

6E6021**6E6021****B.Tech. VI Semester (Main/Back) Examination, April/May - 2017****Computer Sc. & Engg.
6CS1A Computer Networks
CS, IT****Time : 3 Hours****Maximum Marks : 80
Min. Passing Marks : 26*****Instructions to Candidates:***

Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit - I

1. a) What is Distance vector Routing? Explain count to Infinity problem and give its solution? (8)
- b) Explain Flooding and shortest path routing and describe how and when they are used in link state routing. (8)

OR

1. a) What are the basic design issues of a Network layer? Also explain what are the services provided by the network layer to the transport layer? (8)
- b) Differentiate between the static and dynamic routing with their pros and cons. Give examples of some routing protocol used in both type of routing. (8)

Unit - II

2. a) Explain the concept of fragmentation. Why fragmentation is done and how? (8)
- b) What do you understand by layering and protocol? Explain your answer using the Internet architecture. (8)

OR

2. a) Define Network address translation. How the outgoing and incoming packets are made to reach to its destination in the presence of a NAT box? Explain. (8)
- b) Explain the difference between IPV4 and IPV6. (8)

Unit - III

3. a) Describe why an application developer may choose to run its application over U.D.P rather than TCP and draw the format of UDP header. (8)
- b) Write short note on : (4+4)
- 1) Addressing in Transport layer.
 - 2) Flow control and Buffering.

OR

3. Explain the working of Go-Back-N protocol and compare it with selective repeat protocol. (16)

Unit - IV

4. Explain the TCP connection management. What is the significance of sequence number and acknowledgement number fields of TCP segment. Explain with example. (16)

OR

4. a) Explain the concept of Round Trip Time (RTT) and Retransmission Time Out (RTO). (6)
- b) Explain working of Transport layer in the Internet. (6)
- c) Consider sending a series of packets from sending host to receiving host over a fixed route. Explain delay components encountered in the end to end delay for single packet? (4)

Unit - V

5. a) What is Proxy server and how it is related to HTTP. (6)
- b) What is URL and what are its components? Explain. (4)
- c) In electronic mail, what is MIME? (6)

OR

5. a) Compare SMTP with HTTP. (8)
- b) What is DNS? Explain how DNS works. (8)



6E6022**6E6022****B.Tech. VI Semester (Main&Back) Examination, April/May - 2017****Computer Sc. & Engg.****6CS2A Design and Analysis of Algorithms****CS, IT****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 26****Instructions to Candidates:**

Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.

Unit - I

1. a) Explain and write an algorithm for greedy method of algorithm design. Given 10 activities along with their start and finish time as **(8)**

$$S = \{A_1, A_2, A_3, A_4, A_5, A_6, A_7, A_8, A_9, A_{10}\}$$

$$S_i = \{1, 2, 3, 4, 7, 8, 9, 9, 11, 12\}$$

$$F_i = \{3, 5, 4, 7, 10, 9, 11, 13, 12, 14\}$$

Compute a schedule where the largest number of activities take place.

- b) i) Solve the recurrence **(4×2)**

$$T(n) = T(n-1) + T(n-2) + 1, \text{ when } T=0$$

$$T(1) = 1$$

- ii) if $f(n) = 100 \cdot 2^n + n^3 + n$ show that $f(n) = O(2^n)$

OR

1. a) Determine the best case complexity of Merge sort algorithm. **(4)**

- b) Consider the following function **(4)**

```
int Sequential Search (int A[], int & x, int n)
```

```
{
```

```
    Int i;
```

```
    For (int i = 0, i < n && a[i] != x; i++)
```

```
        If (i == n) return i;
```

```
}
```

Determine the average and worst case complexity of the function Sequential Search.

- c) Show all the steps of Strassen's matrix multiplication algorithm to multiply the following matrices. (8)

$$X = \begin{bmatrix} 3 & 2 \\ 4 & 8 \end{bmatrix} \text{ and } Y = \begin{bmatrix} 1 & 5 \\ 9 & 6 \end{bmatrix}$$

Unit - II

2. a) Discuss Knapsack problem with respect to dynamic programming approach. Find optimal solution for given problem, $w(\text{weight set}) = \{5, 10, 15, 20\}$ and size of knapsack is 8. (8)
- b) Discuss Dynamic programming solution to Longest common subsequence problem. Write an algorithm to compute an LCS of two given strings. (8)

