AGJ 1st half (x) 45

2/6/2011

B.E EXTC VIII (Rev)
Wireless Network.

Con. 3988-11. (REVISED COURSE) RK-4773

(3 Hours) [Total Marks : 100

Note: 1 Question No. 1 is compulsory
2. Attempt any four questions from remaining six.
3. Assume suitable data if necessary.
4. Figures to the right indicates full marks.

Q. 1. a) What is frequency reused in GSM? Explain 05
b) Explain the concept of hidden exposed terminal in WLAN. 05
c) Explain the security aspect of Bluetooth. 05
d) Explain various WLAN topologies. 05

Q. 2. a) Explain forward link features of CDMA 2000 and also explain basic services provided by upper layers of CDMA 2000. 10
b) Draw the block diagram and explain GSM architecture in detail indicating all the interfaces. 10

Q. 3. a) Explain Link budget analysis and requirements of Wireless network. 10
b) Draw network connection establishment flow in Bluetooth and explain Park, Hold, and Sniff mode in detail. 10

Q. 4. a) Draw and explain WAP architecture in detail. 10
b) Explain the following: i) Bluetooth protocol stack. 10
ii) Bluetooth application.

Q. 5. a) Explain logical channel hierarchy in GSM. 06
b) Explain security aspect of GSM. 06
c) Explain in detail Wireless sensor network. 08

Q. 6. a) Give the advantages, disadvantages, and applications of WAP. 10
b) Explain the following: i) ZigBee technology. 10
ii) WIMAX.

Q. 7. Compare and contrast the following: 20
a) GSM and CDMA
b) IS-95 and CDMA 2000
c) CDMA 2000 and WCDMA

7/6/2011

B.E EXTC VIII (Rev)
Elective II - Image Processing

21 : 1st half 11-AM(m)

Con. 3061-11. **(REVISED COURSE)** **RK-4770**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. 1 is **compulsory**.
(2) Answer any **four** out of remaining **six** questions.
(3) **Figures** to the **right** indicate **full** marks.
(4) Assume any suitable **data** if **necessary**.

1. Answer the following questions :— 20
   (a) Is the Huffman code optimal ? Prove with an example.
   (b) Justify 'Quality of picture depends on the number of pixels and gray levels'.
   (c) Explain slant transform.
   (d) Justify/ contradict 'For digital Image having salt and pepper noise, median filter is the best'.

2. (a) Explain the following Image Enhancement Techniques with application :— 15
   (i) Intensity level slicing
   (ii) Range Compression
   (iii) Edge detection.

   (b) Compare between contrast stretching and histogram equalization. 5

3. (a) A 8 level image is given below :— 10

f (x,y) =

4	6	0	3	7
2	1	5	0	3
4	2	7	0	7
1	5	4	6	0
4	7	5	4	1

Image

Prepare the histogram of the given image.
Perform Histogram equalization and draw New Histogram.

   (b) A source emits 8 symbols with the probabilities given :— 10

Symbol	a1	a2	a3	a4	a5	a6	a7	a8
Probability	0·1	0·4	0·05	0·05	0·1	0·2	0·07	0·03

Obtain Huffman code and calculate entropy, average code word length and coding efficiency.

[TURN OVER

4. (a) Name different types of image segmentation techniques. Explain the splitting and merging technique with the help of an example. **10**

(b) Apply slant transform and DCT transform on the given image and compare the result. **10**

$f(x,y) =$

2	2	2	1
2	4	4	2
2	4	4	2
2	2	2	2

Image

5. (a) What is Hadamard Transform ? Write a 4 × 4 Hadamard matrix and its application. Is H(4) Orthogonal and Normalized. **10**

(b) Apply Low and High Pass Spatial masks on the following image matrix. Prove that High Pass = Original – Lowpass. Assume virtual Rows and Columns. **10**

$f(x,y) =$

30	31	32
33	120	30
32	32	31

Image

6. (a) Compare :— **10**

(i) Lossy and Lossless compressions.

(ii) Objective fidelity criteria and subjective fidelity criteria.

