

B. E. (EXTC) Sem VIII
Wireless Network

Ash6-D:\Data-29

Con. 8981-13.

LJ-13868

(REVISED COURSE)

(3 Hours)

[Total Marks : 100

N.B. : (1) Question No. 1 is compulsory.

(2) Answer any **four** questions out of remaining **six** questions.

(3) Support your answers with **suitable** diagrams.

(4) Assume **suitable** data if **required**.

- | | | | |
|----|-----|--|----|
| 1. | (a) | List out of components of sensor nodes. | 20 |
| | (b) | What is adaptive multirate coding. | |
| | (c) | Explain the concept of hidden node and exposed node with respect to WLAN. | |
| | (d) | List out services provided by 3G Networks. | |
| 2. | (a) | Explain park, hold and sniff mode of operations in bluetooth. Draw the complete flow diagram for network connection establishment in bluetooth. | 10 |
| | (b) | Compare WAP and imode protocol stack. | 10 |
| 3. | (a) | Explain sensor Network protocol stack in detail. | 10 |
| | (b) | Explain the concept of High Speed Downlink packet access in detail. | 10 |
| 4. | (a) | Calculate the uplink cell load factor and number of voice user for a WCDMA system using the following data. What is the pole capacity of the cell?
<ul style="list-style-type: none"> • Information rate (R_i) : 12.2 kbps. • Chip rate (R_c) : 3.84 Mcps. • Required E_b/N_t : 4 dB. • Required interference margin : 3 dB. • Interference factor due to other cells : 0.5 • Channel activity factor : 0.65 | 10 |
| | (b) | Explain transmit diversity present in forward link of cdma 2000. | 10 |
| 5. | (a) | Explain link budget analysis and requirements of wireless networks. | 10 |
| | (b) | Explain UMTS network architecture. List important features of the UMTS interface. Support your answer with neat block diagram. | 10 |
| 6. | | Write short notes on :- | 20 |
| | (a) | Zigbee Protocol. | |
| | (b) | Wimax. | |
| 7. | (a) | Explain LR-WPAN device architecture with suitable diagram. | 10 |
| | (b) | State and explain commonly used wireless LAN topologies with diagram. | 10 |

N.B. : (1) Question No. 1 is **Compulsory**.

(2) Solve any **four** questions from remaining **six** questions.

(3) Use **smith chart** wherever necessary.

1. (a) What are the causes of low frequency noise and high frequency noise associated with the mixer? 5
- (b) Find s-parameters of two part series network $Z = 100\Omega$ and $Z_0 = 50\Omega$ network. 5
- (c) What are the Characteristic of power amplifiers. 5
- (d) Explain 1dB compression point. 5

- (a) A BJT with $I_c = 30$ mA and $V_{ce} = 10$ v is operated at a frequency of 1.0 GHz in a 50Ω system. Its s-parameters are— 10
 $S_{11} = 0.73 \angle 175^\circ$; $S_{22} = 0.21 \angle -80^\circ$
 $S_{12} = 0.0$; $S_{21} = 4.45 \angle 65^\circ$
 Determine whether the transistor is unconditionally stable. If yes, Calculate the optimum terminations, $G_S, \max, G_L, \max, G_{TU}, \max$
- (b) Explain using suitable diagrams two methods of designing broad band amplified. 10

3. (a) A BJT has the following s-parameters: 10
 $S_{11} = 0.65 \angle -95^\circ$; $S_{21} = 5.0 \angle 115^\circ$
 $S_{12} = 0.035 \angle 40^\circ$; $S_{22} = 0.8 \angle -35^\circ$
 Is this transistor unconditionally stable? Draw input and output stability circles.
- (b) Determine stability of a GaAs FET that has the following s-parameters at 2 GHz in a 50Ω systems bolt graphically and mathematically— 10
 $S_{11} = 0.89 \angle -60^\circ$; $S_{21} = 3.1 \angle 123^\circ$
 $S_{12} = 0.02 \angle 62^\circ$; $S_{22} = 0.78 \angle -27^\circ$

4. (a) Derive the transducer power gain as 10

$$G_T = \frac{P_L}{P_{avg}} = \frac{|s_{21}|^2 (1 - |\Gamma_s|^2) (1 - |\Gamma_L|^2)}{|1 - \Gamma_s \Gamma_{in}|^2 |1 - S_{22} \Gamma_L|^2}$$
- (b) If a one port microwave divide has $\Gamma_{in} = 1.5 \angle 60^\circ$ with respect to $Z_0 = 50\Omega$ Design an oscillator for desired frequency of 10 GHz. 10

5. (a) Describe and classify in detail generator timing networks. **10**
- (b) Explain in detail single ended diode mixer. What are mixer design considerations? **10**
6. (a) Compare microwave amplifiers with microwave oscillators. **10**
- (b) What are different techniques to obtain power amplifier linearity? Draw and explain feed forward technique. **10**
7. Write short note on:—
- (i) Balanced FET mixer **5**
 - (ii) Noise figure test equipment **5**
 - (iii) Power distributed amplifiers **5**
 - (iv) Noise parameters at microwave frequencies. **5**
-

(3 Hours)

[Total Marks : 100

- N.B. :** (1) Question No. 1 is **compulsory**.
(2) Answer any **four** questions out of remaining questions.
(3) Answer the questions with suitable diagrams.

1. (a) What is spot beam ? Explain its use in satellite communication. **20**
(b) Define :-
 - (i) Argument of Perigee.
 - (ii) Right Ascension of ascending node.(c) Compare ELV and STS methods of launching satellite.
(d) Explain rain depolarisation in detail.
2. (a) What are look angles ? Explain its significance in relation to satellite position. **10**
Hence solve an Earth station is located at a latitude of 12° south and longitude of 52° W. Calculate antenna look angles for θ satellite at 70° W.
(b) Describe various reasons for perturbation of satellite orbits. **10**
3. (a) Which type of double reflectors are used in satellite communication. Explain in detail. **10**
(b) What is intermodulation noise ? Does it affect the C/N ratio. Derive the expression for same. **10**
4. (a) What is TT&e subsystem ? Explain the type of antenna's used for tracking and command signal transmitting during transfer orbit. **10**
(b) Draw and explain block diagram of FDM/FM/FDMA earth station. **10**
5. (a) Compare advantages of TDMA, FDMA and DS-SS CDMA Satellite signal. **10**
(b) Explain satellite space and mass power estimate in detail. **10**
6. (a) What is eclipse ? Are there any ways of avoiding eclipse during lifetime of satellite. **10**
(b) Explain the following :- **10**
 - (i) Point of compression of IdB.
 - (ii) AM to PM conversion.
 - (iii) I/P and output back off ratio
7. Write short notes on (any two) :- **20**
 - (a) TDMA synchronization
 - (b) Orbital parameters
 - (c) Lifetime of satellite