Time: 3 hour   Max Marks: 80

Note: 1.Each question carries 20 marks
   2: Question no 1 is compulsory
   3: Solve any 3 out of remaining
   4: Assume suitable data wherever required.

Q1. Solve any four   **20**
A   What is the stability in Amplifier? Why the stability parameter µ is required though Δ
     and K are there?
B   Explain the power amplifier performance parameters
C   Explain Richard's Transformation
D   Explain working principal of Image Reject Mixer.
E   Draw one port oscillator circuit.Find value of R_L which maximizes oscillator power .

Q2 A) Design a low pass filter whose input and output are matched to a 50 Ω   **10**
 impedance with cut off frequency of 3 GHz, equi-ripple of 0.5 dB and rejection
 of at least 40 dB at approximately twice the cut-off frequency.
B) Design an amplifier for a power gain of 15 dB at a frequency of 3 GHz, if the   **10**
 selected bipolar transistor with $V_{CE} = 4V$ and Ic = 5 mA has following S parameters.
S11 = $0.7 \angle -155^0$, S12= 0, S21 = 4 $\angle 180^0$, S22 = $0.51 \angle -20^0$

Q3 A) An amplifier is having gain of 11 dB at 4 GHz. Plot constant gain circles for   **10**
 Gs =2 dB and 3 dB and G_L = 0 dB and 1dB using following S parameters.
 S11 = $0.75 \angle -120^0$, S12= 0, S21 = 2.5 $\angle 80^0$, S22 = $0.6 \angle -70^0$
B) An N =3 Chebyshev band pass filter is to be designed with 3 dB pass band ripple.   **10**
 The centre frequency is at 2.4 GHz and the filter has to meet bandwidth requirement
of 20%. The filter has to be inserted into 50Ω characteristics line impedance.
 Find the inductive and capacitive elements.

Q4 A) What is the indirect frequency synthesis? What is the effect of choice of   **10**
reference frequency (fr) on the performance of frequency synthesizer?
B) Explain in detail phase noise and its effect on oscillator design.   **10**

Q5. A) Explain LISN in detail and how it is useful in conducting EMI tests.   **10**
B) What is shielding? Explain shielding effectiveness.   **10**

Q6. A) Explain variable modulus along with its expression.   **10**
B) What is ESD? Model ESD waveform and explain equivalent circuit model for ESD.   **10**

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TABLE 8.4 Element Values for Equal-Ripple Low-Pass Filter Prototypes ($g_0 = 1$, $\omega_c = 1$, $N = 1$ to 10, 0.5 dB and 3.0 dB ripple)

					0.5 dB Ripple						
N	g_1	g_2	g_3	g_4	g_5	g_6	g_7	g_8	g_9	g_{10}	g_{11}
1	0.6986	1.0000									
2	1.4029	0.7071	1.9841								
3	1.5963	1.0967	1.5963	1.0000							
4	1.6703	1.1926	2.3661	0.8419	1.9841						
5	1.7058	1.2296	2.5408	1.2296	1.7058	1.0000					
6	1.7254	1.2479	2.6064	1.3137	2.4758	0.8696	1.9841				
7	1.7372	1.2583	2.6381	1.3444	2.6381	1.2583	1.7372	1.0000			
8	1.7451	1.2647	2.6564	1.3590	2.6964	1.3389	2.5093	0.8796	1.9841		
9	1.7504	1.2690	2.6678	1.3673	2.7239	1.3673	2.6678	1.2690	1.7504	1.0000	
10	1.7543	1.2721	2.6754	1.3725	2.7392	1.3806	2.7231	1.3485	2.5239	0.8842	1.9841

					3.0 dB Ripple						
N	g_1	g_2	g_3	g_4	g_5	g_6	g_7	g_8	g_9	g_{10}	g_{11}
1	1.9953	1.0000									
2	3.1013	0.5339	5.8095								
3	3.3487	0.7117	3.3487	1.0000							
4	3.4389	0.7483	4.3471	0.5920	5.8095						
5	3.4817	0.7618	4.5381	0.7618	3.4817	1.0000					
6	3.5045	0.7685	4.6061	0.7929	4.4641	0.6033	5.8095				
7	3.5182	0.7723	4.6386	0.8039	4.6386	0.7723	3.5182	1.0000			
8	3.5277	0.7745	4.6575	0.8089	4.6990	0.8018	4.4990	0.6073	5.8095		
9	3.5340	0.7760	4.6692	0.8118	4.7272	0.8118	4.6692	0.7760	3.5340	1.0000	
10	3.5384	0.7771	4.6768	0.8136	4.7425	0.8164	4.7260	0.8051	4.5142	0.6091	5.8095

Source: Reprinted from G. L. Matthaei, L. Young, and E. M. T. Jones, *Microwave Filters, Impedance-Matching Networks, and Coupling Structures*, Artech House, Dedham, Mass.,1980, with permission.

Duration: 3hrs   **[Max Marks:80]**

N.B. : **(1) Question No 1 is Compulsory.**
        (2) Attempt any three questions out of the remaining five.
        (3) All questions carry equal marks.
        (4) Assume suitable data, if required and state it clearly.