OR

2. a) Write an algorithm for solving n-queen problem. Trace it for $N=6$ using backtracking approach. (8)
- b) Describe Travelling salesman problem. Show that a TSp can be solved using backtracking method in the exponential time. (8)

Unit - III

3. a) Explain and write Knuth Morris Pratt algorithm for pattern matching and also comment on its running time. (8)
- b) Let $P = rrlrll$ be a pattern and $T = lrrlrrllrrlrrlrrlrrlrrlr$ be a text in a string matching problem : (8)
- How many shifts (both valid and invalid) will be made by the Naïve string matching algorithm?
 - Provide the algorithm to compute the transition function for a string matching automation.
 - Find out the state transition diagram for the automation to accept the pattern P given above.

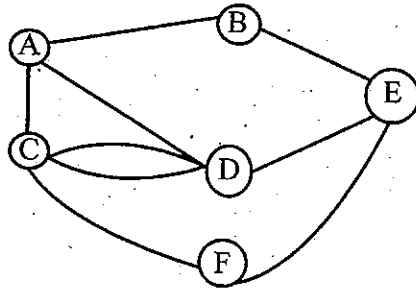
OR

3. a) Discuss Boyer moore pattern matching algorithm with appropriate example of good prefix and bad character. (8)
- b) State the assignment problem and solve the following assignment problem using branch and bound for which cost matrix is given below. (8)

$$\begin{array}{ccc} & 4 & 7 & 5 \\ \text{Cost} = & 2 & 6 & 1 \\ & 3 & 9 & 8 \end{array}$$

Unit - IV

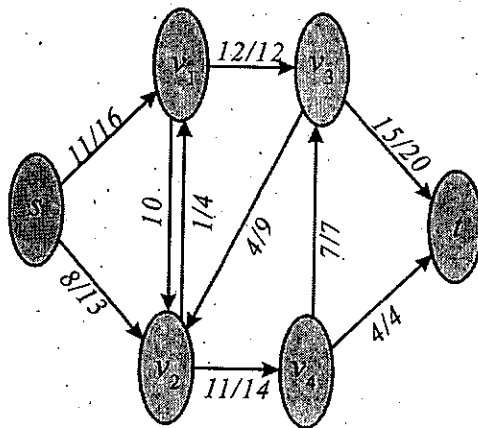
4. a) Give randomized algorithm for min cut of the following graph. (8)



- b) Write and explain ford Fulkerson algorithm (8)

OR

4.



- a) Find Maximum flow in above network. (5)
 b) Find the corresponding minimum cut and check that its capacity is same as that value of maximum flow found in a) part. (5)
 c) Compare Las vegas and Monte carlo algorithm approaches. (6)

Unit - V

5. a) Prove that circuit satisfiability problem belongs to the class NP. (8)
 b) Assuming 3 CNF satisfiability problem to be NP-complete, prove clique problem is also NP-complete. (8)

OR

5. a) Explain approximation algorithm for vertex cover. (8)
 b) Write short note on : (8)
 • NP-completeness • Cook's theorem and its application



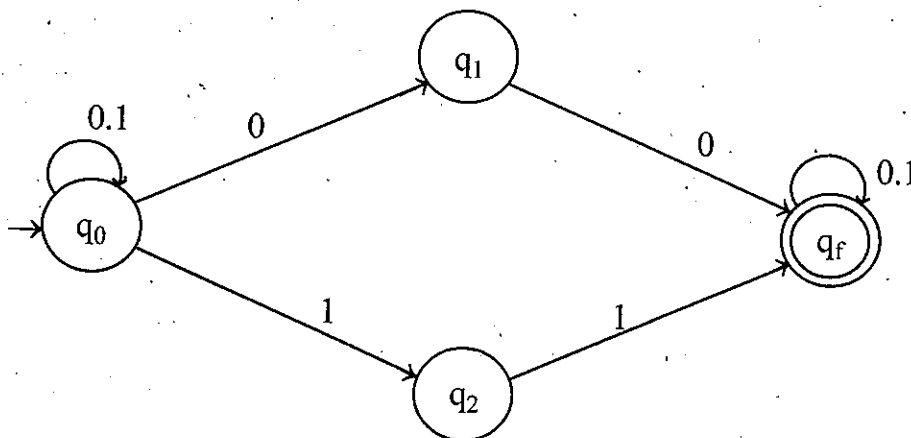


6E6023**6E6023****B.Tech. VI Semester (Main & Back) Examination, April/May - 2017****Computer Sc. & Engg.****6CS3A Theory of Computation****CS,IT****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 26****Instructions to Candidates:**

Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal marks**. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit-I

1. a) Differentiate between deterministic and non-deterministic finite automata. convert the following non-deterministic transition system into deterministic system. (2+8=10)

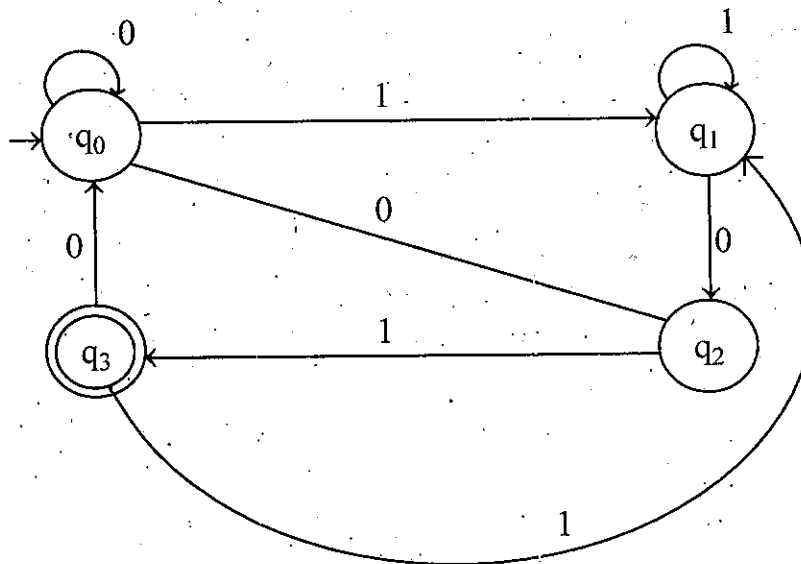


- b) Construct a Moore machine equivalent to the Mealy machine M defined by the table given below : (6)

Present state	Next state			
	a = 0		a = 1	
	State	Output	State	Output
→ q ₁	q ₁	1	q ₂	0
q ₂	q ₄	1	q ₄	1
q ₃	q ₂	1	q ₃	1
q ₄	q ₃	0	q ₁	1

OR

1. a) Construct a regular expression for the given below deterministic finite automata. (12)



- b) Convert the following regular expression into an E-NFA (4)

R.E. = $00(0+1)^*$

Unit-II

2. a) Find a regular expression corresponding to each of the following subset of $\{0, 1\}$ (3×4=12)
- The language of all strings containing at least two 0's
 - The language of all strings containing at most two 0's
 - The language of all strings ending with 1 and don't contain 00.
 - The language of all strings in which both the number of 0's and number of 1's are odd.

- b) Construct a regular grammar for $L = \{a^m b^n \mid m, n \geq 1\}$ (4)

OR

2. a) Construct a DFA (Deterministic finite Automata) set of all strings over $\{0, 1\}$ whose length is divisible by 3. (12)

- b) Construct a finite automation recognizing $L(G)$, where G is the Grammar. (4)

$$S \rightarrow aS|bA$$

$$A \rightarrow aA|a$$

Unit-III

3. a) Construct a push Down Automata (PDA) for language (12)

$$L = \{a^n b^{n+m} a^m \mid n, m \geq 0\}$$

- b) Show that the grammar (4)

$$S \rightarrow a|ab Sb|aAb$$

$$A \rightarrow bS|aAAb \text{ is ambiguous}$$

OR

3. a) Write a short notes on chomsky normal forms. (4)

- b) Construct a Grammar in Greiback Normal Form (GNF) equivalent to grammar (12)

$$S \rightarrow AB, A \rightarrow BS|b B \rightarrow SA|a$$

Unit-IV

4. a) Given the Grammar $S \rightarrow AB, A \rightarrow a, B \rightarrow C|b, C \rightarrow D, D \rightarrow E, E \rightarrow a$ find an equivalent grammar which is reduced and has no unit production. (10)

- b) Consider the following production : (6)

$$S \rightarrow aB|bA$$

$$A \rightarrow aS|bAA|a B \rightarrow bS|a BB|b$$

for string $aaabbabbba$, find left most and right most Derivation Trees.

