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.

1   Attempt **any FOUR**   **[20]**

   a   Differentiate between cybercrime and cyber fraud.

   b   Explain various threats associated with cloud computing.

   c   Explain methods of password cracking

   d   Explain E-contracts and its different types.

   e   Explain different attack vectors in cyber security

2   a   Explain the classification of cybercrimes with examples.   **[10]**

    b   Explain various types of credit card frauds   **[10]**

3   a   Explain different buffer overflow attacks also explain how to mitigate buffer   **[10]**

        overflow attack

    b   Explain electronic banking in India and what are laws related to electronic   **[10]**

        banking in India

4   a   What do you understand by DOS and DDOS attack? Explain in detail.   **[10]**

    b   Write a note on Intellectual Property Aspects in cyber law.   **[10]**

5   a   Explain the objectives and features of IT Act 2000   **[10]**

    b   What are Botnets? How it is exploit by attacker to cause cyber attack?   **[10]**

6   a   Explain SQL injection attack. State different countermeasure to prevent the   **[10]**

        attack.

    b   Explain what is Information Security Standard and Explain HIPAA act in detail   **[10]**

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Time: 3 Hours   **Max. Marks: 80**

N.B. : (1) Question No.1 is compulsory
      (2) Write any three questions from Q. 2 to Q.6.
      (3) Draw a neat diagrams wherever necessary.
      (4) Assume suitable data, if required and state it clearly.

Q1   **Solve any five**
   a Compare GSM and GPRS   **4**
   b What is Doppler frequency shift?. Derive an expression for it   **4**
   c Explain why OFDMA is preferred for downlink and SC-FDMA for uplink in LTE   **4**
   d Explain soft and hard handoff with a neat diagram   **4**
   e What is SDR? State its advantages   **4**
   f List the specifications of 5G   **4**

Q2 **a** Explain GSM Network Architecture with neat diagram   **10**
   b In a cellular system with frequency reuse distance of 7 and the mobile **10**
receiver located at the boundary of its operating cell, under the influence of
interfering cells in the first tier. Compute the S/I ratio at mobile receiver for:
      i)   omnidirectional antenna design
      ii)   3 sector 120° directional antenna design
      iii)   6 sector 60° directional antenna design
comment on the effect of sectoring on S/I ratio.
Consider path loss exponent of 3.

Q3 **a** Compare 1G, 2G, 3G, 4G and 5G with respect to speed, applications, **10**
bandwidth, spectral efficiency and handoff.
   b Compare IS-95, CDMA-2000 and WCDMA   **10**

Q4 **a** What is MIMO? What are its advantages. Explain MIMO with respect to 4G **10**
Technology.
   b Draw LTE network architecture and Discuss in details.   **10**

Q5 **a** Explain multi-path signal propagation and RAKE receiver in detail   **10**
   b Draw a neat diagram of UMTS system architecture showing all interfaces **10**
and explain in details.

Q6   **Write a short note on (Solve any 2)**   **20**
   a Two Ray ground reflection Model
   b Traffic Theory with respect to mobile cellular networks
   c Orthogonal Frequency Division Multiple Access

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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.

1	Attempt any FOUR	**[20]**
A	What is Big Data? What is Hadoop? How are Big Data and Hadoop linked?	
B	Write the step of Grivan-Newman algorithm. Explain clustering of Social Network Graph using GN algorithm with example.	
C	What is MapReduce ? Explain How Map and Reduce Work?	
D	Explain PCY algorithm with suitable examples.	
E	Explain NoSQL data Architecture patterns.	
F	Explain Recommendation system & its various types with example.	

2	a	Describe the structure of HDFS in a Hadoop Ecosystem using a diagram	**[10]**
	b	What is NOSQL? What are the business drivers for NoSQL? Discuss any two architectural patterns of NoSQL.	**[10]**

3	a	Explain Page Rank with Example. Can a Website's Page rank Ever Increase? What are its chances of Decreasing?	**[10]**
	b	Evaluate PCY algorithm on the following transaction to find the candidate sets (frequent sets).	**[10]**

    Given data: Threshold value or minimization value = 3
    Hush function = $(i * j)$ mod 10.

