the help of diagram, explain the Amazon web service architecture.
 - b. Explain in detail the provisioning of storage resource in cloud computing systems.
 - c. What is Virtual Machine Template? What does it contain?
 - d. Explain the data and software techniques in cloud environments.

4. **Attempt any two of the following:** 12
 - a. With the help of diagram, explain the Google File System.
 - b. Explain the structure of Google Chubby distributed lock service.
 - c. Explain the Amazon EC2 execution environment and instance type available on Amazon EC2.
 - d. Write a short note on Nimbus Cloud.

5. **Attempt any two of the following:** 12
 - a. Write a short note on online social networking services.
 - b. Explain the graph representation of social network.
 - c. What is Twitter? Explain the architecture of Twitter.
 - d. What is Facebook? Explain the architecture of Facebook.