14-11-13-DTP7-RM-20 ME - SEM I (EXTC) 3/12/13 DEC-2013

**Con. 8345-13.** S.T.C. **BB-12673**

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

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

1. Explain the following terms with suitable example :- **20**
   (a) Characteristic Function
   (b) Power Spectoral Density
   (c) Random process
   (d) Queing theory.

2. (a) An UrN contains 5 balls numbered 1 to 15. Suppose we select 2 balls in succession without replacement. What is a probability that the 1st ball has a no. large than that of 2nd ball? **10**
   (b) State and prove schwartz inedуality for two real R.V. **10**

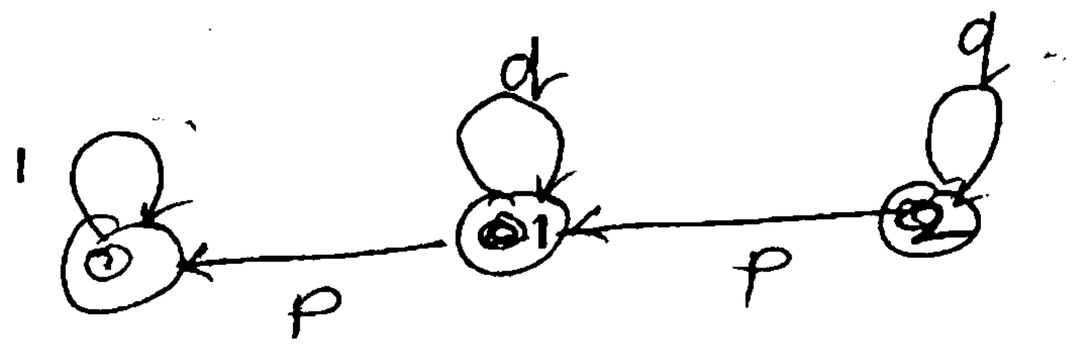
3. (a) State and prove Bay's theorm. **10**
   (b) Suppose a coin is tossed 3 times. If we assume that the tosses are independent and the probability of heads in P. What is the probability that there will be K no. of heads in 3 trials for K=0, 1,2,3. **10**

4. (a) The samples of the amplitude of speech signal follows the exponential **10**
   pdf $f_X(x) = c\,e^{-\alpha|x|}$ ....$-\infty < x < \infty$
   (i) Find constant C?
   (ii) P(|X|< x)
   (b) Find the pdf of sum z =x+y of two non-independent zero mean, unit variance Gaussian **10**
   R.V. with correlation coefficient :-
   $\rho = -\frac{1}{2}$.

5. (a) Find the transfer function of optimum filter for estimating z(t) from **10**
   $x(\alpha) = z(\alpha) + N(\alpha)$, $\alpha \in (-\infty, \infty)$ where $z(\alpha)$ and $N(\alpha)$ are independent zero mean random processes.

**[ TURN OVER**

(b) On day 1 a house has two new light bulbs in reserve. The probability that the house will need a single light bulb during day n is p and probability that it will not need any is q=1−p. Let yn the Mazkor chain with state transition diagram. Find the n-step transition probability. **10**




6. (a) A random telegraph signal is passed through an RC LPF which has transfer function **10**

$$H(\beta)=\frac{\beta}{\beta+j2\pi^{S}}, \text{ where } \beta=\frac{1}{RC}$$

Find the PSD of output if input has autocorrelation function

$$Rxx(\lambda)=e^{-2\alpha|\lambda|}$$

(b) $X(t)=A\cos(2\pi f_u t+\theta)$ where $\theta$ is uniformly distributed in the interval $(0,2\pi)$. Find PSD Sx(β). **10**

7. Explain following terms :- **20**
   (a) Memoriless property of exponential distribution.
   (b) Markov Process.
   (c) Autocorrelation Function.
   (d) Poisson Process.