T1 = {1, 2, 3}	T2 = {2, 3, 4}	T3 = {3, 4, 5}
T4 = {4, 5, 6}	T5 = {1, 3, 5}	T6 = {2, 4, 6}
T7 = {1, 3, 4}	T8 = {2, 4, 5}	T9 = {3, 4, 6}
T10 = {1, 2, 4}	T11 = {2, 3, 5}	T12= {3, 4, 6}

4	a	Explain the Role and effect of damping Factor(teleportation) in page rank computation	**[10]**
	b	Calculate the Cosine distance measure for given vectors	**[10]**

d_1 = **3 2 0 5 0 0 0 2 0 0**
d_2 = **1 0 0 0 0 0 0 1 0 2**

5	a	Explain Clearly with diagram how the PCY algorithm helps to perform frequent itemset mining for large datasets	**[10]**
	b	Give the formal definition of Nearest Neighbor problem,Show how finding plagiarism in a document is nearest Neighbour Problem. What similarity measure can be used	**[10]**

6	a	Given a Dim Dataset (1,5,8,10,2} Use the agglomerative clustering algorithm with Euclidean distance to establish hierarchical grouping relationship. Draw the dendrogram.	**[10]**
	b	Write a note on (Any Two)	**[10]**

    i)   HITS
    ii) Distance measurement for Big data
    iii) Multistage Frequent Itemset Mining Algorithm

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Duration: 3 Hours   [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.

1		Attempt **any FOUR**	**[20]**
	a	What is Software Defined Networking (SDN)?	
	b	Explain the Real Time Transport Control Protocol (RTCP) message types.	
	c	Describe each field of Secure Shell (SSH) packet format with diagram.	
	d	Explain Virtual Private Network in brief with diagram.	
	e	Compare OSI and TCP/IP protocol suite.	

2	a	Explain concepts of device provisioning, data collection, migration and configuration management with respect to network automation.	**[10]**
	b	What are the steps involved in image compression using JPEG standard.	**[10]**

3	a	What is a firewall? Explain packet filter and proxy firewall with necessary diagrams.	**[10]**
	b	Explain IoT protocol layer diagram with protocols at each layer.	**[10]**

4	a	Describe each field of Real Time Transport Protocol (RTP) packet header format with diagram?	**[10]**
	b	Explain DHCP packet format with diagram.	**[10]**

5	a	Explain query and response messages in DNS with header format.	**[10]**
	b	Explain Differentiated Services (DS) with respect to Quality of Service (QoS). Explain DS field, per-hop behavior and traffic conditioner with respect to DS.	**[10]**

6	a	What is Voice over IP? Explain messages and address formats of Session Initiation Protocol (SIP)? How a simple session of VOIP happen using SIP?	**[10]**
	b	Explain Pretty Good Privacy (PGP) protocol with respect to application layer security.	**[10]**

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[Time: 3 Hours]   [Marks:80]

Please check whether you have got the right question paper.

N.B: 1. **Q 1 is compulsory**
         2. **Solve any 3 from remaining**
         3. **Assume suitable data if required**

Q.1   Solve any four   **20**
  a)   What is mode jumping and how is it avoided in magnetron
  b)   List microwave frequency bands with frequency range
  c)   Calculate coupling factor of directional coupler when the incident power is
        600 mW and power in auxiliary waveguide is 350 mW.
  d)   Explain working of Tunnel diode and its application in microwave
        engineering.
  e)   Explain microstrip line working with geometry

Q.2 a) Explain schematic of Reflex klystron & working with applegate diagram.   **10**
     b) Explain physical structure and principle of working of TRAPATT diode.   **10**

Q.3 a) An air filled 5 x 2 cm waveguide has E2 = 20 sin (40 π x) sin (50 π y) $e^{-j\beta z}$ **10**
        z v/m 15GHz
          1. What is mode of propagation. Justify
          2. Determine wave impedance Ey/Hx
     b) A magnetron has following parameters   **10**
        Gnner radius : 0.15 m
        Outer radius : 0.45m
        Flux density of magnetic field Bo : 1.2 Wb/m^2
          1. Determine Hull cut off voltage
          2. Cut off magnetic field density when beano voltage Vo = 6000V
          3. Cyclotron frequency in GHz if B = 0.3 Wb/ m^2

Q.4 a) A 50Ω transmission line is terminated on a load of $73 - j80\Omega$. Design   **10**
        single stub matching impedance matching using shart circuited shunt stub
     b) Explain any two methods of power measurement.   **10**

Q.5 a) Construct a four port circulator using two magic Tees & a gyrator. Explain   **10**
        working of same at all four parts.
     b) Discuss working of Faraday Rotation isolator from port 1 to port 2 & port 2   **10**
        to port 1 with relavant diagrams.

Q.6 a) List various modes of oscillation of Gunn diode. Give criteria of   **10**
        classification of these modes and explain working of any one mode.
     b) Derive field equations for TE modes in rectangular waveguides. What are   **10**
        degenerate modes?

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