(b) Explain segmentation based on discontinuity and segmentation based on similarities. **10**

7. Write short notes on any **four** of the following :— **20**

(a) Haar Transform

(b) Frequency domain filtering

(c) Wiener Filtering

(d) Spatial domain filtering

(e) Connectivity of Pixels

(f) Uniform and non-uniform sampling.

7/6/2011

B.E EXTC VIII (Rev)
Elective II – Satellite Communication

VT-April.-11- 231

Con. 3780–11. (REVISED COURSE) RK–4755

(3 Hours) [Total Marks : 100

N.B. : (1) Question No. 1 is **compulsory.**
(2) Attempt any **four** questions from **remaining**.
(3) Assume **suitable** data if necessary.

1. Answer the following :– 20
   (a) Why satellite communication is considered as 'distance insensitive communication system' ? Compare satellite communication system with optical fibre communication system.
   (b) At the input to a receiver, the received carrier power is 400 pwatts and the system noise temperature is 450 k. Calculate $\left(\frac{C}{N}\right)$ density ratio in dBHz. Given that the bandwidth is 36 MHz, calculate $\left(\frac{C}{N}\right)$ in dB,
   (c) Define and explain the terms 'roll', 'pitch' and 'yaw' with respect to a satellite. Support your answer with neat sketches. What do you mean by 'Antenna Look Angles'.
   (d) Compare the major differences, advantages and disadvantages of FDMA and TDMA used in satellite communication.

2. (a) Explain in detail various types of satellite orbits. How launching of geostationary satellites is achieved ? 8
   (b) Explain what is meant by orthogonal polarisation and the importance of this in satellite communication. 4
   (c) Describe the 'tracking, telemetry and command' subsystem of a satellite communication system. 8

3. (a) With a neat and labelled diagram, explain double reflector antennas and shaped reflector system. 10
   (b) Derive the expression for Carrier-to-Noise-Ratio $\left[\frac{C}{N}\right]$ of a satellite communication link. 10
   Hence, solve the following :–
   In a satellite link, the propagation loss is 200 dB. Margins and other losses account for another 3 dB. The receiver $\frac{G}{T}$ is 11 dB and EIRP is 45 dBw. Calculate the received (C/N) for a system bandwidth of 36 MHz.

[TURN OVER

4. (a) Describe the principles of operation of code division multiple access. What effect do the unwanted signals have on the wanted signal ? 10

   (a) With the aid of a block schematic, explain various elements of an earth station. Why is it desirable to place the low-noise amplifier of the antenna end of the feeder cable ? 10

5. (a) Explain in detail various ways of propagation impairment that affect transmission of satellite signals. 10

   (b) What impact the earth eclipse of satellite has on satellite communication ? Explain in detail with the help of neat sketches. 10

6. (a) Explain in detail how electrical power requirement in a satellite is managed. What are the different means of power supply are adopted ? 10

   (b) What are the main considerations in the design of an earth station ? How design of small earth station is different from that of large earth stations ? 10

7. Answer the following (any **four**) :– 20

   (a) Kepler's Laws of planetary motion
   (b) Limits of visibility
   (c) Intermodulation noise
   (d) Single spot, Global spot and multiple spot beam antenna
   (e) Frequency bands used for satellite communication.

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BE EXTC sem-VIII (R) ;
Advance microwave Engg.

Con. 3030–11. (REVISED COURSE) RK–4752

(3 Hours) [Total Marks : 100

N.B. : (1) Question No. **1** is **compulsory**.
(2) Make use of **Z-Smith chart** wherever **necessary**.
(3) Assume **suitable** data if **required**.
(4) Solve any **four** questions from remaining **six** questions.

