BE / EXTC / VII (REV)
DTSP 26/11/12

87 : 12 D:sd.mk

Con. 8402-12. **KR-1068**

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

N.B. (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from the remaining **six** questions.
(3) Assumptions made should be **clearly** stated.

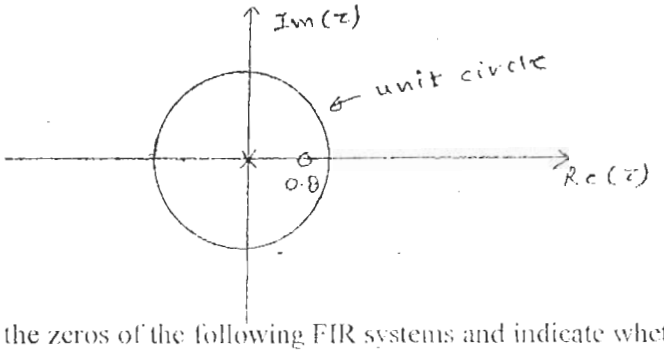
1. (a) Periodic analog signal will always remain periodic when converted into digital signal. Is it true or false ? Justify your answer. **5**
(b) Frequency domain representation of a periodic discrete time signal is a periodic. Is it true or false ? Justify your answer. **5**
(c) Obtain the pole-zero plot of a causal symmetrical linear phase FIR filter with odd number of coefficients, assuming smallest length, if it is known to have zeros at $z = j$, $z = 1$, $z = -1$. **5**
(d) A high pass linear phase FIR filter has a magnitude response — **5**
$|H(e^{jw})| = 4 \sin(aw) - 3 \sin(bw)$
Find values of 'a' and 'b' assuming minimum value of N. Obtain corresponding impulse response.

2. (a) Classify the following (i.e. (A), (B) and (C)) as — **12**
(i) Linear phase/Non-linear phase
(ii) FIR/IIR
(iii) All pass/high pass/low pass/band pass
(iv) Stable/unstable —

(A) $H(e^{jw}) = 3e^{-2jw}$

(B) $H(z) = \dfrac{z + 0.6}{z - 0.8}$

(C) Given following pole-zero plot.



(b) Determine the zeros of the following FIR systems and indicate whether the system is minimum phase, maximum phase or mixed phase. **8**
(i) $H(z) = 6 + z^{-1} + z^{-2}$
(ii) $H(z) = 1 \quad z^{-1} \quad 6z^{-2}$

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(iii) $H(z) = 1 - \frac{5}{2} z^{-1} - \frac{3}{2} z^{-2}$

(iv) $H(z) = 1 - \frac{5}{6} z^{-1} - \frac{1}{3} z^{-2}$

3. (a) Design a causal digital high pass filter using windowing technique to meet the following specifications : **10**

Passband edge : 9·5 kHz
Stopband edge : 2 kHz
Stopband attenuation : ≥ 40 dB
Sampling frequency : 25 kHz

(b) Obtain the analog transfer function of a Butterworth low-pass filter with following specifications :— **10**

Passband edge (Ωp) = 250 rad/sec.
Passband attenuation ≤ 0·1 dB
Stopband edge (Ωs) = 2000 rad/sec.
Stopband attenuation ≥ 60 dB

4. (a) (i) If x(n) = { 1 + 2j, 3 + 4j, 5 + 6j, 7 + 8j }. Find DFT X(k) using DIFFFT. **5**

(ii) Using the results obtained in (i) above and not otherwise, find DFT of following sequence : **5**

$x_1(n)$ = { 1, 3, 5, 7 } and
$x_2(n)$ = { 2, 4, 6, 8 }

(b) Obtain direct from I, direct form II realization to second order filter given by — **10**

$y(n) = 2\ b \cos(w_0)\ y(n-1) - b^2\ y(n-2) + x(n) - b \cos(w_0)\ x(n-1)$

5. (a) Using linear convolution find y(n) for the sequence — **10**

x(n) = { 1, 2, –1, 2, 3, –2, –3, –1, 1, 2, –1 } and h(n) = { 1, 2 }

Compare the result by solving the problem using overlap and add method.

(b) Find the response of the difference equation given by — **10**

y(n) = 5y(n –1) – 6y(n – z) + x(n) for x(n) = u(n).

6. (a) Explain up-sampling by an integer factor with neat diagram and waveforms. **10**

(b) Why is the direct form FIR structure for the multirate system inefficient ? **10**
Explain with neat diagram, how this inefficiency is overcome in implementing a decimator and an interpolator.

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

(a) Frequency sampling realization of FIR filters
(b) Goertzel algorithm
(c) Set-top box for digital TV reception
(d) Adaptive echo-cancellation
(e) Comparison of FIR and IIR filters.

