

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

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

(3) Assume **suitable** data wherever **necessary**.

(4) **Figures** to the **right** indicate **maximum** marks.

1. Explain the following :-

- (a) Stability criteria of an Amplifier 5
- (b) Unilateral figure of merit of an amplifier 5
- (c) DC Biasing networks 5
- (d) IMPATT Diode. 5

2. (a) Find the s-parameters of a transmission line and prove that its s-matrix **10** is symmetrical as well as reciprocal.
- (b) Explain the importance of signal flow graph for a microwave circuit. Define **10** the Mason's rules for evaluating a signal flow graph.

3. (a) A BJT has the following s-parameters :- 10

$$S_{11} = 0.65 \angle -95^\circ, \quad S_{21} = 5.0 \angle 115^\circ$$

$$S_{12} = 0.035 \angle 40^\circ, \quad S_{22} = 0.8 \angle -35^\circ$$

Is this transistor unconditionally stable ? If not, use resistive loading to make the transistor conditionally stable. What are the resistor values ?

- (b) Determine the stability of a GaAs FET that has the following s-parameters **10** at 2 GHz in a 50Ω system both graphically and mathematically :-

$$S_{11} = 0.89 \angle -60^\circ, \quad S_{21} = 3.1 \angle 123^\circ$$

$$S_{12} = 0.02 \angle 62^\circ \text{ and } S_{22} = 0.78 \angle -27^\circ$$

4. (a) Explain the following in case of Gunn effect devices :-

- (i) Domain formation 5
- (ii) Operating modes 5

- (b) Convert the h-parameters of two-port n/w into Z, Y and ABCD networks. **10**

Con. 7540-BB-4082-12.

2

5. (a) Derive the conditions for stable and sustainable oscillations in one and two port negative resistance oscillators. **10**
(b) Describe in detail Dielectric Resonance Oscillator, its coupling and tuning mechanism. **10**
6. (a) Explain RWH mechanism in Gunn-diode. **10**
(b) If the transistor has the following s-parameters at 5 GHz with 50Ω impedance **10**

$$S_{11} = 0.6 \angle -175^\circ, \quad S_{12} = 0.02 \angle 20^\circ$$

$$S_{21} = 2.2 \angle 35^\circ, \quad S_{22} = 0.6 \angle -95^\circ$$

Determine the stability criteria and plot the stability circles.

7. (a) Explain using suitable diagrams two methods of designing broadband amplifier. **10**
(b) Discuss the working principles of Avalanche and Transferred electron devices. **10**

M.E. EATC sem II 14 Dec - 2012

Sub - DCM.

D : scan Oct.12 329
Con. 7542-12.

BB-4604

(3 Hours)

[Total Marks : 100

- N.B. :** (1) Question No. 1 is **compulsory**.
(2) Attempt any **four** out of remaining **six** questions.

1. (a) Describe the need for Data Compression. Explain the different techniques for compression and the measures of performance. 10
(b) Explain the various approaches for Image Compression, based on different type of images. 10
2. (a) A source emits letters from an alphabet $A \{ a, b, c, d, e \}$ with probabilities $\{ 0.2, 0.4, 0.2, 0.1, 0.1 \}$ respectively – 10
(i) Calculate the entropy of the source
(ii) Find the Huffman code using both the Standard and the Minimum variance method.
(iii) Find the average length of the code and redundancy for both codes of part (ii).
(b) Explain the RLE compression method with respect to text and image. 10
3. (a) Explain the concept of static and adaptive dictionary. Explain with a suitable example the encoding using LZ 77. 10
(b) Describe the best case and worst case scenarios for LZ 77. Explain the LZ 78 algorithm specifying the improvements over the LZ 77 algorithm. 10
4. (a) Explain the JPEG compression method used for Image Compression. How is JPEG-LS different from JPEG? 10
(b) What is motion compensation w.r.t. video compression? Give the basic structure of MPEG-1 video standard. 10
5. (a) How is LPC employed in the modelling of a speech source? Explain how the coefficients for the predictor may be obtained. 10
(b) Why are CELP and MELP coders preferred for speech encoding? 10
6. (a) How can sub-band coding be effectively used for image compression? Give a general scheme for the same. 10
(b) What are the requirements for good compression algorithms to perform well in the ATN environment? Discuss giving examples. 10
7. Write notes on (any two) :- 20
(a) Arithmetic Coding
(b) Sibling Properties in Adaptive Huffman
(c) Vector Quantization.
(d) Progressive Image Transmission.

18/12/12

ME/ EXTC/ II/ Newtron

mobile communication system

61 : 2nd half.12-shilpa(e)

Con. 10322-12.

BB-4592

(3 Hours)

[Total Marks : 100

- N.B. :**
- (1) Question No. 1 is **compulsory**.
 - (2) Answer any **four** out of remaining **six** questions.
 - (3) Assume **suitable** data wherever **required** and justify same.

