

(2 ½ Hours)

[Total marks: 60]

- N. B.:** (1) **All questions are compulsory**  
 (2) **Figures to the right indicate full marks.**  
 (3) **Assume additional data if necessary** but state the same clearly.  
 (4) **Symbols have their usual meanings** unless stated otherwise.

- Q.1** Attempt **any two** of the following (12)
- Compare between Implicit and Explicit Human–Computer Interaction. Explain the concept by giving suitable example. 6
  - Write a note on partitioning and distribution of service components with reference to smart devices and services. 6
  - Briefly explain how wearable smart devices and implants help in implementing and experiencing ubiquitous computing. 6
  - Explain the Abstraction and Virtualization approaches for reducing complexity of Ubiquitous System. 6
- Q.2** Attempt **any two** of the following (12)
- What is Mobile Code? What are the benefits and challenges of Code Mobility? Explain with suitable example. 6
  - What is a Smart Card? Briefly explain different types of smart cards. Also list salient features of smart card operating system. 6
  - Compare and contrast a micro-kernel operating system with a monolithic operating System. Which is better for use in hand-held mobile devices? 6
  - Write a note on use of multimodal interface in Ubiquitous system design. 6
- Q.3** Attempt **any two** of the following (12)
- What is the use of Tagging in Ubiquitous system interaction? Discuss any one application of Tagging in detail. 6
  - What are Sensor Net? List and explain various challenges in designing and deploying sensors. 6
  - What is MEMS? List and briefly explain any three applications of MEMS. 6
  - Differentiate between hard RTS and soft RTS. Give example of each type of RTS. 6
- Q.4** Attempt **any two** of the following (12)
- List and explain benefits to using wireless networks for UbiCom Systems. 6
  - What is Ubiquitous Networks? Give examples. Also list various characteristics of such network. 6
  - List and explain important Network Design Issues when designing and operating Ubiquitous systems. 6
  - Briefly describe the network models that can provide universal access to heterogeneous services. 6
- Q.5** Attempt **any two** of the following (12)
- Describe the Holistic Framework for UbiCom Systems. 6
  - Write a note on Hidden UI Via Basic Smart Devices. 6
  - Explain how control systems are important as any other component in designing Ubiquitous systems. List various type of Feedback Control. 6
  - Write a note on Audio and Video (AV) broadcast Content Based Networkss. 6

(2 ½ Hours)

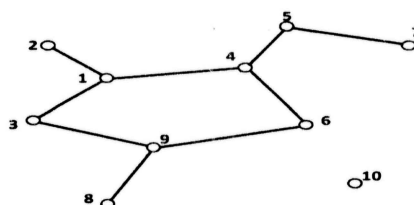
[Total Marks: 60]

- N.B:** (1) All questions are compulsory.  
 (2) Figures to the **right** indicate full marks.  
 (3) **Assume additional data if necessary** but state the same clearly.  
 (4) Symbols have their usual meanings and tables have their usual standard design unless stated otherwise.  
 (5) Use of **calculators** and statistical tables are **allowed**. / If required keep it.

- Q.1 Attempt any two of the following (12)  
 a) What is DFS? Explain its use in social network analysis. 6  
 b) Differentiate between Conventional and social data. 6  
 c) Explain different types of relations in a social network. 6  
 d) Explain the following with example. 6

- i. Path and Walk  
 ii. Egocentric Network.

- Q.2 Attempt any two of the following (12)  
 a) Explain Link analysis in social network with example. 6  
 b) Define centrality. Explain Closeness and Betweenness Centrality with example. 6  
 c) The given graph represents synthetic social network, For this network define and compute following: 6  
 i. Density ii. Degree of centrality iii. Connectedness



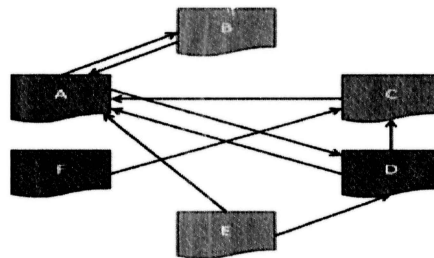
- d) What is cliques? Explain following terms with respect to cliques: 6  
 a) N cliques b) N-clans c) K-cores

- Q.3 Attempt any two of the following (12)  
 a) Explain the concept of equivalence. And explain structural equivalence with example. 6  
 b) Explain how to find Manhattan and Euclidean distance with example. 6  
 c) How to measure the similarity and dissimilarity of binary relation? 6  
 d) Write a short note on Structure hole. 6

