(2 ½ Hours) **[Total Marks: 60]**

Q.1 Attempt any TWO. **12**

A Define ubiquitous computing and explain any two real life examples to support your answer.

B Explain Framework of smart DEI and provide its features.

C Write short notes on following:
- classroom 2000
- Meeting room

D List and explain characteristics of service access used by smart devices.

Q.2 Attempt any TWO. **12**

A Draw and explain structure of smart card.

B List and explain various features of smart mobile.

C Explain HCI with respect to motivation, humans, computer and interactions.

D Write a short note on gesture interface.

Q.3 Attempt any TWO. **12**

A Justify a statement :Tele presence is the advantage of using Skype.

B State the need of Real time OS and Provide its features.

C Write a short note on RFID (Radio Frequency Identifier) tags.

D List and explain various design challenges for handling emotions.

Q.4 Attempt any TWO. **12**

A State and explain advantages of using wireless network.

B What do you mean by PSTN, or Public Switched Telephone Network? Provide its silent features.

C Explain following terms :
1)VoIP
2)TCP
3)UDP

D List and explain various ubiquitous networks like Wireless network, Power Line Communication ,Personal Area Networks,Body Area Networks.(any three)

Q.5 Attempt any TWO. **12**

A Explain various benefits of P2P computing model.

B What do you understand by low power CPU? How one can achieve the same?

C Define robot and state elements of the same.

D Write short notes on following :
1) satellite and microwave
2)USB

(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 standarddesign 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) Define social network analysis. How it is represented by using graph theory. **6**

b) Explain ego centric and socio centric network density with example. **6**

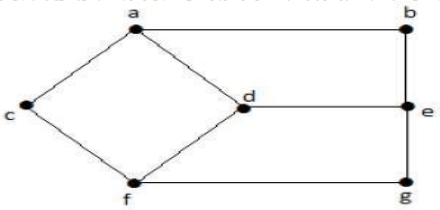
c) How social network link is analyzed? **6**

d) List and explain different types of relations in social network analysis. **6**

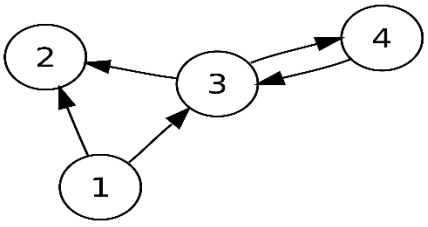
Q.2 Attempt **any two** of the following **(12)**

a) The given graph represents synthetic social network, for this network compute following social network metrics: **6**

i)Density ii) Connectedness ii) Degree of centrality.



b) What is reciprocity? Find reciprocity rate of following network **6**



c) What is clique? Explain following terms with respect to cliques: **6**

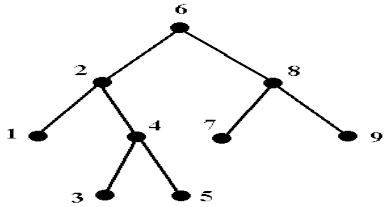
i) N-cliques ii) K-plexes iii) K-cores

d) Why the Divisions of actors into groups and sub-structures can be a very important aspect of social structure. **6**

Q.3 Attempt **any two** of the following **(12)**

a) How are network roles and social roles different from network "sub-structures" as ways of describing social networks? **6**

b) Explain and compute structural, automorphic and regular equivalence classes for given network **6**



c) how we can measure the similarity of actors in a network based on their relations to other actors. **6**

d) Write short note on structure hole, **6**

Q.4 Attempt **any two** of the following **(12)**

a) Explain the data structure use to store two-mode network information. **6**

b) How two mode data differ from one mode data? Explain need of two mode data analysis, **6**

c) Explain two-mode core-periphery analysis with example. **6**

d) Differentiate between qualitative and quantitative analysis. **6**

Q.5 Attempt **any two** of the following **(12)**

a) How reciprocity is differentfrom transitivity? **6**

b) What is page rank algorithm? List different challenges and issues of it. **6**

c) How can you estimate Euclidean distance as a measure of structural equivalence? **6**

d) Write short note on 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) What is the use of Computer Forensic in law enforcement & what type of Computer forensic specialist we choose for criminal case? **6**
b) Explain Intrusion detection system with its method. **6**
c) Write a note on Satellite Encryption. **6**
d) Write the Key objective of CFX-2000 & its work. **6**

Q.2 Attempt **any two** of the following. **(12)**
a) Write a short note on Time travel. **6**
b) Explain the types of file format & how to convert files. **6**
c) Explain the factors that affect back-up in data recovery. **6**
d) Why we need to backup data and its recovery? Explain any two obstacles to backing up application. **6**

Q.3 Attempt **any two** of the following. **(12)**
a) Explain Open system Interconnection model in terms of OSI Model. **6**
b) Write a note on Internet Protocol. Discuss the difference between IPV4 & IPV6. **6**
c) Explain Physical Interception of i) switches ii) Hubs iii) Radio frequency **6**
d) Explain DNS & HTTP in terms of higher layer traffic analysis. **6**

Q.4 Attempt **any two** of the following. **(12)**
a) Write a note on Web proxy analysis. **6**
b) Explain logs & sources of logs. **6**
c) Explain network architecture & its network device. **6**
d) What is encrypted web traffic? Explain the three methods to encrypt your Internet traffic. **6**

Q.5 Attempt **any two** of the following. **(12)**

a) Explain the types of Business computer forensic technology. **6**

b) Why there is need to authenticate evidence? **6**

c) Explain some intercepting traffic in cables. **6**

d) Explain the following terms in context of network. **6**
i) Switches ii) routers iii) firewalls iv) Interfaces

