NB : 1. Question no.1 is compulsory.
    2. Answer any 4 from the remaining 6.
    3. Assume suitable data if required.

Q.1.a. Is the system $y(n) = \ln[x(n)]$ is linear and time invariant?   20
    b. What are the quantization errors due to finite word length registers in digital filters?
    c. Distinguish between Butterworth and Chebyshev filter.
    d. What is a window in FIR filter design and why it is necessary?

Q.2.a. Compute the DFT of a sequence $(-1)^N$ for N=4.   10
    b. Using linear convolution find y(n) for the sequences x(n)= (1,2,-1,2,3,-2,-3,-,1,1,2,-1) and   10
        h(n) =(1,2). Compare the result by solving the problem using overlap save method and
        overlap add method.

Q.3.a. Compute 8 – point DFT of a sequence x(n)= { 1,2,3,4,4,3,2,1}   10
    b. Find the response of the difference equation given   10
        y(n)−5y(n-1) + 6y(n-2) = x(n) for x(n)=u(n)

Q.4.a. Design a Chebyshev analog high pass filter that will pass all radian frequencies greater   10
        than 200 rad/sec with no more that 2 dB attenuation and have a stop band attenuation
        of greater than 20 dB for all Ω less than 100 rad/sec.
        Compare bilinear transformation and impulse invariance methods,(2 points of each)

    b. Determine the frequency response of the FIR filter defined by   10
        y(n)= 0.25x(n) + x(n-1) + 0.25 x(n-2). Calculate the phase delay and group delay.

Q.5.a   An FIR filter is given by the difference equation   10
        $y(n) = 2\, x(n) + \dfrac{4}{5}\, x(n-1) + \dfrac{3}{2}\, x(n-2) + \dfrac{2}{3}\, x(n-3).$
        Determine the lattice form.
    b. Write a short note on dual tone multi frequency detection using Goertzel's algorithm.   10

Q.6.a. Explain poly phase structure of a decimator for 3 branches, L branches and with a   10
        commutator.
    b. Write a short note on sub band coding of speech signals and explain the function of   10
        every block.

Q.7.   Write short notes on any two:

    a. Set top box for digital TV reception.
    b. Adaptive television echo cancellation.
    c. Application of DTSP in radar.

Con. 3568–11.   **(REVISED COURSE)**   **RK–3462**

(3 Hours)   [Total Marks : 100

N.B. : (1) Question No. **1** is **compulsory.**
      (2) Attempt any **four** questions out of remaining **six** questions.
      (3) Assumptions made must be **clearly** stated.

1. (a) Discuss about frequency rulse used in cellular system.   5
   (b) List and discuss factors influencing small scale fading.   5
   (c) Explain security algorithm in GSM.   5
   (d) Derive relationship between capacity C of system and cluster size N.   5

2. (a) How is mobility managed in CDPD ?   10
   (b) List and explain specifications of radio transmission in GSM system.   10

3. (a) Give a complete functional account on NSS.   10
   (b) How does sectoring improve S/I in cellular system ?   10

4. (a) Consider a transmitter which radiates a sinusoidal carrier frequency of 1850   10
MHz. For a vehicle moving 60 mph, compute the received carrier frequency
if the mobile is moving :–
    (i) directly toward the transmitter
    (ii) directly away from the transmitter and
    (iii) in a direction which is $\perp^{ar}$ to the direction of arrival of the transmitted
      signal.
   (b) Sketch the block diagram of reverse IS–95 channel modulation process for   10
a single user. Explain function of each block.

5. (a) For the two ray ground reflection model; derive the expression for received   10
power at a distance 'd' from the transmitter.
   (b) Discuss 1MT 2000 system.   10

6. (a) Discuss GPRS technology.   10
   (b) Give the 3G CDMA evolutionary path.   10

7. Write short notes on :–   20
    (a) Authentication in GSM
    (b) Rake receiver
    (c) Handoff procedure
    (d) SDMA.

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AGJ 1st half (p) 14

Con. 3448-11.

RK-3444

(3 Hours) [Total Marks : 100

N.B. : (1) Question No. **1** is **compulsory** and answer any **four** questions out of remaining **six** questions.

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

(3) **Figures** to the **right** indicate **full** marks.