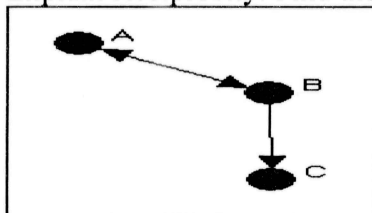
P.T.O

- Q.4 Attempt **any two** of the following (12)
- Explain two-mode factor analysis with example. 6
  - Explain two-mode SVD analysis with example. 6
  - Explain Bi-partite data structure use to store two-mode network information. 6
  - Explain Two mode Core-periphery Analysis. 6

- Q.5 Attempt **any two** of the following (12)
- How adjacency List and Edge List are used to find the relation between the different actors in a social network. 6
  - Find the google page rank of A for given graph. If the value of  $d=0.20$ ,  $PR(B)=0.65$ ,  $PR(C)=1.25$  6



- c) Explain Reciprocity. Find the reciprocity rate of given graph. 6



- d) Write a short note on two mode faction analysis. 6

(2 ½ Hours)[Total Marks: 60]

- N.B:** (1) All questions are compulsory.  
(2) Figures to the **right** indicate full marks.  
(3) **Assume additional data if necessary** but state the same clearly.  
(4) Symbols have their usual meanings and tables have their usual standard design unless stated otherwise.  
(5) Use of **calculators** and statistical tables are **allowed**.

- Q.1 Attempt **any two** of the following (12)  
a) How method implemented on other computer can be used? Why remote methods are required in cloud computing? 6  
b) Explain two reference models for achieving the communication among processes in Cloud computing. 6  
c) Explain reference architecture of Cloud computing Distributed system. 6  
d) How load balancing is achieved in cloud computing? 6
- Q.2 Attempt **any two** of the following (12)  
a) Discuss various types of clouds along with their applications. 6  
b) Describe Web services and mashup architectures for integration over the Internet. 6  
c) What are enterprise components used in Cloud computing? Explain the component view of enterprise architecture. 6  
d) What is a middleware? Explain platform as a service reference model. 6
- Q.3 Attempt **any two** of the following (12)  
a) Why thread programming is necessary in developing clouds? 6  
b) When to use SOAP/WSDL Web service or REST Web service in Cloud based applications? 6  
c) Explain virtualization as a mechanism to achieve multi-tenancy at the system level. 6  
d) What is a task? How it is represented? Explain different categories of task computing. 6
- Q.4 Attempt **any two** of the following (12)  
a) With neat figure explain how InstantApps is deployed and used on the Amazon infrastructure cloud as compared to traditional SaaS-based Dev 2.0. 6  
b) What is Dev 2.0 paradigm? What are its advantages in Cloud computing? 6  
c) How the layered architecture is implemented in practice? Give an example. 6  
d) Explain user interface patterns and basic transactions used in developing enterprise applications. 6
- Q.5 Attempt **any two** of the following (12)  
a) How fault tolerance is useful in cloud computing? 6  
b) Differentiate between computation and communication with context to Cloud computing. 6

2

- c) What is data-intensive computing? Explain different technologies used for data-intensive computing. 6
  - d) What is NoSQL systems? List various implementation of NoSQL. Explain any one in detail. 6
-

(2 ½ Hours)

[Total Marks: 60]

- N.B:**
- (1) All questions are compulsory.
  - (2) Figures to the **right** indicate full marks.
  - (3) **Assume additional data if necessary** but state the same clearly.
  - (4) Symbols have their usual meanings and tables have their usual standard design unless stated otherwise.
  - (5) Use of **calculators** and statistical tables are **allowed**.

- Q.1** Attempt any two of the following. (12)
- a) Explain Information Security Investigation. 6
  - b) Write a note on Satellite Encryption. 6
  - c) Explain different Security System. 6
  - d) Write a note on Spyware & Adware. 6
- Q.2** Attempt any two of the following. (12)
- a) Explain the factors that affect back-up in data recovery. 6
  - b) What are the roles of Data Recovery in Cyber Forensic? 6
  - c) Explain the rules of evidence. 6
  - d) What is time keeping? 6
- Q.3** Attempt any two of the following. (12)
- a) Write a note on Internet Protocol. Discuss the difference between IPV4 & IPV6 6
  - b) What is Statistical Flow Analysis? 6
  - c) Write a note on Evidence Acquisition. 6
  - d) What are the types of NIDS/NIPS? 6
- Q.4** Attempt any two of the following. (12)
- a) What is encrypted web traffic? Explain the three methods to encrypt your Internet traffic. 6
  - b) Explain the Principles of Internetworking. 6
  - c) Explain Mobile Forensic. 6
  - d) Why need to investigate Web Proxies? 6
- Q.5** Attempt any two of the following. (12)
- a) What is Net Privacy & Identity theft? 6
  - b) Explain the Types of Evidences. 6
  - c) What are the Modes of Detection? 6
  - d) Write a note on Network Architecture. 6