OR

4. Construct a Turing machine for $L = \{a^n b c^n \mid n \geq 1\}$ (16)

Unit-V

5. a) Explain the model of Linear Bounded Automata (LBA). (6)

- b) Find a context-free grammar for $L = \{a^n b^n c^n \mid n \geq 1\}$ (10)

OR

5. Write short notes on :

(4×4=16)

- a) Recursive and recursively enumerable language
- b) Chomsky Hierarchy of languages
- c) Variation of Turing machine
- d) Properties of context-free language



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6E6024**6E6024****B.Tech. VI Semester (Main/Back) Examination, April/May - 2017****Computer Sc. & Engg.****6CS4A Computer Graphics and Multimedia Techniques****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 26****Instructions to Candidates:**

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit-I

1. a) Explain various application areas of computer graphics. Differentiate beam penetration method of colored CRT with shadow mask method. (4+4=8)
- b) What steps are required to plot a line whose slope is between 0° and 45° using Bresenham's method? Indicate the raster locations would be chosen by Bresenham's algorithm when scan converting a line from screen coordinate (20,10) to (30,18). (4+4=8)

(OR)

1. a) If a TV screen has 525 scan lines and an aspect ratio of 3:4 and if each pixel contains 12 bits of intensity information, how many bits are required for refresh rate 30 frames per second? (8)
- b) Give the advantages and disadvantages of DDA line algorithm. Explain mid point circle algorithm. (2+6=8)

Unit-II

2. a) Show rotation of a 2D Box represented by (5,5) to (10,15) with respect to (5,5) by 90° in anticlockwise direction. (8)
- b) Explain flood fill algorithm. Differentiate it with Boundary fill algorithm. (5+3=8)

(OR)

2. a) Explain Cohen Sutherland line algorithm. (8)

- b) Show that the composition of two rotations is additive by concatenating the matrix representation for $R(\theta_1)$, and $R(\theta_2)$ to obtain : (8)
 $R(\theta_1) \cdot R(\theta_2) = R(\theta_1 + \theta_2)$

Unit-III

3. a) Explain the scan line method for displaying the visible surface of a given polyhedron. (8)
b) Differentiate B-splines with Bezier curves. Briefly describe B-spline curve. (3+5=8)

(OR)

3. a) What is hidden surface problem? Write and explain Z-buffer algorithm for visible surface detection. (2+6=8)
b) What is parametric representation of a curve? Explain Bezier curve in detail. (2+6=8)

Unit-IV

4. a) Explain following terms : (3×3=9)
i) Diffuse reflection
ii) Specular reflection
iii) Illumination model
b) Explain phong shading. Compare it with Gouraud shading. (4+3=7)

(OR)

4. a) What is Ray Tracing? Explain Basic ray tracing algorithm. (2+6=8)
b) Explain color model RGB. Compare it with HSV. (5+3=8)

Unit-V

5. a) Define Animation. Explain principles of animation briefly. (2+6=8)
b) What is compression of data? Explain MPEG in detail. (2+6=8)

(OR)

5. a) Explain various presentation tools. (8)
b) Explain Authority tools with their uses. (8)



6E6025**6E6025****B.Tech. VI Semester (Main/Back) Examination, April/May-2017****Computer Sc. & Engg.****6CS5A Embedded System Design****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 26****Instructions to Candidates:**

Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable by assumed and stated clearly). Units of quantities used/calculated must be stated clearly.

Unit-I

1. a) Define embedded systems and also define the components of embedded system hardware. (8)
- b) What are the requirements before designing an embedded system? (8)

OR

1. a) What is the microcontroller and what is the use of microcontroller? (8)
- b) Define an embedded system give specific feature of embedded system. In this context how is microcontroller different from a micro processor. (8)

Unit-II

2. a) Explain scheduling of multiple tasking in real time by RTOS and define Interrupt handling. (8)
- b) Explain benefits that an interrupt address table has over fixed and vectors interrupt methods. (8)

OR

2. a) Explain different types of scheduling models. (8)
- b) Explain Round Robin scheduling with suitable example? (8)

Unit-III

3. a) Explain the meaning of "No Blocking" and "No RTOS calls without fair warning" for interrupt Routines in an RTOS Environment with examples. (8)
- b) Write short notes on : (4×2)
- i) TCB
 - ii) Market window

