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4E 4160

4E 4160

B.Tech. IV Semester (Main/Back) Examination, June/July - 2015
Computer Science and Engineering
4CS1 A Microprocessors and Interfaces
Common with 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 suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Draw the architecture diagram of 8085 microprocessor and explain functions of various registers (8)

   b) Explain the following pins in relations to 8085 microprocessor (8)

      i) ALE

      ii) READY

      iii) S_1 and S_0

      iv) $I O/\overline{M}$

OR

1. a) Explain the address BUS, data BUS and control BUS of 8085 microprocessor. Also draw the flag register. (8)

   b) Explain the need to demultiplex the bus AD_0-AD_7 (8)

2. a) What is assembly language? Also explain its advantages and disadvantages

b) Draw and explain the timing diagram for the instruction MV1M , 7AH **(8+8)**

OR

2. a) What are peripheral mapped I/O memory and memory mapped I/O? Differentiate b/w them. **(8)**

b) Write the uses of buffers, decoders, encoders and D-flip/flop in Microprocessor? **(8)**

Unit - III

3. a) Write a program to sort the 10 data element in descending order assume that the data are stored at 4000H to 5000H **(8)**

b) Explain the addressing modes for 8085 microprocessor by giving examples of each **(8)**

OR

3. a) Write a program to transfer a block of 10 data elements from memory location 5000H to 6000H **(8)**

b) Explain the following Instructions:- **(8)**

   i) CMA

   ii) CMP

   iii) LDAX

   iv) LXI

   v) XCHG

   vi) IN

Unit - IV

4. a) Draw and explain the block diagram of 8255 PPI **(8)**

b) Draw and explain diagram of 8253 **(8)**

4. a) Draw and explain the pin diagram of 8255 PPI? Explain all of its modes? **(8)**

b) Draw and explain the block diagram of 8279 keyboard/display interface **(8)**

Unit - V

5. a) Draw the internal Block diagram of 8251 USART and explain its initialization process **(8)**

b) What is the difference between microprocessor and microcontroller **(8)**

OR

5. a) Compare RS-422A and RS-423A serial data standards **(8)**

b) Briefly describe the communication standards RS-232 C and I EEE 488 by showing configurations **(8)**

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4E4161

B.Tech. IV Semester(Main/Back) Examination, June/July - 2015
Computer Science and Engineering
4CS2A Discrete Mathematical Structures
Common with 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 suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit - I

1. a) State and prove the Principle of Inclusion and Exclusion for three sets A,B and C. **(4)**

    b) There are 250 students in a computer Institute of these 180 have taken a course in Pascal, 150 have taken a course in C++, 120 have taken a course in Java. Further 80 have taken Pascal and C++, 60 have taken C++ and Java, 40 have taken Pascal and Java and 35 have taken all 3 courses. So find-

    i) How many students have not taken any course?

    ii) How many study at least one of the languages?

    iii) How many students study only Java?

    iv) How many students study Pascal and C++ but not Java? **(8)**

    c) *Let $A = \{1,1,1,2,2,3,4,4\}$ and $B = \{1,2,4,4,5,5,5\}$*. Find $A \cup B, A \cap B, A - B$ *and* $A + B$. **(4)**

OR

1. a) Let f: $R \to R$ be a function defined as f(x)=3x+5 and g: $R \to R$ be another function defined as g(x)=x+4. Find $(gof)^{-1}$ and $f^{-1}og^{-1}$ and verify $(gof)^{-1}=f^{-1}og^{-1}$ **(6)**

b) Any 7 numbers are choosen from 1-12. Show that,

    i)   Two of them will add to 13.

    ii)   There are two relative prime integers. **(4)**

c) Define the followings with example:

    i)   Floor function

    ii)   Ceilling function

    iii) Remainder function. **(6)**

Unit - II

2. **a)** Let $A = \{1,2,3,4\}$ and $R = \{(1,3),(3,2)(2,4)(3,1)(4,1)\}$. Find the transitive closure of R using Warshall's algorithm. **(8)**

    b) Define the followings with example:

        i)   Equivalence relation

        ii)   Partial order relation

        iii) Total order relation

        iv) Cross partition of a set. **(8)**

OR

2. **a)** Let R be a relation defined on a set of ordered pairs of positive integers such that for all $(x,y),(u,v) \in Z^+ \times Z^+$, (x,y) R (u,v) if and only if $\frac{u}{x} = \frac{v}{y}$. Determine whether R is an equivalence relation. **(8)**

    b) Let $A = \{1,2,3,4\}$ and $R = \{(a,b) : a+b > 4\}$ be a relation on A. Draw the graph of the relation R. **(4)**

    c) Let R be an equivalence relation on a set of positive integers defined by x R y if and only if $x \equiv y \pmod 3$. Then, find the equivalence class of 2 and also find the partition generated by the equivalence relation. **(4)**

