

Con. 9387-13.

BB-12460

(3 Hours)

[Total Marks : 100

- N. B. :** (1) Question No. 1 is **compulsory**.
 (2) Solve any **four** questions from the remaining **six** questions.
 (3) **Assume** suitable data, if **required**.

1. (a) Explain lossy and lossless compression with example. 20
 (b) What is the difference between scalar and vector quantization?
 (c) What is the advantage of minimum variance Huffman code over standard Huffman code?
 (d) How is differential coding useful in speech compression?
 - (a) Consider a discrete memoryless source with probabilities 0.3, 0.25, 0.25, 0.2, use Huffman encoding procedure to determine the binary code. Also explain the different measures of performance of data compression technique. 10
 (b) Compare Adaptive DPCM with DM. 10
 3. (a) Write the steps involved in LBG Algorithm. 10
 (b) Encode the string abracadabradabra with LZ78 method and decode the coded stream to get back the string. 10
 4. (a) Write various methods for speech synthesis. 10
 (b) How can sub-band coding effectively used for image compression? Explain with general scheme for the same. 10
 - (a) Explain with diagram sinusoidal encoder and decoder. 10
 (b) What is progressive image Transmission? Explain with example. 10
 6. (a) Write various steps involved in standard JPEG for still image compression. 10
 (b) Explain with example fractal image compression. 10
 7. Write notes on (any two):— 20
 - (a) Facsimile Transmission
 - (b) MPEG
 - (c) Run-length-encoding
 - (d) Transform coding.
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(3 Hours)

[Total Marks : 100]

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 (2) Attempt any **four** from remaining **six** questions.
 (3) Assume suitable **data** if **necessary**.

1. (a) Explain why 5 meter diameter antenna for satellite communication not require tracking, where as 30 metere diameter antenna require tracking of satellite. **20**
- (b) What is meant by "Redundant" Earth Station ?
- (c) Explain what are look angles and coverage angles.
- (d) Calculate maximum satellite eclipse period by explaining the geometry involved in it.

2. (a) Explain and compare satellite launching methods using space shuttle and expendable launcher. **10**
- (b) What are "Transperant" and "Regenerative" repealers ? Explain using block diagrams. **10**

3. (a) What is "orbital perturbation" and its effect ? Explain in details. **10**
- (b) Explain various "Polarization Techniques" used for satellite communication, why is faraday rotation of no concern with circularly polarized waves. **10**

4. (a) A C - band earth station has an antenna with a transmit gain of 54 dB. The transmitter output power is set to 100 watts at a frequency of 6.1 GHz. The signal is received by a sattellite at a distance of 37,500 km, by an antenna with a gain of 26 dB. The signal is then routed to a transponder with a noise temperature of 500 K, a bandwidth of 36 MHz and a gain of 110 dB :- **10**
 - (i) calculate the path loss at 6.1 GHz. wavelength is 0.04918 m.
 - (ii) calculate the power at the outport port of the satellite antenna, in dBW.
 - (iii) calculate the C/N ratio, in dB, at the input of the transponder.
- (b) Explain with the help of block diagram explain Telemetry, Tracking and command systems in satellite communication. **10**

5. (a) What is "Frame Efficiency" in TDMA system ? Explain synchronization techniques used in TDMA system. **10**
- (b) Calculate the overall carrier- to -noise ratio of an FDM / FM / FDMA link. Also explain the effect of Intermodulation Noise in the link performance. **10**

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6. (a) State the type of satellite antenna normally used to produce a wide beam radiation pattern, providing "Global Coverage." How are "Spot Beams" formed? **10**
- (b) Explain "STATION KEEPING". Also compare "Spin Stabilization" and "3-axis Stabilization" methods. **10**
7. Write a short notes on (any **four**):- **20**
- (a) Link Budget
 - (b) CDMA
 - (c) VSAT Networks
 - (d) Reliability of Space Craft subsystems.
 - (e) Earth Station design considerations.

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BB-12445

(3 Hours)