1. (a) Explain important specification of CT2 system. 5
- (b) Explain the signalling steps to connect two mobile subscribers in a wireless cellular network. 5
- (c) Explain cell sectoring and its advantages. 5
- (d) Explain in brief about Data Services in GSM. 5

2. (a) In relation to GSM explain :- 10
 - (i) Logical channel structure in GSM
 - (ii) Call flow sequences.
- (b) Explain the Radio aspects and network aspects of IMT 2000. 10

3. (a) For UPT, explain the functional architecture and service profile parameters. 10
- (b) Describe the algorithm and scheme of voice coding in TETRA system. 10

4. (a) Explain Intelligent cell concept and its applications. 10
- (b) Give the details of services, configurations and standards of PMR. 10

5. (a) List services provided by direct mode operation of TETRA system. 10
 Explain direct mode channel and call set up procedure.
- (b) Explain mobility management in TETRA system. 10

6. (a) List and explain functions of mobile to Base Link Entity (MLE) in TETRA system. 10
- (b) Discuss in brief Teleservices and supplementary services offered by TETRA system. 10

7. Write short notes on following :- 20
 - (a) Power control, soft handoff in CDMA
 - (b) Inter system signalling in TETRA
 - (c) SNMP model of managed network
 - (d) PMR user community.

ME | EXTC | II

4/12/12

ADC

12 : 2nd half. 12-AM(g)

Con. 7534-12.

BB-4088

(3 Hours)

[Total Marks : 100

- N.B. :** (1) Question No. 1 is **compulsory**.
(2) Attempt any **four** questions from the remaining **six** questions.

1. Write short notes on the following :—
 - (a) Slow Frequency Hopping and Fast Frequency Hopping 5
 - (b) Nyquist Criterion for band limited channels 5
 - (c) Linear modulation with memory 5
 - (d) Fractionally spaced equalizers. 5
2. (a) What are various source coding techniques for analog sources ? Explain Spectral Waveform Coding in detail. 10
(b) The output of a DMS consists of seven possible symbols with probabilities 0.35, 0.30, 0.20, 0.10, 0.04, 0.005, 0.005. Use a Huffman encoding procedure to find out the binary code for the source output. Also find the efficiency. 10
3. (a) Describe the basic concept of ISI. Discuss design of band limited signal with controlled ISI. 10
(b) What are adaptive equalizers ? Explain LMS algorithm with neat diagram. 10
4. (a) Define the modified Duobinary encoder. Derive and sketch the spectrum and impulse response. State the advantages of modified Duobinary encoder. 10
(b) Obtain signal space representation of BPSK, QPSK and Octal PSK. Obtain the Euclidean distance for each. Also draw the power spectral density of each. 10
5. (a) Describe in detail process of model based source coding. 10
(b) Give a detailed account of optimum receiver for CPM signals. 10
6. (a) Describe the need for the generation of P-n sequence in the implementation of DSSS. 10
(b) Explain Decision Feedback Equalizer. 10
7. Write short notes on any **two** of the following :— 20
 - (a) Miller Code
 - (b) Kalman Algorithm for Adaptive Equalizers
 - (c) Adaptive Delta Modulation and its advantage over Delta Modulation.

ME-(E+TC) SEM II

Nov-Dec 2012

Sat. Comm. Systems

13 : 2nd half. 12-AM(g)

Con. 7537-12.

BB-4085

(3 Hours)

[Total Marks : 100

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

1. Answer any **four** of the following :— 20
- (a) Explain why an Omni-directional antenna must be used aboard a satellite for Telemetry and command during launch phase.
 - (b) Define and explain -1 – dB Compression point. What is the significance of this point in relation to the operating point of a TWTA ?
 - (c) What is redundancy and why it is necessary for the satellite sub-system ?
 - (d) What is meant by station keeping of satellite ? What are N – S and E – W station keeping ?
2. (a) What is meant by the satellite stabilization ? Explain which type of stabilization is used in orbitising phase and explain it. 10
- (b) Explain launching process of Geo-satellite. 10
3. (a) What are the main considerations in the design of an earth station ? With the help of a block-diagram explain large earth station. 10
- (b) Compare and explain different type of Tracking in Satellite. 10
4. (a) Explain Regenerative type of repeater for K-band application. 10
- (b) Explain effect of Rain-depolarization, how it is compensated. 10
5. (a) Explain : Input back-off and Output back-off. 8
- (b) Explain synchronization of TDMA System. 8
- (c) Explain Sun transit outage. 4
6. (a) Explain various antennas used for Satellite Communication. 10
- (b) Explain Orthogonal Polarization and its significance in Satellite Communication System. 10
7. Write short notes on any **two** of the following :— 20
- (a) Thermal Control Sub-system
 - (b) Usefull orbits for Satellite Communication
 - (c) Link around for Satellite Communication
 - (d) Power Sub-system.
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