OR

3. Write short note on : (4×4)
- a) Fixed block Allocation
 - b) Preemptive Scheduling
 - c) Mutex
 - d) Pipe

Unit-IV

4. Write short note on : (4×4)
- a) JTAG
 - b) QNX
 - c) Windows CE
 - d) Locator

OR

4. a) Explain the requirement of RTOS? What are the criteria to achieve it? (8)
- b) Explain software Architecture of RTOS kernel. And also define types of RTOS kernel. (8)

Unit-V

5. Write short note on : (4×4)
- a) CPU performing issue
 - b) Data acquisition system
 - c) Energy meter
 - d) Debugging Techniques

OR

5. a) Explain pros and cos of leaving the debugging software in final embedded system firmware. (8)
- b) What is the complex testing in Embedded system? And define the function of ICE. (8)



6E6027**6E6027**

B.Tech. VI Semester (Main&Back) Examination, April/May - 2017
Computer Sc. & Engg.
6CS6.2A Artificial Intelligence

Time : 3 Hours**Maximum Marks : 80**
Min. Passing Marks : 26**Instructions to Candidates:**

*Attempt any **five** questions, selecting **one** question from each unit. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Explain artificial intelligence with suitable example.
- b) Write the characteristics of production system, with various types of production systems.

OR

1. a) Differentiate the breadth first search and depth first search in detail.
- b) What is Control strategy, define briefly.

Unit - II

2. Explain non monotonic reasoning with suitable example.

OR

What is predicate logic? Differentiate propositional and predicate logic.

Unit - III

3. a) Convert the following statement into predicate logic.
 - 1) Horses, cows and pigs mammals.
 - 2) An offspring of a horse is a horse.
 - 3) Bluehog is a hog
 - 4) Bluehog is a charlie parent
 - 5) Offspring & parent are inverse relation.

- 6) Every mammal has a parent.
- b) Write short note on Minimalist reasoning.

OR

3. Explain the concept of script as a structure describing the sequences of events. Construct a script of any suitable examples.

Unit - IV

4. a) What is natural language processing? Explain with example.
- b) Explain the following in detail :
- 1) Syntactic processing 2) Semantic processing

OR

4. a) What are game playing techniques? Explain minimax procedure with example.
- b) Explain the algo of minimax search procedure with suitable diagram of two ply search and packing up the value of two ply search.

Unit - V

5. a) What do you mean by expert system? Explain "MYCIN" in depth with block diagram.
- b) Explain the concept of hop field neural network with suitable sketch with its applications.

OR

5. a) What are the techniques used in measuring? Explain.
- b) How "learning by example" is different from "learning by taking advice"? Explain it giving suitable example.



6E6028**6E6028****B.Tech. VI Semester (Main/Back) Examination, April/May - 2017****Computer Sc. & Engg.****6CS6.3A Human Computer Interface****CS, IT****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 26****Instructions to Candidates:**

Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit - I

1. a) Compare various test entry devices. (8)
- b) How do ergonomics affect the interaction between man and machine? Explain. (6+10)

OR

1. a) State what are the causes and effects of emotions. (8)
- b) Explain various input-output channels. (8)

Unit - II

2. a) Explain : (8)
- i) Process of design
- ii) Usability Engineering
- iii) User Focus
- b) Differentiate between local structure and global structure. (8)

OR

2. a) What are the principles to support learnability? (8)
- b) Explain low fidelity prototyping and high fidelity prototyping in details. (8)

Unit - III

3. Explain the requirements of user support system and approaches for the same. (16)

OR

3. Explain : (8 × 2 = 16)

- i) Evaluation through expert analysis
- ii) Experimental evaluation.

Unit - IV

4. What is cognition? Explain cognitive architecture in detail. (16)

OR

4. Explain key stroke level models. Three state model and problem state model. (16)

Unit - V

5. Describe the main kind of social mechanism that are used by people to communicate and collaboration. (16)

OR

5. Explain knowledge based and ER based analysis Differentiate between both. (16)



6E6094**6E6094****B.Tech. VI Semester (Back) Examination, April/May - 2017****Computer Sc. & Engg.****6CS4(O) Programming in Java****(Common with IT(Main))****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 26****Instructions to Candidates:**

Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit-I

1. a) Explain primitive data types supported by Java. (8)
- b) How can you implement one dimensional arrays, multidimensional arrays in Java. Also give examples. (4+4=8)

(OR)

1. a) Explain how to declare variables in Java? Explain dynamic initialization, scope and lifetime of variables. (2+2+2+2=8)
- b) Explain the working of Java virtual machine in detail. (8)