1		Attempt any FOUR	**[20]**
	a	Explain wireless network architecture.	
	b	Introduce UWB with its working.	
	c	Discuss the exponential backoff algorithm used in WLAN.	
	d	Write short note on "IEEE 802.16 standard".	
	e	What is mobile adhoc network? Highlight on MAC protocols.	
2	a	Describe WBAN architecture with diagram.	**[10]**
	b	Explain Bluetooth security features and security levels with proper diagrams.	**[10]**
3	a	Explain zigbee network components and network topologies.	**[10]**
	b	Explain RFID technology with radio specifications and architecture.	**[10]**
4	a	What are the factors influencing design of Wireless Sensor Network. Describe the components of a sensor node.	**[10]**
	b	Draw the suitable diagrams for the downlink and uplink link budgets for GSM 1800 and give their equations of signal received(S) and noise (N).	**[10]**
5	a	Explain different planning and designing phases in Wireless Networks.	**[10]**
	b	Discuss the classifications MANET routing protocols.	**[10]**
6	a	Compare main features of IEEE 802.11 a,b,i and n.	**[10]**
	b	Explain the framework and architecture of IoT.	**[10]**

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Time: 3 Hour   **Marks: 80**

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

(2) Solve any three questions from the remaining five

(3) Figures to the right indicate full marks

(4) Assume suitable data if necessary and mention the same in the answer sheet.

Q1. Attempt any 4 questions   **[20]**

    A)   What are the perspectives of Network Managers?

    B)   Show the encoding for the INTEGER 1456.

    B)   Explain in brief OSI Management System Architecture.

    C)   Explain the basic objectives and need for a TMN.

    D)   Analyze five-step process involved in Fault management.

    E)   Explain in detail the Broadband Service Networks.

Q2. A) How Network provisioning play role in Configuration Management.   **[5]**

    B) Show the encoding for the OCTET STRING "Hello World."   **[5]**

    C)   Explain Performance Metrices to defining network performance on a global level. **[5]**

    D) Justify the role of SNMP and ILMI in ATM Management.   **[5]**

Q3 A) Elaborate the encoding methods used in SMI   **[5]**

    B) What is ATM LAN emulation   **[5]**

    C) Explain different types of reports used in Report Management.   **[5]**

    D) Draw and explain TMN Functional Architecture.   **[5]**

Q4   A) Explain ATM Network Reference Model   **10**

     B) Draw and explain SNMPv3   **10**

Q5   A) Classify and explain the OSI network management organizational model.   **10**

     B) Explain M1, M2, M3, M4, M5 interface in Network Management.   **10**

Q6   A) What do you mean by event corelation technique. Propose and explain any two   **10**
     event corelation techniques.

     B) Classify the services provided by Common Management Information Service   **10**
     Elements (CMISEs) and also explain the communication protocol used for
     intersystem communication (CMIP).

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Duration: 3hrs **[Max Marks:80]**

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

(2) Attempt any three questions out of the remaining five.

(3) All questions carry equal marks.

(4) Assume suitable data, if required and state it clearly.

1	Attempt any **FOUR**	**[20]**
a	Explain polarization	**[5]**
b	Explain the various frequency bands used in satellite communication. List out advantages and disadvantages of 6/4 GHz band used in satellite communication	**[5]**
c	Compare DS- CDMA & FH-CDMA	**[5]**
d	Explain the parameters that control the design of earth station	**[5]**
e	Write a short note on bath tub curve.	**[5]**

2 a Draw and explain simplified block diagram of satellite transponders: **[10]**
a. Single conversion C band. b. Double conversion Ku band

b Define the following with respect to TWTA amplifier **[10]**

a. 1 dB compression point

b. Input and Output back-off

c. 3rd order Inter-modulation Noise

d. Am/PM conversion coefficient

3 a A multiple carrier satellite circuit operates in the 6/4-GHz band with the following **[10]**
characteristics. Uplink: Saturation flux density 67.5 dBW/m2 ; input BO 11 dB;
satellite G/T 11.6 dBK 1 . Downlink: Satellite saturation EIRP 26.6 dBW;
output BO 6 dB; free-space loss 196.7 dB; earth station G/T 40.7 dBK 1 . For
this example, the other losses may be ignored. Calculate the carrier-to-noise
density ratios for both links and the combined value

b Explain **[10]**

(1) Lobe switching

(2) Mono pulse tracking

(3) step tracking

(4) intelligent tracking

4 a Explain TDMA frame structure and Unique word detection in detail. **[10]**

   b Draw a block diagram of TVRO or DBS system and explain each block in brief **[10]**

5 a Write a short note on **[10]**

     a. Sun-synchronous orbit.

     b. Polar orbit

     c. Molynia orbit

     d. Sun transit outage

     e. Solar and Sidereal day

   b Derive general link equation. Find expression for C/N and G/T ratio. Explain **[10]** importance of these ratios in satellite link design.

6 a Differentiate MCPC and SCPC FDMA systems and explain SPADE system in **[10]** detail,

   b What are the different types of lasers used for satellite communication? Explain **[10]** acquisition link model for optical communication

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