9/12/13

M.E (Sem I)
EXTC
Comm. N/w

16-11-13-LVTP6-MU-23

**Con. 8760-13.** **BB-12676**

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

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

1. (a) Discuss the various delay components in the communication network. **5**
   (b) Explain the flow control at transport layer. **5**
   (c) Mention various QoS parameters of ATM. **5**
   (d) Explain the role of IGMP and ARP protocol in TCP/IP. **5**

2. (a) What is the function of subnet addressing incase of IP version 4 addressing? **4**
   (b) What are the functions of the transport layer in OSI model for network communication? Explain TCP multiplexing and error recovery. **8**
   (c) Explain the function of ATM layer with ATM cell header format. **8**

3. (a) Explain the TCP segment with header format. Explain how TCP establish and close the connection. **10**
   (b) Explain the function of ATM adaptation layers. Explain in detail the AAL1 and AAL2 layers. **10**

4. Explain the following protocols with their header formats :- **20**
   (a) IP Version 4 (b) IP Version 6
   (c) UDP (d) RTP

5. (a) Explain in detail the architecture of ATM network. **10**
   (b) Explain in detail M/M/1 Queuing system. Compare the M/G/1 system with M/M/1 system. **10**

6. (a) Discuss various approaches to provide QoS in Internet model. **10**
   (b) Explain the features of IP routing protocol 'OSPF' and its operation with the help of the common header. **10**

7. Write short notes on any **two**:– **20**
   (a) DHCP
   (b) Mobile IP
   (c) RSVP
   (d) RSA Algorithm

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ME (EXTC) - sem I 13/12/13

Microwave Integrated Circuits

22-11-2013-DTP-P-8-NK-13

**Con. 9479-13.** **BB-12679**

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

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

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

1. Write short notes on the following :- **20**
   (a) Varactor diodes.
   (b) Dielectric Resonators.
   (c) Green's Functions.
   (d) Monolithic capacitors.

2. (a) Draw and explain an odd mode electric field distribution for microstrip lines (Coupled). **10**
   (b) State and explain the various losses in microstrip lines. **10**

3. (a) Describe in detail the Doping Techniques used in making MMICs. **10**
   (b) Describe the key processing techniques used in making HMICs. **10**

4. (a) Discuss the effect of strip thickness on CPW characteristics. **10**
   (b) Obtain the dispersion relation for open microstrip. **10**

5. (a) State and explain important considerations in slot line design. How are the slot lines realized? **10**
   (b) Explain the concept of coupled microstrip directional couplers. **10**

6. (a) Explain the operation of GaAsFET. Why is it considered suitable for microwave frequencies ? **10**
   (b) Discuss the operation characteristics of IMPATT diode. **10**

7. Discuss the following :- **20**
   (a) Ion implantation techniques.
   (b) Grounding problems in MIC.

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ME | EXTC | I 19/12/2013.

Error correction Codes.

Ash7-D:\Data-65

**Con. 9825-13.** **BB-12682**

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

**N.B. :** (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** from **remaining** questions.
(3) Assume **suitable** data if **necessary** and **state** them **clearly.**
(4) **All** questions carry **equal** marks.

1. (a) Define :– **20**
   (i) Field.
   (ii) Vector space.
   (iii) Ring.
   (iv) Galois field.
   (v) Group.

   (b) Calculate minimal polynomial of $\alpha^3$ for the given field Gf($2^4$).

   (c) Construct group under Mod. 7 Addition and Multiplication.

   (d) Compare FEC and APQ.

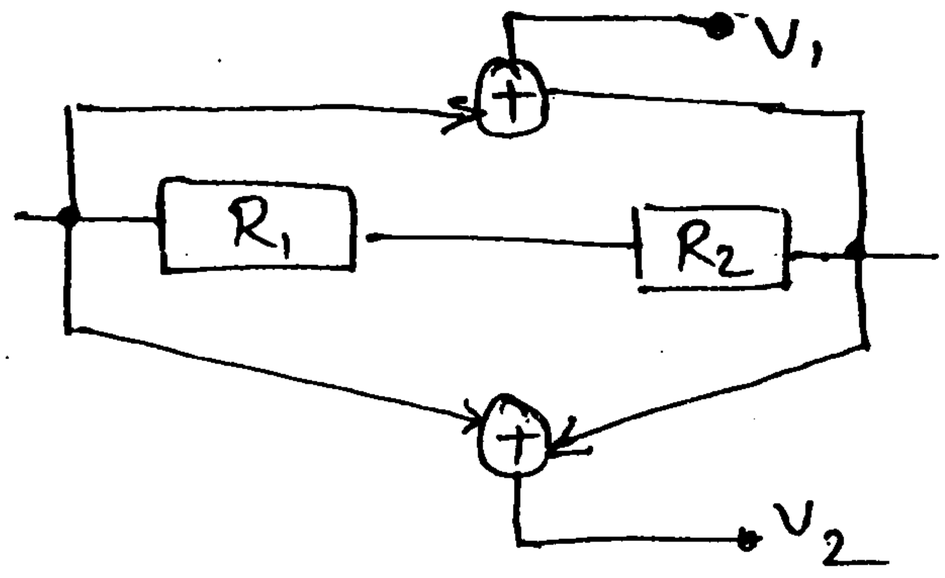
2. (a) If 'G' generates (n, k) code $C_1$, with a null space generated by H. Then H generates **10**
   (n, n–k) code $C_2$, with null space generated by 'G', show that $C_1$ and $C_2$ are dual codes.

