(3Hours)                                                      [Total marks 80]

Note: (1) Question No 1 is compulsory
      (2) Solve any three from remaining questions.
      (3) Assume suitable data if required.

Q.1 (a) Why TCP is not suitable for interactive multimedia traffic, while UDP is.        [5]
    (b) How iterative resolution differs from recursive resolution in DNS?                [5]
    (c) Differentiate between Subnetting and Supernetting.                                [5]
    (d) Define network address and network mask.                                         [5]

Q.2 (a) Draw the DHCP packet format. With referenec to this which fields determine       [10]

      i) The no. of hops a packet can tarvel?

      ii) The command is a request or reply?

      iii) Why there is a need of transaction Id apart from IP address and port address?

      iv) What is the maximum number of seconds that can be stored in the Number of Seconds field of
         a DHCP packet?

      v) Which field determine that the response from the server is unicast or broadcast?

      vi) If DHCP packet is request from client, which fields are used?

      vii) If DHCP packet is a reply message from server, which fields are used?

    (b) Explain how voice is transmitted over packet switched network using H.323.       [10]

Q.3 (a) Explain the IP datagram header with suitable illustrations.                       [10]

    (b) Explain the various phases of congestion control in TCP with suitable diagram.
        How the window size is set in each phase.                                         [10]

O.4 (a) Name the various components of Email system. List the function of them.           [10]
        Which protocol defines the MTA client and server in internet?                     [10]

    (b) Differntiate between TELNET and SSH.Explain the various components of SSH.        [10]

Q.5 (a) What are various scheduling schemes to improve Qos ? Explain any one in brief.    [10]

    (b)What are the limitations of File Transfer Protocol and how they are overcome in Trivial File
       Transfer Protocol?                                                                 [10]

Q.6  (a) What are the special addresses used in classful addressing. Explain any 3 with suitable example.
                                                                                          [10]
    (b) Explain the connection establishment & termination Process in TCP with suitable diagram.
                                                                                          [10]

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**Time: 3 Hours** **Marks: 80**

N.B: **(1) Question No. 1 is compulsory**
**(2) Attempt any Three questions from the remaining Five questions**
**(3) Figures to the right indicate full marks**

1. (a) What are the properties of the autocorrelation function ? [4]
   (b) What is phoneme? Explain in detail about semivowels and diphthongs? [4]
   (c) How are formants useful in speech processing? [4]
   (d) Describe the equations involved in the design of an all-pole filter of order 1. [4]
   (e) What are the uses of pitch period estimation? [4]

2. (a) Describe the speech production mechanism and identify the different categories of
   excitation? [10]
   (b) Explain the different losses involved in modeling of the vocal tract. Explain how each of
   them affects the resonance frequency of vibration of the vocal cords [10]

3. (a) Explain the different time domain parameters derived from the speech signal. Briefly
   describe with equations how they can be computed. [10]
   (b) Explain narrowband spectrogram of a speech signal with suitable examples [10]

4. (a) (i) What is 'complex ceptrum' of a speech signal? Specify its properties, with
   related equations?. [8]
   (ii) What is the need to generate Linear Predictor coefficients for a speech signal? [2]

   (b) Levinson-Durbin acts as a recursion function for calculation of prediction coefficients.
   Explain? [10]

5. (a) Compare and contrast the different speech standards. [10]

   (b) How would you compare two speech signals using Dynamic Time Warping algorithm. [10]

6. (a) Explain Text-to-Speech conversion using a block schematic? State the different applications
   of TTS [8]
   (b) Explain the different challenges involved in the design of a speaker recognition system. [7]
   (c) How is HMM used for speech recognition? [5]

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**Duration: 3 Hours**                                                                              **Marks: 80**

**Note:**
1) Q.1 is **compulsory**.
2) Attempt any **three** questions from the remaining **five** questions.
3) Assume Suitable data wherever necessary

Q1. Attempt any **FOUR**                                                                              **20**

   a) Explain Launching of Geostationary satellites
   b) Explain design considerations of Earth station
   c) State and explain Kepler's Laws
   d) Explain different orbital parameters
   e) Differentiate window and frame organization