Unit-II

2. a) Describe the following selection statements in Java (using examples) (2×4=8)
 - i) Break
 - ii) Continue
- b) Explain constructors in Java with examples. (8)

(OR)

2. a) Explain about explicitly garbage collectors and finalize () method with an example. (4+4=8)
- b) Describe how access control implemented in Java. (8)

Unit-III

3. a) How do you add a class or an interface to a package? Explain with examples. (8)
b) Write all similarities and differences between interfaces and class with examples. (4+4=8)

(OR)

3. a) What is a string buffer? Give three ways of creating a string object. (4+4=8)
b) Describe the various levels of access protection available in packages and their implications with an example program. (4+4=8)

Unit-IV

4. a) Explain how exception handling mechanism can be used for debugging a program. (8)
b) i) Is it possible to have multiple catch blocks? Give example? (4+4=8)
ii) Is it possible to have nested try statement? Give example.

(OR)

4. a) Explain how files can be read and write in Java with example. (8)
b) How are the various stream classes classified in Java? (8)

Unit-V

5. a) What are the difference between threads and process? How can extend the thread class? Explain with example (code)? (4+4=8)
b) Explain the structure of applet with the help of example. (8)

(OR)

5. a) How an applet differ from application program (8)
b) Briefly explain : (4+4=8)
i) Thread synchronization
ii) Thread execution



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6E6095

B.Tech. VI Semester (Main & Back) Examination, April/May-2017
Information Technology
6IT5A Information Theory and Coding

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable by assumed and stated clearly). Units of quantities used/calculated must be stated clearly.

Unit-I

1. a) State and prove Shannon-Hartley theorem. How it can give trade off between bandwidth and channel capacity? What is the maximum value of channel capacity? (8)
- b) A discrete source emits one of 5 symbols once every millisecond. The symbol probabilities are $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{16}$ respectively. Calculate H,R. (8)

(OR)

1. a) Define entropy. Under what condition the maximum entropy is achieved? Obtain the value of maximum entropy for a binary system. (8)
- b) Verify the following equation : (8)
- i) $H(x, y) = H(x/y) + H(y)$
- ii) $H(x, y) = H(x) + H(y)$

Unit-II

2. a) Write short notes on : (4)
- i) Types of errors encountered in communication systems. (4)
- ii) Error control coding used for controlling errors. (4)
- b) Determine the Hempel ziv code for the following bit stream : (8)

010011111001010000010101011001100000

Recover the original sequence from the encoded stream.

(OR)

2. a) The following set of messages with their probabilities are given below : (8)

$$x = \{x_1, x_2, x_3, x_4\}$$

$$P \left\{ \begin{array}{cccc} 1 & 1 & 1 & 1 \\ \hline 2 & 4 & 8 & 8 \end{array} \right\}$$

Find average code word length of a suitable binary code to above message.

- b) State channel coding theorem. What is the fundamental limit on the rate at which reliable transmission can take place? (8)

Unit-III

3. a) What is linear block code, error correcting code, systematic linear block code? (4)
- b) For an (n, k) block code with $k=8$, find the value of n and hence calculate the error correcting capability of this code? (8)
- c) For block code (n, k) , define rate of code or rate efficiency? (4)

(OR)

3. a) Explain the relation between generator matrix and parity check matrix H ? (8)
- b) Explain matrix description of cyclic codes? (8)

Unit-IV

4. a) A three-error correcting $(23, 12)$ golay code is a cyclic code with a generator polynomial $g(x) = x^{11} + x^9 + x^7 + x^6 + x^5 + x + 1$ Determine the code words for the data vectors. (8)
- 000011110000, 101010101010, 11000101011110
- b) Draw a block diagram of an encoder and syndrome calculator for the code $g(x) = 1 + x + x^2$ verify the operation using message vector (1010). (8)

(OR)

4. a) Specify the properties of $g(x)$, a generator polynomial for cyclic codes? (8)
- b) Describe encoding and decoding steps of BCH codes? (8)

Unit-V

5. a) Draw the tree diagram for a suitable convolutional coder. Assume 5 bit message input. How it can be used for decoding the message? (5)
- b) Define burst error. Why does it occur and how it is different from random errors. (5)
- c) Compare the three ARQ schemes? (6)

(OR)

5. a) What is transfer function? Explain its role in convolutional codes? (8)
- b) Write short notes on the following : (4×2=8)
- Catastrophic code
 - Viterbi algorithm



