(Time: 3 Hours)   (Total Marks: 80)

N.B. 1. Question **No. 1 compulsory**.
2. Attempt **any three** out of **remaining five** questions.
3. Figures to the right indicate full marks.
4. Draw neat diagram wherever necessary.

Q1		Attempt any **Four** of the following:	
	a.	How does OFDMA handle synchronization and interference between users?	5
	b.	List and explain the core components of the UMTS network?	5
	c.	Explain difference between Adhoc network and infrastructure based network	5
	d	What role does VANET play in intelligent transportation systems (ITS)?	5
	e.	Explain the function of a Subscriber Identity Module (SIM) in GSM.	5
Q2		Attempt the following:	
	a	What is Frequency Hopping Spread Spectrum (FHSS), and how does it improve communication security?	10
	b	Explain how LoRaWAN enables long-range, low-power communication by using spread spectrum techniques (Chirp Spread Spectrum).	10
Q3		Attempt the following:	
	a	Explain the architecture and working of 4G.	10
	b	How does Wi-Fi handle multiple users and avoid collisions in the network?	10
Q 4		Attempt the following:	
	a	Explain the architecture and Features of a WiMAX network.	10
	b	Explain the pairing and security mechanisms used in Bluetooth communication.	10
Q5		Attempt the following:	
	a	What is mesh networking in ZigBee, and how does it enhance the network's reliability?	10
	b	What are the primary security mechanisms employed in GSM to protect user data and privacy?	10
Q6		Write short note on	
	a	Discuss the flaws in WEP's initialization vector (IV) implementation and how it leads to key reuse and susceptibility to attacks.	10
	b	How does Cisco implement security in its Unified Wireless Network?	10

(3 Hours)   **[Total Marks: 80]**

N.B. (1) Question No. 1 is compulsory
      (2) Attempt any three questions out of the remaining five questions
      (3) Figures to the right indicate full marks
      (4) Assume suitable data whenever required

Q1	a)	What are the different issues in ML algorithms?	**5M**
	b)	Compare barplot and histogram.	**5M**
	c)	Define and state effects of overfitting and underfitting.	**5M**
	d)	Explain learning agents with example.	**5M**

Q2   a)   What do you mean by covariance and correlation? Explain the range of coefficients   **10M**
          of correlation and covariance. Calculate COV (Observed Value1, Observed Value2)
          and CORRCOV (Observed Value1, Observed Value2) for following data. How do
          you interpret these values?

Experiment No.	1	2	3	4	5	6	7	8	9	10
Observed Value 1	20	10	30	15	45	40	30	35	45	30
Observed value 2	20	15	30	10	40	45	20	35	40	25

     b)   Compare Z-Test, T-Test and ANOVA in detail.   **10M**

Q3   a)   What is SVM? Explain its significance in ML and compare it with logistic regression   **10M**
     b)   What are the different univariate plots in EDA? Explain them in detail.   **10M**

Q4   a)   Differentiate between data scientists, big data professionals and data analysts.   **10M**
     b)   What is linear regression? Explain its significance in ML and compare it with logistic   **10M**
          regression

Q5   a)   Describe steps for developing ML applications with a labled diagram.   **10M**
     b)   What are the different types of environments? Give examples. Explain the vacuum   **10M**
          world problem with its environment.

Q6   Write Short Note on (Any four)   **20M**
     a)   CNF
     b)   Alpha Beta Pruning
     c)   A* algorithm
     d)   Skolemization
     e)   Rules in Propositional Logic

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Duration: 3hrs   **[Max Marks:80]**

N.B. : (1) Question No 1 is Compulsory.
      (2) Attempt any three questions out of the remaining five.
      (3) All questions carry equal marks.
      (4) Assume suitable data, if required and state it clearly.

Q.1   **[20]**

A   Give the difference between OLAP and OLTP

B   Explain Confusion Matrix. Calculate Accuracy, Precision and Recall for the following Confusion Matrix

Cancer Classes	Yes	No	Total
Yes	90	210	300
No	140	9560	9700
Total	230	9770	10000

C   Explain Multilevel and Multidimensional Association rules with suitable examples

D   Explain DBSCAN algorithm with example.