Q2. a) What is EIRP, Discuss importance of [ G/T ] ratio. Calculate Overall [C/N] for a satellite
      link, if [C/N] up link =25dB and [C/N] downlink=20dB and intermodulation noise =13dB

                                                                                                    **10**

   b) Explain TT & C subsystem. Explain role of multi-tone frequency in tracking system.   **10**

Q3  a) Describe different stabilization technique                                              **10**

   b) What are different types of lasers used for satellite communication? Explain acquisition
      link model for optical communication                                                      **10**

Q4  a) With the help of block diagram explain transmit receive type of earth station          **10**

   b) Draw and explain satellite network architecture                                         **10**

Q5 a) Explain SPADE system and SCPC of FDMA                                                    **10**

   b) Which types of antennas used in satellite communication. Explain any one in detail.     **10**

Q6. Write short note on any TWO                                                                **20**

   a) Onboard connectivity with transparent processing
   b) VSAT and GPS
   c) Reliability and space Qualification

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# Paper / Subject Code: 52905 / 4) Ultra Wideband Communication

(3 Hours) [Total Marks: 80]

N.B. : 1) Question no. 1 is compulsory.

2) Answer any 3 questions from remaining five questions.

3) Assume suitable data if required and justify the same.

4) Figures to the right indicate full marks.

| | | | |
|---|---|---|---|
| 1 | (a) | What are practical constraints and effect of imperfections in UWB? | 5 |
| | (b) | What are the applications of the UWB communication system? | 5 |
| | (c) | Describe UWB ad-hoc network. | 5 |
| | (d) | What are multiple access techniques in UWB and describe in short. | 5 |
| 2. | (a) | What are prolate spheroidal functions? Why are they attractive for UWB communications? | 10 |
| | (b) | Explain multiband OFDM UWB proposal for standardization. | 10 |
| 3. | (a) | Compare and contrast UWB communication system performance with direct sequence spread spectrum and frequency hopped spread spectrum on basis of SNR and BER for single and multiple users. | 10 |
| | (b) | Discuss time hopping PPM based UWB systems. | 10 |
| 4. | (a) | Explain two ray propagation model for UWB signals. | 10 |
| | (b) | Discuss frequency domain autoregressive model. | 10 |
| 5. | (a) | Explain the different data modulation schemes in IR-UWB communication systems and compare data modulation schemes. | 10 |
| | (b) | Explain self interference in UWB with special reference to IFI and IPI. | 10 |
| 6. | (a) | Discuss free space path loss model. Modify the same for UWB application. | 10 |
| | (b) | Explain any two networks based positioning techniques. | 10 |

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Q. P. Code: 36600

Duration-3hrs                                                    Marks -80

N.B  i) Question no.**1** is compulsory

   ii) Solve any **three** from the remaining **five** questions

| | | |
|---|---|---|
| 1a | Discuss the Advanced Antenna systems used in HSPA and LTE. | 5 |
| b | Draw and explain with a neat diagram the various components of a sensor node. | 5 |
| C | What are the different Network Topologies supported by Zigbee? | 5 |
| d | Explain the 'Zone planning' concept for the Indoor radio planning. | 5 |
| | | |
| 2a | What are the different requirements to plan a good Link Budget for Wireless Networks? | 10 |
| b | Explain 'hidden node' and 'exposed node' problems in WLANs. | 10 |
| | | |
| 3a | What is UMTS? List important features of UMTS air interface. | 10 |
| b | Explain various Bluetooth connection establishment states .Draw a complete flow diagram. | 10 |
| | | |
| 4a | Explain Middleware architecture for WSNs. | 10 |
| b | Discuss Wimax in detail and compare its performance with Wifi . | 10 |
| | | |
| 5a | Discuss the various routing challenges and design issues in WSNs. | 10 |
| b | Why Network Management Design is a critical issue in WSN? Justify. | 10 |
| | | |
| 6a | What are the different types of handovers in GSM? | 10 |
| b | How does a typical RFID system work  ? Discuss its components and list its applications. | 10 |

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Time: 3 hrs                                                                                          Max. Marks: 80