5 : 2nd half-12-(h) JP

Con. 8373-12. KR–1188

(3 Hours) [Total Marks : 100

N.B.: (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Assume **suitable** data wherever **necessary**.

1. (a) Explain features of CDMA. 20
(b) Explain the factors influencing small scale fading.
(c) Compare cordless telephony, paging system and cellular system.
(d) Discuss power control in 3G system.

2. (a) List and explain various methods to improve the cell capacity. 10
(b) Explain frame structure used in GSM. 10

3. (a) Compare TDMA, CDMA, FDMA and SDMA. 10
(b) Explain GSM speech processing in detail. 10

4. (a) Explain the major 3G RTT proposals. 10
(b) Define the following :— 10
(i) Discontinuous transmission
(ii) Subscriber Identity Module (SIM).

5. (a) Discuss handoff procedure in CDPD with neat sketch. 10
(b) Derive the relationship between S/I (Signal to Interference) and cluster size N. 10

6. (a) With a neat diagram, explain forward CDMA channel. 10
(b) Explain an impulse response model of a multipath channel. 10

7. Write short notes on :— 20
(a) Diversity methods
(b) Umbrella cell approach
(c) Types of mobile data networks
(d) Channel assignment strategies.

B. E. EATC sem VII (Rev) Dec.-12

Sub.- FME.

7 : 2nd half.12-AM(j)

Con. 8416-12. **KR-1305**

(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.

1. (a) State and explain Lorentz Reciprocity theorm. 5
   (b) Enumerate and explain the advantage and application of Microwaves. 5
   (c) Differentiate between Waveguide and Transmission Lines. 5
   (d) A 50 Ω transmission line is matched to a 10 V source that feeds a load $Z_L = 100\ \Omega$. If the line is 2·3 λ long and has an attenuation constant $\alpha = 0{\cdot}5$ dB/λ. Find the power that are delivered by the source lost in the line and delivered to the load. 5

2. (a) Explain the working and derive S matrix for a two hole directional coupler. 10
   (b) Derive the expression for velocity modulation process for two cavity klystrons. 10

3. (a) Derive expression for phase velocity, cut off frequency, cut off wavelength and field equation for circular waveguide. 10
   (b) A lossless line of characteristic impedance $R_0 = 50\ \Omega$ is to be matched to a load $Z_L = 50/\left[2+j\left(2+\sqrt{3}\right)\right]\Omega$ by means of a lossless short-circuited stub. The characteristics impedance of the stub is 100 Ω. Find the stub position and length so that a match is obtained. 10

4. (a) Explain the working of a negative resistance Parametric amplifier and explain its application. 10
   (b) An n GeP Ga Asn GaAs heterojunction transistor at 300°K has the following Parameter — 10

Donor density in n Ge region	$N_d = 5 \times 10^{18}\ cm^{-3}$
Acceptor density in P GaAs region	$N_a = 6 \times 10^{16}\ cm^{-3}$
Hole life time	$\tau_p = 6 \times 10^{-6}$ sec
Bias voltage at emitter junction	$V_E = 1$
Cross section	$A = 2 \times 10^{-2}\ cm^{-2}$

Compute :—
(i) The built in voltage in the P GaAs side
(ii) The hole mobility
(iii) The hole diffusion constant
(iv) The minority hole density in the nGe region
(v) The minority electron density in the P GaAs region
(vi) The diffusion length
(vii) The emitter junction current.

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5. (a) A reflex klystron operates under following condition. V_0 = 600 V L = 1 mm R_{sh} = 15 KΩ e/m = $1{\cdot}759 \times 10^{11}$ f_r = 9 GHz. the tube is oscillating at f_r at the peak of the n = 2 mode or $1\frac{3}{4}$ mode. Assume that the transit time through the gap and beam loading can be neglected. **8**
   (i) Find the value of repeller voltage V_r.
   (ii) Find the direct current necessary to give a Microwave gap voltage of 200 V.
   (iii) What is electric efficiency under this condition.
   (b) Explain different mode of Gunn diodes. **6**
   (c) Explain measurement of dielectric constant. **6**

6. (a) Design a composite 10 w pass filters by image parameter method with following specification — **10**
   $R_0 = 50\ \Omega$ f_c = 50 MHz f_∞ = 52 MHz.
   (b) What are different limitation of conventional tube. **6**
   (c) Compare advantage and disadvantage of a GaAs MOSFET with Si MOSFET. **4**

7. Write short notes :— **20**
   (a) Microwave filters
   (b) Magic tee
   (c) TWT
   (d) Show that – TM_{01} and TM_{10} modes in a rectangular waveguide do not exist.