Q1) a) list out different characteristics of microwaves. 5

b) What are different microwave bands? What are different microwave applications? 5

c) Differentiate between waveguide and transmission lines. 5

d) Explain in brief point contact diode and its applications. 5

2) a) explain single stub impedance matching method . What are its advantages and disadvantages? 10

b) Calculate the position and length of short circuited stub design to match 200 +j 300 load to a transmission line whose characteristics impedance is 300 ohm.(use smith chart) 10

Q 3) a) Compare TE and TM modes of rectangular waveguide. 10

b) Derive equations for phase velocity, cutoff frequency, cutoff wavelength and field equations for circular waveguide. 10

Q 4) a) Describe construction and working of two hole directional coupler along with its s-matrix. 10

b) Describe operation of following devices using faraday's rotation principle.

i) Isolator. ii) Gyrator. 10

5) a) what is TWT? Explain its construction and amplification process.. 6

b) Compare klystron and magnetron. 8

c) A travelling wave tube has the following characteristics. Beam voltage V0=3 Kv., beam current Io=10 ma. Frequency f= 8.5 GHz.Circuit length N=42. Chatecteristics impedance =120 ohm. Determine i) gain parameter ii) phase constant iii) power gain. 6

Q 6) a) Describe different modes of oscillations of Gunn diode. 10

b) Explain in brief operation of IMPATT diode and compare it with varactor diode. 10

Q7 a) discuss design procedure for filters using image parameter method. 10

b) Explain measurement procedure for

i) Microware frequency. ii) Antenna gain. 10

AGJ 1st half (p) 15

The Complete Smith Chart

Black Magic Design
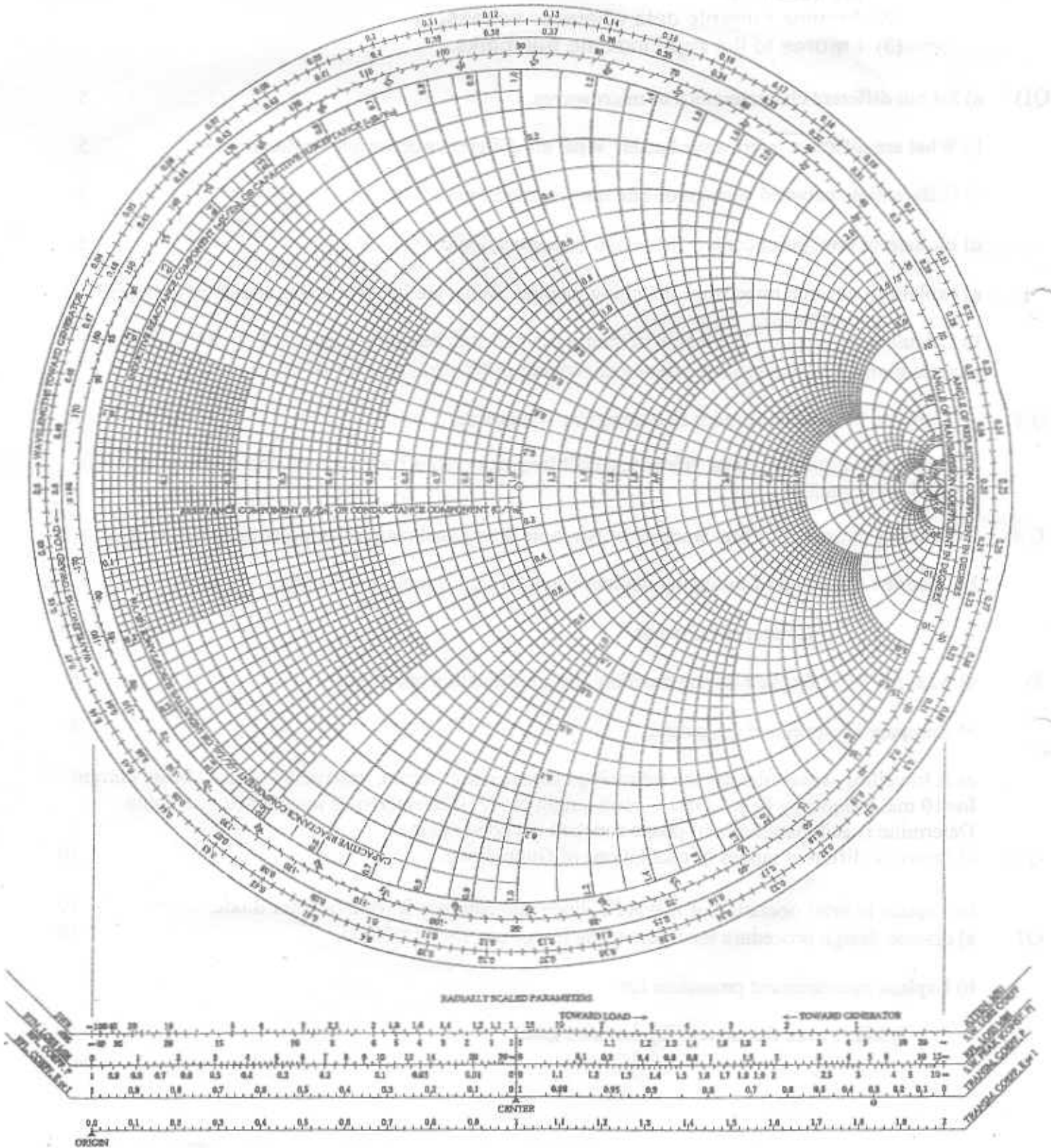
RADIALLY SCALED PARAMETERS