**N.B:**
1. **Question No.1** is compulsory
2. Answer any **three** out of remaining  questions
3. Assumptions made should be clearly stated
4. Assume any suitable data wherever required but justify the same
5. Figures to the right indicate marks
6. Illustrate answer with sketches wherever required

1 (a)  Why is it not possible to access entire table at one time in SNMP V1?                         (5)

(b) Explain probe functions for remote monitoring                                                   (5)

(c) In a network if 3Com router is added by one of the department, what updates will

happen in MIB and will SMI be accessed  during this process                                     (5)

(d). What are the challenges faced by the network managers while managing a network?                (5)

2 (a). Explain physical architecture of Telecommunication Management Network.                        (10)

(b)  What is TRAP. What is its purpose. Discuss different types of SNMP traps.                       (10)

3 (a) Discuss  eTOM business framework with reference to Level 0, Level 1 and Level 3

processes.                                                                                      (10)

(b)  Sketch & explain User security model in SNMPV-3.                                               (10)

4 (a). Draw SNMPv1 Architecture & discuss the messages involved.                                    (10)

(b). Explain various M-interfaces used between an ATM end user or device and an ATM
network.                                                                                        (10)

5. (a). What is role of ILMI and SNMP in ATM  Management? Explain M1 and M2 interfaces

in detail.                                                                                      (10)

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(b). Explain the following RMON-1 groups: (10)

      (1) Statistics group.

      (2) Packet Capture group.

6 (a) Describe three scenarios that require event correlation techniques and explain clearly why each one

    needs it. (10)

(b) Discuss conceptual views of managed object with reference to Intenet perspective and OSI perspective

    (10)

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**(3 Hours)**                                                     **Max Marks: 80**

1. **Question No. 1 is compulsory**
2. **Out of remaining questions, attempt any three questions.**
3. **Assume suitable additional data if required and justify the same.**
4. **Figures in brackets on the right hand side indicate full marks.**

Q.1. (A) Explain briefly Green's function                                                        (05)
      (B) Give a comparison of Conventional Microwave Circuits (CMC) with the     (05)
          Microwave Integrated Circuits (MIC).                                          (05)
      (C) List and explain various performance parameters of mixer.                      (05)
      (D) Compare microwave amplifier versus microwave oscillators.

Q.2. (A) Explain Stability circles and its importance in amplifier design.                  (10)
      (B) Describe key processing techniques used in making HMICs.                         (10)

Q.3. (A) Give design considerations of Coplanar wave guides.                               (10)
      (B) Give limitations and criteria for the choice of substrate material in HMICS      (10)
          and MMICS.

Q.4. (A) For two port oscillator at steady state oscillation, prove that if:               (10)
          $\Gamma_L \Gamma_{in} = 1$ then $\Gamma_T \Gamma_{out} = 1$.
      (B) Derive the dispersion relation for open microstrip line.                         (10)

Q.5.                                                                                        (20)
      Design a class A power amplifier at 900 MHz using mRF-8585 NPN transistor
      with output power of 3 W. Design input and output impedance matching section
      for amplifier. Find the required input power and compute the power added
      efficiency. Use the given S-parameter to compute source and load reflection
      coefficient.     $S_{11} = 0.94 \angle 164°$, $S_{12} = 0.031 \angle 59°$,

      $S_{21} = 1.222 \angle 43°$, $S_{22} = 0.57 \angle -165°$

Q.6. (A) Describe the analysis of lange coupler assuming TEM propagation.                   (10)
      (B) A BJT has the following S-parameters as a function of three frequencies.          (10)
          Determine in which of these cases, device is unconditionally stable and
          which has greatest stability.

| Freq. (MHz) | $S_{11}$ | $S_{12}$ | $S_{21}$ | $S_{22}$ |
|---|---|---|---|---|
| 500 | $0.70 \angle -57°$ | $0.04 \angle 47°$ | $10.5 \angle 136°$ | $0.79 \angle -33°$ |
| 750 | $0.56 \angle -78°$ | $0.05 \angle 33°$ | $8.6 \angle 122°$ | $0.66 \angle -42°$ |
| 1000 | $0.96 \angle -97°$ | $0.06 \angle 22°$ | $7.1 \angle 112°$ | $0.57 \angle -48°$ |

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