1. (a) Draw and explain in short, test set up to measure signal to noise ratio. **5**
(b) With neat diagram, define (i) power gain (ii) available power gain (iii) transducer power gain (iv) transducer power gain in 50 Ω system, for two port amplifier. **5**
(c) What are the causes of low frequency noise and high frequency noise associated with the mixer ? **5**
(d) Define and explain with neat diagram noise correlation matrix for general noisy two port network. **5**

2. (a) What are different techniques to obtain power amplifier linearity ? Draw and explain feed-forward technique. **10**
(b) Draw π and T equivalent configuration of CE bipolar transistor with noise sources. Also give equations of mean square values of noise generator and noise power spectral density due to noise sources, in a narrow frequency interval Δf. **10**

3. A GaAs FET is biased for minimum noise figure and has the following S-parameters and noise parameters at 4 GHz ($Z_0 = 50\ \Omega$) : $S_{11} = 0{\cdot}6 \angle -60°$, $S_{21} = 1{\cdot}9 \angle 81°$, $S_{12} = 0{\cdot}05 \angle 26°$, $S_{22} = 0{\cdot}5 \angle -60°$; $F_{min} = 1{\cdot}6$ dB, $\Gamma_{opt} = 0{\cdot}62 \angle 100°$, $R_N = 20\ \Omega$. For design purposes, assume the device is unilateral, and calculate the maximum error G_T resulting from this assumption. Then, using microstrip matching network, design an amplifier having a 2·0 dB noise figure with the maximum gain that is compatible with this noise figure. **20**

4. Design microstrip matching network for generating port and terminating port for a FET transistor oscillator at 10 GHz. An inductor ($L_G = 5$ ηH) is placed in series with the gate to increase the positive feedback and thus increase further instability. The S-parameters of the transistor have been converted from the common source into the common gate configuration and are given by – **20**

$$S = \begin{bmatrix} 2{\cdot}18 \angle -35° & 1{\cdot}26 \angle 18° \\ 2{\cdot}75 \angle 96° & 0{\cdot}52 \angle 155° \end{bmatrix}$$

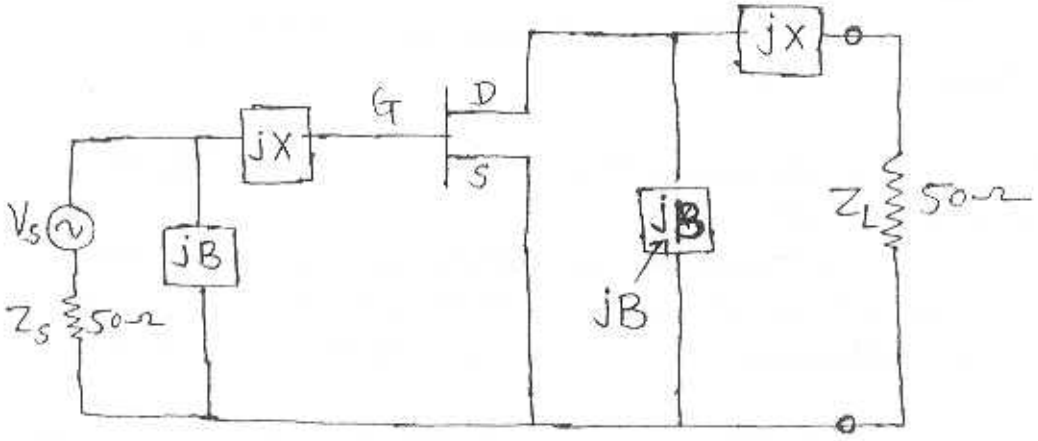
[TURN OVER

5. (a) Explain with neat sketch dielectric resonator coupled to a microstrip. Also draw it's equivalent circuit. **10**

(b) For a balanced mixer using two diode and a 90° hybrid junction, derive an expression for I.F. output current. **10**

6. A GaAs MESFET has the following S-parameters measured with a 50 Ω resistance at $V_{Ds} = 4$ V, $I_{DS} = 0{\cdot}9\ I_{DSS}$ at 9 GHz. Design the input and the output matching network for maximum power gain at 9 GHz, as shown in figure below, using lumped elements. **20**

$$[S] = \begin{bmatrix} 0{\cdot}55 \angle -150° & 0{\cdot}04 \angle 20° \\ 2{\cdot}82 \angle 180° & 0{\cdot}45 \angle -30° \end{bmatrix}$$



Desired amplifier circuit.

7. Write short notes on :–

(a) Power distributed amplifier **7**

(b) Leeson's model for oscillator phase noise **7**

(c) Balanced amplifier using 90° hybrid coupler. **6**