Q.2 A   What is noisy data? How to handle it   **[10]**
           For the following data D={4,8,9,15,21,21,24,25,26,28,29,34}
           Number of bins =3
           Perform the following:
           i. Partition into equal frequency bins
           ii. Smoothing by bin means
           iii. Smoothing by bin boundaries

    B   Explain K means algorithm in detail. Apply K-means Algorithm to   **[10]**
        divide the given set of values {2,3,6,8,9,12,15,18,22} into 3 clusters

Q.3 A   Explain different types of attributes used in data exploration with example   **[10]**
    B   Using the given training dataset classify the following tuple using Naïve   **[10]**
        Bayes Algorithm: <Homeowner: No, Marital Status: Married, Job experience:3>

Homeowner	Marital Status	Job experience (in years)	Defaulted
Yes	Single	3	No
No	Married	4	No
No	Single	5	No
Yes	Married	4	No
No	Divorced	2	Yes
No	Married	4	No
Yes	Divorced	2	No
No	Married	3	Yes
No	Married	3	No
Yes	Single	2	Yes

Q.4 A   What do you mean by data mining? Explain KDD process with help of a   [10]
           suitable diagram

     B   For the table given below apply Apriori algorithm and show frequent item   [10]
           set and strongassociation rules. Assume Minimum Support of 30% and
           Minimum confidence of 70%.

TID	Items
01	1,3,4,6
02	2,3,5,7
03	1,2,3,5,8
04	2,5,9,10
05	1,4

Q.5 A   Design BI system for Fraud Detection? Explain all steps from data   [10]
           collection to decision making

     B   Compare star schema, Snow flakes schema.   [10]

Q.6   **Solve the following(Any 2)**   [20]

     A   What is an outlier? List types of outliers. Describe methods used for outlier
           analysis.

     B   Describe different steps involved in data preprocessing

     C   Explain Bagging of a classifier

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TIME : 3 HOURS   MARKS : 80

N.B.: (1) Question No.1 is compulsory
      (2) Attempt any three questions from remaining five questions.

Q.1 a) Explain cybercrime and its types.   05

   b) Differentiate White, Black and Grey Hat Hackers.   05

   c) Discuss Digital Evidence and its types.   05

   d) What is malware? Explain in brief concept of Virus.   05

Q .2 a) What are the primary goals of ethical hacking and what are its phases? 10

    b) Explain goals and guidelines for one Incident Report Writing.   10

Q. 3 a) Elaborate about Mobile Device Forensics   10

    b) Explain the forensic duplication and investigation process in detail.   10

Q.4 a) What is Intrusion Detection systems? Explain the detailed types of IDS. 10

    b) Describe tasks in investigating e-mail crimes and violations.   10

Q.5 a) Explain the attacks on Network and Prevention.   10

    b) What is computer forensics? Why computer forensics is important?   10

Q. 6 Write Short note on (Any Four)   20
        a) Firewall with Neat diagram
        b) Chain of custody
        c) roles of CSIRT in incident handling
        d) Challenges in network forensics
        e) Cyber Forensic tools

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(3 Hours.)   **Maximum Marks = 80**

NB:

1. Question No. 1 is compulsory and solve any THREE questions from the remaining questions
2. Assume suitable data if necessary
3. Draw clean and neat diagrams

Q1.   Attempt **any four**

     a.   Compare and contrast Web 1.0, Web 2.0 and Web 3.0   5

     b.   Explain AngularJS Controller.   5

     c.   What are the features of MongoDB?   5

     d.   Differentiate between JavaScript and TypeScript   5

     e.   What is Content Management System (CMS)   5

Q2. a.   Define Semantic Web. Explain the components of Semantic Web Stack   10
           with diagram.

     b.   Explain how internal and External Modules used in TypeScript with   10
           suitable example.

Q3. a   Explain Flask templates with an example.   10

     b   Explain Angular JS filters with example   10

Q4. a.   Explain RSET API in detail.

     b   Explain Drupal's architecture with its advantages.   10

Q5. a.   What is an AngularJS dependency injection? State 6 examples of   10
           AngularJS built-in helper function

     b.   Explain MongoDB CRUD Operations with an example   10

Q6. a.   How do you set, access and delete cookies in Python Flask?   10

     b.   Explain working of AJAX with diagram? How XMLHttpRequest object
           works in AJAX?