

WIRELESS NETWORK

(3 Hours)

Q.P. Code : 799802

[Marks : 80]

- Note :** (1) Q1 is compulsory.
 (2) Solve any three questions from remaining five.
 (3) Assume suitable data if required.

1. (a) List out Quality of service [Qos] attributes in UMTS. 05
 (b) Explain 'Hidden Node' and 'exposed node' problem in wireless LANs. 05
 (c) How is power control implemented in CDMA? 05
 (d) Draw and explain with neat diagram, the components of Sensor nodes. 05

2. (a) Calculate the down link cell load factor and numbers of voice users per cell 10
 for a WCDMA system using the following data. What is the pole capacity of the cell?
 (1) Information Rate (R_i) = 12.2 kbps
 (2) Chip rate (R_c) = 3.84 Mcps
 (3) $E_b/N_t = 4$ db
 (4) Average interference factors due to others cells = 0.5
 (5) Orthogonality factor = 0.65
 (6) Interference margin = 3db.
 (b) What is Localization in wireless sensor network? Explain with examples centralized and distributed schemes in Localization algorithms. 10

3. (a) Give the detailed radio Access Network overview. Explain in detail functions of Node B and RNC also draw UTRAN logical architecture. 10
 (b) Explain the ZigBee technology. Discuss different Network Topologies that are supported in Zigbee. 10

4. (a) Explain Link budget analysis of requirements of wireless networks. 10
 (b) Explain Various Bluetooth connection establishment states. Draw a complete flow diagram. 10

5. (a) Give technical requirements of IEEE 802.15.3a Physical layer w.r.t. data rates, power consumption, power management modes, scalability and interference, etc. 10
 (b) Why Network management design issue is a critical issue in wireless sensor network? Give reasons. 10

6. (a) Write short notes on: 20
 (a) Wimax
 (b) Rake Receivers.

(3 Hours)

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1. (a) Briefly describe the following: 05
(i) Why does a satellite in highly inclined elliptical orbit spend most of its orbital period over higher latitude regions?
(ii) Why is it preferable for a remote sensing satellite to be in Sun synchronized orbits?
- (b) Explain: 05
(1) Lobe switching (2) mono pulse tracking (3) step tracking (4) intelligent tracking.
- (c) Why the control system in satellite waits for an execute command after receiving the command to be executed? 05
- (d) Differentiate between window and frame organization. 05
2. (a) Explain: 10
1) Why a spin stabilized satellite uses relatively large number of solar cells as compared to three axis stabilized satellite for the same power requirement?
2) Why are storage batteries used along with solar arrays?
- (b) What is the antenna noise temperature? What are the major factors that decides the antenna noise temperature? What is the antenna gain to noise temperature (G/T) ratio? What is the significance of Earth stations antenna gain to noise temperature ratio? 10
3. (a) Explain thermal sub-system. What are the methods of thermal control in satellite? 10
- (b) What are the different types of lasers used for satellite communication? Explain photo detector noise model.

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4. (a) With the help of a block diagram describe the working of transmit receive earth station used for telephone traffic. 10
- (b) Explain in detail the operation of the Spade system of demand assignment. Explain what is meant by thin route service? Suggest the type of satellite access is most suitable for this service. 10
5. (a) An earth station employs a power amplifier providing an output power of 100W and an antenna of 5m diameter for both transmission and reception. The transmission frequency is 6.25 GHz and receiving frequency is 4.5 GHz. System noise temperature is 140 K. Find EIRP and G/T ratio. 10
- (b) What is limit of visibility of satellite? How it is calculate? 05
- (c) Explain what is meant by earth eclipse of an earth- orbiting satellite? Why it is preferable to operate with a satellite positioned west rather than east, of earth station longitude? 05
6. (a) How the reliability of the earth station is improved? 08
- (b) Draw and explain the satellite network architecture. 08
- (c) Explain Unique word detection. 04

INTERNET & VOICE
comm.

QP Code : 717903

(3 Hours)

[Total Marks : 80

- N.B. :** (1) Question No. 1 is **compulsory**.
(2) Attempt **any three** questions out of remaining.
(3) Figures to the **right** indicate **full** marks.

1. Solve following : 20
 - (a) Explain the techniques to improve QoS in multimedia.
 - (b) What is pseudo header? Why it is used in UDP.
 - (c) What is Remote Login? Explain working principle of NVT.
 - (d) What is socket address? Explain with example.
 2. (a) Which protocol is responsible to report error messages? Explain in brief. 10
(b) What is role of H.323 protocol in VOIP.
 3. (a) Explain need of digitizing audio and video in Internet communication. 10
Explain video compression (MPEG) in detail.
(b) Explain the resource record format of DNS. 10
 4. (a) What is 3 way handshaking? Explain connection establishment using TCP. 10
(b) How the IP address is allocated dynamically? Explain state transition diagram of DHCP. 10
 5. (a) Explain the working principle of POP3 and JMAP4 for mail delivery? 10
(b) What are the different special addresses in classful addressing? Explain in detail. 10
 6. Write a short note on (any three) 20
 - (a) TFTP
 - (b) UDP multiplexing/ demultiplexing
 - (c) RTP
 - (d) Address depletion
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Q.P. Code : 722900

(3 Hours)

[Total Marks : 80

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

1. (a) Explain in detail the human hearing mechanism with suitable diagrams. **5**
(b) Explain the procedure for computation of pitch and formants based on cepstral analysis of speech. **5**
(c) State and explain the applications of LPC to speech processing. **5**
(d) Draw the block schematic for a text-to-speech synthesis system and explain the functions of each block. **5**
2. (a) Explain linear filtering interpretation of short-time spectrum analysis with suitable block diagram. **7**
(b) With a neat block diagram, explain non-linear smoother for estimation of parameters in speech processing. Justify the need for delays in non-linear smoother. **8**
(c) Explain general discrete-time model for speech production. **5**
3. (a) With related equations explain the terms (i) Short-time energy **7**
(ii) Short-time average magnitude and (iii) Short-time zero crossing rate. How do you distinguish voiced and unvoiced segments based on these parameters?
(b) Explain pitch estimation based on FFT analysis of speech signal. **8**
(c) Write a note on production of semivowels and nasals. Give the reason of broadening of nasal resonances. **5**
4. (a) Draw a diagram of a single-stage lattice and write the equations for the lattice. **5**
(b) Explain the covariance method for LPC analysis. **5**
(c) What is CELP? How is the code book generated for CELP? What are the limitations of CELP? What are the modifications suggested in the basic CELP coder? **10**

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5. (a) How will you convert power spectrum to mel scale? Explain the procedure for calculation of MFCC with a block schematic. Clearly explain how the integration of power is done on mel scale filters. How will you compress the amplitude of the power spectrum? How is spectral smoothing done? **10**
- (b) Write a detailed note on place and manner of articulation. **10**
6. (a) Explain the terms "liftering" and "quefreny" in connection with cepstral analysis of speech signal. **5**
- (b) What is HMM? What is hidden in it? Draw a state diagram for HMM as a general case and show how you can write a transition matrix. **10**
- (c) Explain speech synthesis using phone-based synthesizer. **5**
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