(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)	Discuss the most relevant technologies supporting service 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 does cloud development differentiate from traditional software development?	**6**
Q.2	Attempt **any two** of the following:	**(12)**
a)	Which are basic components of an IaaS-based solution for Cloud computing?.	**6**
b)	Describe Web services and mashup architectures for integration over the internet.	**6**
c)	Which enterprise components used in Cloud computing? Explain the component view of enterprise architecture.	**6**
d)	What does the acronym SaaS mean? How does it relate to Cloud computing? Give two examples of SaaS. How your examples satisfies essential characteristics of Cloud computing?	**6**
Q.3	Attempt **any two** of the following:	**(12)**
a)	How multithreading supports the development of high throughput computing applications? Give any one example with detail.	**6**
b)	When to use SOAP/WSDL Web service or REST Web service in Cloud based applications?	**6**
c)	What are multi-core processors? Why they are used in Cloud Computing?	**6**
d)	Explain virtualization as a mechanism to achieve multi-tenancy at the system level.	**6**

Q.4	Attempt **any two** of the following:	**(12)**
a)	Describe information maintained in cross-enterprise applications such as enterprise resource planning (ERP)?	**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)	What tasks a business logic method needs to handle? State various design strategies and architecture frameworks used for implementing business logic.	**6**

Q.5	Attempt **any two** of the following:	**(12)**
a)	State and explain characteristics of MapReduce programming model.	**6**
b)	Differentiate between computation and communication with context to Cloud computing.	**6**
c)	Explain Cloud technology for Data Intensive Computing.	**6**
d)	Comment on 'Public cloud services can be cheaper than using similar virtualized infrastructure in-house'.	**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. Attempt the following (any Two): (12)
(A) What is data analytics? Discuss Modern data analytic tools.
(B) Define Big data. Discuss Big data Platform used in today's scenario.
(C) How Neurons in Neural Network works explain with the help of a diagram.
(D) How Fuzzy Decision Trees works?

Q2. Attempt the following (any Two): (12)
(A) How does map reduce work?
(B) How to Compute Natural Join by Map Reduce.
(C) Explain Matrix-Vector Multiplication, with an example
[Note:- assume required data and state them clearly]
(D) Write a short note on
1. Union
2. Intersection

Q3. Attempt the following (any Two): (12)
(A) What is Jaccard similarity? How does it helps
(B) How shingle works? Discuss the working of Hashing Shingles.
(C) Find the edit distances (using only insertions and deletions) between the following pairs of strings.
(a) abcdef and bdaefc.
(b) abccdabc and acbdcab.
(c) abcdef and baedfc.
(D) Discuss Applications of Locality-Sensitive Hashing in detail.

Q4. Attempt the following (any Two): (12)
(A) Explain the concept of data-stream-management system
(B) Suppose we have a stream of tuples with the schema
Grades(university, courseID, studentID, grade)
Assume universities are unique, but a courseID is unique only within a university (i.e., different universities may have different courses with the same ID, e.g., "CS101") and likewise, studentID's are unique only within a university (different universities may assign the same ID to different students). Suppose we want to answer certain queries approximately from a 1/20th sample of the data. For each of the queries below, indicate how you would construct the sample. That is, tell what the key attributes should be.
(a) For each university, estimate the average number of students in a course.
(b) Estimate the fraction of students who have a GPA of 3.5 or more.
(c) Estimate the fraction of courses where at least half the students got "A."
(C) Write a short note on Real time analytics Platform(RTAP).
(D) How Decaying Windows work? Explain with example.

Q5. Attempt the following (any Two): (12)

(A) Differentiate between Analysis and Reporting.

(B) How one can Cope With Node Failures in map reduce.

(C) Write a short note on Workflow Systems.

(D) List and explain any two examples of Stream data Sources.

QP Code:28617

(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) In a bolt factory machines A, B and C manufacture 25%, 35% and 40% respectively of the total bolts produced. Of their output 5, 4, 2 per cent are respectively defective. A bolt is drawn at random from the product and is found to be defective. What is probability that it was manufactured by machines (i) A (ii) B (iii) C? **6**

b) What are probability distributions? **6**

c) Explain the concept of inference and learning. **6**

d) Describe the concept of latent variable models. **6**

Q.2 Attempt **any two** of the following **(12)**

a) Define a Kernel function? Explain any two types of kernel function with examples. **6**

b) Explain Support Vector Machine for multiclass classification. **6**

c) Explain in detail various component of Generalized Linear Model. **6**

d) Describe Markov and Hidden Markov Models. **6**

Q.3 Attempt **any two** of the following **(12)**

a) Define sampling. Describe rejection sampling with example. **6**

b) Write down applications of Monte Carlo method. **6**

c) Write down algorithm of collapsed Gibbs Sampler for mixture model. **6**

d) Describe Label Switching problem. **6**

Q.4 Attempt **any two** of the following **(12)**

a) Describe the networks of structure learning for knowledge discovery. **6**

b) Explain Directed and Undirected tree. **6**

c) Describe a huge Directed graphical models (DGM) called Rephil **6**

d) Explain in detail any three deep generative models **6**

Q.5 Attempt **any two** of the following **(12)**

a) Explain Google's page rank algorithm for web page ranking. **6**

b) Explain Markov Logical Network with example. **6**

c) Write down any two applications of deep network. **6**

d) Let $X' = (X_1, X_2, X_3)$ be $N_3(\mu, \Sigma)$ with $\mu' = [-3, 1, 4]$ and $\Sigma =$. Are the following random variables in (a) and (b) independent? (a) X_1 and X_2 (b) (X_1, X_2) and X_3. Find marginal pdf of X_2. **6**