(2 ½ Hours)

[Total Marks: 60]

- N.B:** (1) All questions are compulsory.  
 (2) Figures to the **right** indicate full marks.  
 (3) **Assume additional data if necessary** but state the same clearly.  
 (4) Symbols have their usual meanings and tables have their usual standard design unless stated otherwise.

- Q.1 Attempt any two of the following (12)  
 a) Discuss the concept of prediction error. Also explain how it is used. 6  
 b) Differentiate between sampling and resampling with an example. 6  
 c) Write short note on : 6  
     1. Rule induction  
     2. Nonlinear Dynamics  
 d) Explain the working of Fuzzy Decision Trees. 6
- Q.2 Attempt any two of the following (12)  
 a) What are key-value pairs? How do they help in Map-reduce implementation? 6  
 b) What is recursion? Explain recursive extension to Map-Reduce. 6  
 c) How does Grouping by key Works? 6  
 d) Explain Matrix-Vector Multiplication using Map reduce. 6
- Q.3 Attempt any two of the following (12)  
 a) Define the concept of near neighbor search? 6  
 b) What is the concept of hashing? Explain hashing shingle with an example. 6  
 c) How shingle is built from different words? Explain with an example. 6  
 d) How one can find similarity of documents? Discuss the basic method which is used by mirror pages and plagiarism. 6
- Q.4 Attempt any two of the following (12)  
 a) What do you mean by combining estimate? Explain with an example. 6  
 b) Write a short note on : 6  
     1. Bloom filter.  
     2. Real Time Analytics Platform.  
 c) How does estimating moments helps in stream processing? 6  
 d) How does data stream management works. 6
- Q.5 Attempt any two of the following (12)  
 a) How regression modeling works? 6  
 b) Discuss any one common Map Reduce Algorithm. 6  
 c) Write short note on : 6  
     1. LSH of documents  
     2. Locality sensitive functions  
 d) Explain Alon-matias-szegedy algorithm for second moments. 6



(2 ½ Hours)

[Total Marks:60]

- N.B: (1) All questions are compulsory.  
 (2) Figures to the right indicate marks.  
 (3) Illustrations, in-depth answers and diagrams will be appreciated.  
 (4) Mixing of sub-questions is not allowed.

Q1.	<b>Attempt the following (any Two)</b>	<b>(12)</b>
(A)	Explain in detail Conditional independence properties of DGMs	6
(B)	What is Bayes Net? Explain with suitable example.	6
(C)	Explain in detail Parameter estimation for mixture models	6
(D)	Discuss in detail Some common discrete distributions.	6
Q2.	<b>Attempt the following (any Two)</b>	<b>(12)</b>
(A)	Explain SVMs for classification.	6
(B)	Explain in detail Types of inference problems for temporal models.	6
(C)	Explain in detail Linear Kernal and String Kernal.	6
(D)	Discuss application of Applications of HMMs.	6
Q3.	<b>Attempt the following (any Two)</b>	<b>(12)</b>
(A)	Explain Sampling from standard distributions.	6
(B)	Explain in detail Importance sampling.	6
(C)	What is Rejection sampling? Explain with suitable example.	6
(D)	Explain Importance sampling.	6
Q4.	<b>Attempt the following (any Two)</b>	<b>(12)</b>
(A)	Explain in detail Bayesian inference for GGM structure.	6
(B)	Explain in detail Deep Boltzmann machines.	6
(C)	Explain in detail Bayesian inference for GGM structure.	6
(D)	Explain in detail Structural EM.	6
Q5.	<b>Attempt the following (any Two)</b>	<b>(12)</b>
(A)	Explain in detail Gibbs sampling is a special case of MH.	6
(B)	Explain in detail Deep belief networks.	6
(C)	Explain in detail The forwards algorithm.	6
(D)	Explain in detail covariance and correlation.	6