Con. 8440-12.

KR–1530

(3 Hours) [Total Marks : 100

N.B.: (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** out of the remaining **six** questions.
(3) Assume **suitable** data wherever **necessary**.

1. (a) What is IP address, physical address, port number and socket address of a device. 5
(b) What is piggybacking ? How is its use significant. 5
(c) Where is the MAC sublayer placed in the OSI model. What does it deal with and what services does it provide. 5
(d) Explain the role of Internet layer and Network Interface Layer. 5

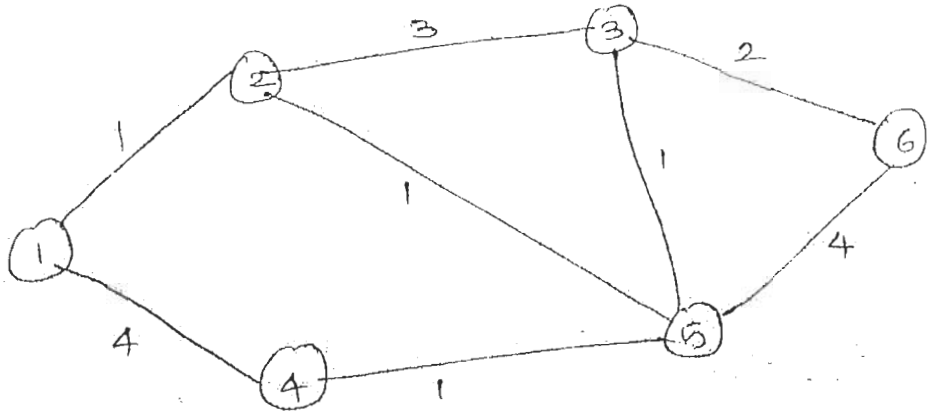
2. (a) What is flow control ? Explain stop and wait ARQ with its state diagram. 10
(b) Compare packet switching, circuit switching and cell switching techniques with the help of timing diagram. 10

3. (a) Describe station types, configuration and communication (response) modes supported by HDLC protocol. 10
(b) Explain Repeater, Bridges, Routers and Switches. 10

4. (a) Explain how fragmentation and reassembly helps IP to work on a variety of physical networks. 10
(b) Differentiate between TCP and UDP. 10

5. (a) Explain the following medium sharing techniques : 10
(i) Reservation
(ii) Polling
(iii) Token passing.
(b) Explain Transparent bridges. Also show how bridge learning takes place with appropriate example. 10

6. (a) Discuss Queuing system classification. Explain M/M/I queuing system. 10
   (b) For the graph shown in the figure show the successive iterations of the Dijkstra's method of Shortest Path Algorithm. Take node1 as the root node. 10



7. Write short notes on any **two** :— 20
   (a) Mobile IP
   (b) DHCP
   (c) OSPF.

B.E. Electronics & Telecomm Sem-VII (Rev-cou 98) Data compression and Encryption 17/12/12

2nd Half-12 mina-(c)-96

Con. 8490-12. **KR-1980**

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

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

1. (a) Briefly explain Modelling and Coding with respect to data compression. **5**
(b) Explain the principle of Public Key Cryptography. **5**
(c) Explain the working principle of Arithmatic Coding with suitable example. **5**
(d) Explain Chinese remainder theorem. **5**

2. (a) Define the following terms :— **10**
(i) Compression ratio
(ii) Distortion
(iii) Compression Rate
(iv) Fidelity and Quality
(v) Self information.
(b) Explain Diffie-Hellman key exchange algorithm with example. **10**

3. (a) What is adaptive dictionary based coding. Explain any one method. **10**
(b) What is the significance of 'prime numbers' in public key cryptography ? Explain RSA algorithm with a suitable example. **10**

4. (a) Explain DPCM and ADPCM techniques used in audio compression. **10**
(b) What is Malicious Programe ? Explain different types of malicious programmes. **10**

5. (a) Explain audio encoder and decoder used in MPEG. **10**
(b) Explain Digital Immune System. **10**

6. (a) Design Huffman code for a source which generates letters from an alphabet $A = \{a_1, a_2, a_3, a_4, a_5\}$ with $P(a_1) = P(a_3) = 0{\cdot}2$, $P(a_2) = 0{\cdot}4$, $P(a_4) = P(a_5) = 0{\cdot}1$. Also calculate entropy of the source. **10**
(b) What is message digest ? Explain HMAC algorithm. **10**

7. Write short notes on any **two** :— **20**
(a) JPEG-2000
(b) Key Distribution Center
(c) Fire wall design
(d) Differences between :—
(i) lossy and Lossless Compression
(ii) Audio Compression and Image Compression.