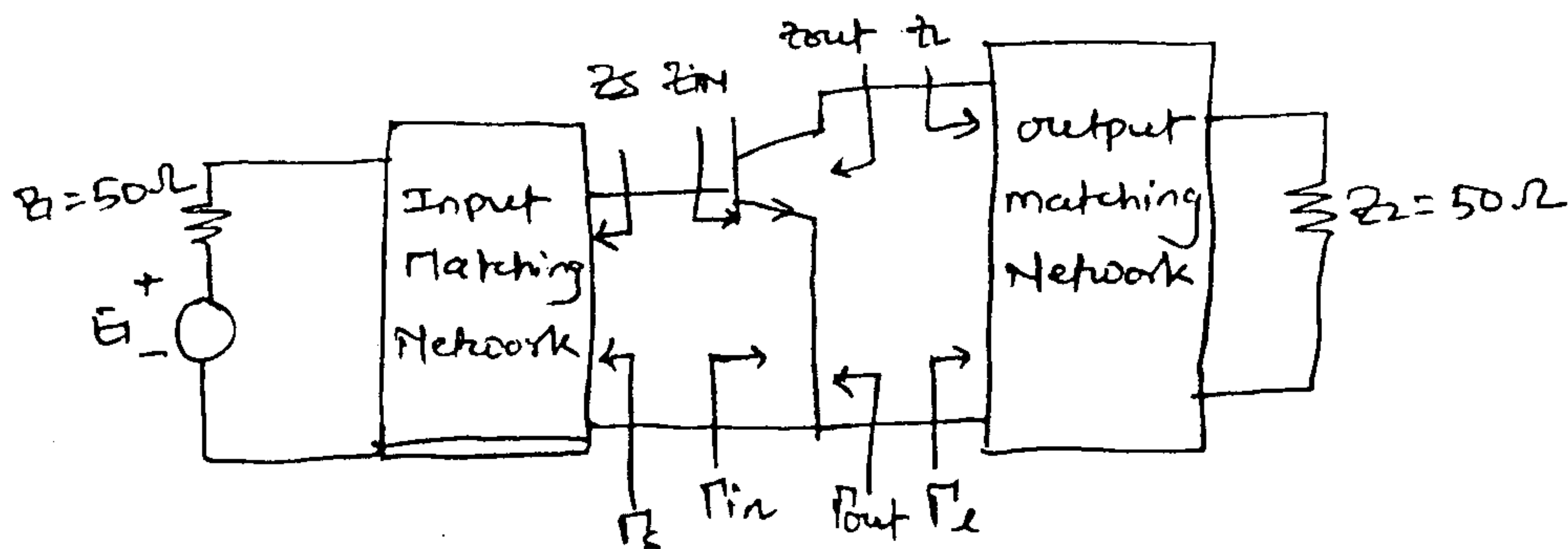
[Total Marks : 100

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

1. Write short notes on following:-

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|---|---|
| (a) Stability Criteria of Amplifier. | 5 |
| (b) Impatt diode. | 5 |
| (c) Smith chart and Compressed Smith chart. | 5 |
| (d) Quarter wave transformer. | 5 |

2.a) Discuss various design considerations of Microwave Amplifier. The input and output matching networks of following Amplifier are designed to produce :- 14
 $\Gamma_s = 0.5 \angle 120^\circ$ and $\Gamma_l = 0.4 \angle 90^\circ$. The S-parameters for transistor are,
 $S_{11} = 0.6 \angle -160^\circ$, $S_{12} = 0.045 \angle -60^\circ$, $S_{21} = 2.5 \angle 30^\circ$, $S_{22} = 0.5 \angle -90^\circ$.
 Calculate P_{avs} , P_{in} , P_{avn} , P_l if $E_1 = 10 \angle 0^\circ$, $Z_1 = Z_2 = 50 \Omega$?
 Calculate $VSWR_{in}$ and $VSWR_{out}$?



- | | |
|---|----|
| b) What is Unilateral figure of merit of an Amplifier? | 6 |
| 3.a) How many types of 2-port network parameters are there? Convert the h-parameter of 2-port network into their Z, Y, and transmission parameters. | 14 |
| b) Using Smith chart explain how impedance matching is obtained using single stub? | 6 |
| 4.a) Derive the conditions for stable and sustainable oscillations in one and two port network negative resistance oscillators? | 12 |
| b) Define S-parameters for 2-port network and describe the method to measure the same. | 8 |
| 5.a) Explain the domain formation and operating modes in GUNN diode. | 10 |

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- b) The S-parameters for the GA MESFET at 9 GHz with 50Ω impedance are, **10**
 $S_{11} = 0.64 \angle -170^\circ$, $S_{12} = 0.05 \angle 15^\circ$, $S_{21} = 2.10 \angle 30^\circ$, $S_{22} = 0.57 \angle -95^\circ$.
 Calculate the following :-
 (i) Delta factor
 (ii) Stability factor
 (iii) Centre and radius of Input stability circle and plot them in Smith chart.
- 6 a) Draw the equivalent circuit of transmission line and calculate its S-parameters. Prove that its S-matrix is Symmetrical and Reciprocal. **10**
- b) Derive the expressions for power gain (G), Available gain (GA) and Transducer gain (GT) for an Amplifier. **10**
- 7 a) Realize 20 nH inductor using section of transmission line at 1.8 GHz and $Z_0 = 50 \Omega$. **5**
- b) Explain the functioning of Hartley and Colpitt oscillators. **10**
- c) Explain RWH mechanism in GUNN diode. **5**

II (OLD) ~~MAINS~~ ADC

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Con. 7917-13.

BB-12451

(3 Hours)

[Total Marks : 100

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

1.	(A) Decision feedback equalizers (B) Lempel ziv algorithm (C) Optimum maximum likely load receiver (D) Vector quantization	(20)
2.	(A) The output of DMS consists of letters x_1, x_2, x_3 with probabilities 0.45, 0.35 and 0.20, respectively. Find out the efficiency using Huffman code. If pairs of symbols are encoded using Huffman code, find out the efficiency? Comment on your result. (B) Wrote a short note on Slow frequency hopping and high frequency hopping	(10) (10)
3.	(A) Explain the concept of transition probabilities, transition matrix and transition diagram in Markov chain process. (B) Describe the basic concept of ISI. State and prove Nyquist theorem for band limited signals.	(10) (10)
4.	(A) For a binary data 1 0 0 0 0 1 1 1 1 0 1 0, draw the output waveforms for duo binary encoder with pre coder. What are the drawbacks of duo binary encoder? Derive the transfer function and plot it. Also derive the impulse response. (B) What is continuous phase modulation system (CPM)? Draw the phase trajectory for binary CPFSK.	(10) (10)
5.	(A) What are the properties of PN sequences? Explain any one method of PN sequence generation. (B) What are adaptive equalizers? With neat block diagram, explain the working of adaptive equalizers with feedback.	(10) (10)
6.	(A) What are linear equalizers? Explain peak distortion criteria for linear equalizers in detail. (B) Describe in detail process of model based source coding.	(10) (10)
7.	Discuss the following in details. (A) QAM and associated power constraints. (B) Miller codes.	(20)