CENTER

ORIGIN

Con. 3863-11.   (REVISED COURSE)   RK-3447

(3 Hours)   [Total Marks : 100

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

1. (a) What are the various measures of performance of data compression ?   5
    (b) List the various lossless techniques of image compression and explain one of them. 5
    (c) What are the principles of public key cryptography ?   5
    (d) What are viruses and worms and how are they threat to system security ?   5

2. (a) With A = {a, b, c, d} and P {0·35, 0·25, 0·2, 0·1} respectively. Encode the message 10
         'dcbad' using arithmetic coding and also decipher the real value tag generated.
    (b) What are the various aspects of conventional encryption ? Discuss the types of attacks. 10

3. (a) Encode the string 'uvwx uvwx uvwx' using L Z W. Also decode the codes to get 10
         back the string.
    (b) What are the various types of DES ? What are the type of operations performed 10
         in DES ?

4. (a) How are differential encoding schemes used in audio compression ?   10
    (b) Explain Chinese Remainder Theorem with an example.   10

5. (a) Discuss the various layers of MPEG encoder and decoder.   10
    (b) What are the various ways in which message authentication can be done ?   10

6. (a) What are the main features of video compression ? How is the encoding and decoding 10
         done in a video sequence ?
    (b) What is a firewall and how can they be designed for effective security ?   10

7. Write notes on (any **two**) :—   20
    (a) Biometric Authentication
    (b) Digital Signatures
    (c) JPEG 2000
    (d) A-Law and µ Law Companding.

Con. 4028-11.   (REVISED COURSE)   RK-3459

(3 Hours)   [Total Marks : 100

N.B. : (1) Question No. **1** is **compulsory**.
(2) Solve any **four** questions from the remaining **six** questions.
(3) **Figures** to **right** indicate **full** marks.

1. (a) Explain bit 'stuffing'.   5
    (b) What is Address Resolution Protocol ?   5
    (c) How does reservation work in Medium Access Control ?   5
    (d) What is the use of Subnet Mask in IP addressing ?   5

2. (a) Compare Circuit Switching, Packet Switching and Message Switching.   10
    (b) Explain the Bellman Ford Algorithm.   10

3. (a) Explain the ISO-OSI model in detail and compare it with the TCP/IP model.   10
    (b) Classify the various networking and Internet working devices and explain   10
        their functions in detail.

4. (a) Explain how the sliding window protocol is used for error control.   10
    (b) Explain the roll of TCP and UDP in data communication and compare them.   10

5. (a) Draw the IP packet format and explain each field in detail.   10
    (b) Explain the various types of HDCL frames in detail.   10

6. (a) What is IP Multicasting ? Explain the Protocol which supports IP Multicasting.   10
    (b) What is IP fragmentation ? How is it implimented ? How is the length of   10
        a fragment determined ?

7. Write short notes on –   20
        (a) Classless Interdomain Routing
        (b) The M/G/I model
        (c) Network Topologies.