   (b) A generator matrix for a(6, 3) linear code is $g^{Nn}$ by:– **10**

$$G = \begin{bmatrix} 0 & 1 & 1 & 0 & 1 & 0 \\ 1 & 1 & 0 & 0 & 0 & 1 \\ 1 & 1 & 0 & 1 & 1 & 0 \end{bmatrix}$$

   Find :– (i) G in systematic form.
   (ii) Find all code words.
   (iii) Find error Correcting and Defecting capability.

3. The given diagram of encoder :– **20**




   (a) Draw first three stages of Trellis diagram.
   (b) Using Viterbi algorithm find max. likelyhood code word by BSC if received signal is :–
   R = 10 11 11 11 01 00

**[ TURN OVER**

4. (a) Consider the (15, 11) cyclic Hamming code generated by $g(x)=1+x+x^4$. **10**

Find :– (i) Parity polynomial h(x).

(ii) Generator and Parity matrices in systematic form.

(iii) An encoder and Decoder; if input is (1011) and received vector $V=(1001011)$.

(b) Define :– **10**

(i) BCH Band.

(ii) Design distance.

Explain BCH design procedure and Reed–Solaman design rule (Frequency Domain).

5. (a) Consider a binary narrow-sense BCH code of length 15 and design distance 3. **10**

(i) Compute a generator polynomial for this code.

(ii) Determine the rate of this code.

(iii) Construct generator and parity-check matrices.

(b) If $g(x)$ is a polynomial of degree (n-k) and is a factor of $(x^n+1)$, then prove **10** that $g(x)$ generates and (n, k) cyclic code.

6. For (–7, 3) two bit error correcting R-S code find the correct code using Berlekamp Massey algorithm if the received vector is :– **20**

$$r(x)=1+\alpha^2x+\alpha^4x^2+x^3+\alpha^6x^4+\alpha^3x^5+\alpha^5x^6$$

7. Write notes on any **two** :– **20**

(a) Goppu code.

(b) Perfect and Quasi perfect code.

(c) Shortened cyclic code.

ME / EXTC / I 23/12/2013

Fiber optic communication



**Con. 10092-13.** **BB-12685**

(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 wherever **necessary** and **justify** the same.

1. (a) Explain the different windows in optical communication. Discuss their attenuation and dispersion characteristics. **5**
   (b) Draw a ray diagram explaining propagation through a step-index fiber and a graded index fiber. Draw the refractive-index profile. Clearly state the difference between the two. **5**
   (c) Explain model birefringence and fiber beat length. **5**
   (d) What is link power budget and rise time budget? **5**

2. (a) Explain various losses in optical fibers. **8**
   (b) Derive the waveguide equation for optical fibers for TE mode. **12**

3. (a) What is V-number? Derive its relation with M, the number of modes supported by the fiber. **10**
   (b) Explain any one fiber fabrication process, with neat sketch. **10**

4. (a) Explain gain process in Raman Amplifier. **10**
   (b) What are EDFAs? Explain their working and application. **10**

5. (a) Differentiate between PIN and RAPD; explaining their construction and working. **10**
   (b) Explain stimulated emission. What are different noises arising in LASERs? **10**

6. (a) Explain WDM principle with a neat block diagram. **10**
   (b) Draw and explain block diagram of optical receiver with various noise sources and relevant equations. **10**

7. Write short notes on any **two** :– **20**
   (a) Non linear optical effects
   (b) Dispersion management in optical fiber
   (c) Coherent optical communication.

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