Unit - III

3. **a)** Let $a_n = a_{n-1} + a_{n-2}$ for $n \geq 3$ with the initial conditions $a_1 = a_2 = 1$, then prove that $2^{n-1} a_n \equiv n \pmod 5, \forall n \geq 1$ **(4)**

b) State and prove Euclidean Algorithm for integers. **(8)**

c) Use binary search algorithm to search the list X={3,5,8,13,21,34,55,89} for key=5 **(4)**

OR

3. a) Prove that $7^{2n}+2^{3n-3}.3^{n-1}$ is divisible by 25 for all positive integers. **(4)**

b) State and prove Division Algorithm for integers. **(8)**

c) Use bubble sort to put 3,2,4,1,5 into searching order. **(4)**

Unit - IV

4. a) Define the followings with example:

   i) Complete graph

   ii) Bipartite graph

   iii) Complete Bipartite graph

   iv) Weighted graph **(8)**

b) Define spanning tree in a graph. Find five spanning trees for the graph shown in figure and write the sets of branches and chords corresponding to these spanning trees. **(8)**
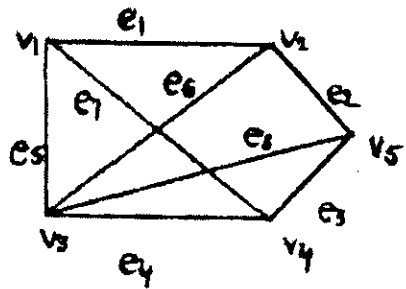
4. a) Apply a breadth-search algorithm to explore all the vertices from the vertex A of the graph given in figure and find the breadth-first search tree. **(8)**
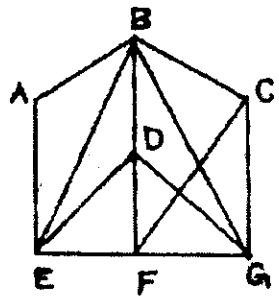
b) Prove that a disconnected simple graph G with n vertices and k components

can have at most $\frac{(n-k)(n-k+1)}{2}$ edges. **(8)**

Unit - V

5. a) Explain the following for propositions with example:-

    i)   Logical Equivalence **(2)**

    ii)   Tautological Implication **(2)**

    iii)   Normal Forms **(4)**

  b) Check the validity of the following argument:

If I go to school, then I attend all classes. If I attend all classes, then I get A grade. I do not get grade A and I do not feel happy. Therefore, if i do not go to school then, I do not feel happy. **(4)**

  c) Find the DNF of following:

    i) $P \rightarrow ((P \rightarrow Q) \wedge \sim (\sim P \vee \sim P))$

    ii) $\sim (P \rightarrow (Q \wedge R))$. **(4)**

OR

5. a) Determine whether the conclusion C follows logically from the premises H_1, H_2 and H_3.

$H_1 : P \vee Q$

$H_2 : P \rightarrow R$

$\dfrac{H_3 : \sim Q \vee S}{C : S \vee R}$ **(4)**

  b) Explain the followings:

    i)   Argument **(2)**

    ii)   Predicates **(2)**

    iii)   Quantifiers **(4)**

  c) Without constructing the truth table, show that $(\sim P \wedge (P \vee Q)) \rightarrow Q$ is a tautology. **(4)**

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4E 4162

4E 4162

B.Tech. IV Semester (Main/Back) Examination, June/July - 2015
Computer Science and Engineering
4CS3A Statistics and Probability Theory
(Common with 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 suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Use of following supporting material is permitted during examination.

1. Normal distribution table.

Unit - I

1. a) Two computers A and B are to be marketed. A salesman who is assigned the job of finding customers for them has 60% and 40% chances respectively of succeeding in case of computers A and B. The two computers can be sold independently. Given that he was able to sell at least one computer, what is the probability that computer, A has been sold. **(8)**

   b) There are three boxes containing respectively 1 white, 2 red and 3 black balls, 2 white, 3 red and 1 black ball, 3 white, 1 red and 2 black balls. A box is chosen and from it two balls are drawn at random. They happen to be one red and one white. find the probabilities that these come from

   i) The first box

   ii) The second box and

   iii) The third box **(8)**

OR

1. a) The joint probability mass function of (X,Y) is given by $f_{XY}(x,y) = k(2x+3y)$; $x=0,1,2$; $y=1,2,3$ find:

i) The value of constant K,

ii) Marginal probability distribution of X and Y

iii) $P\left(\dfrac{Y=y}{X=2}\right)$ **(6)**

b) If f(t) be the pdf of a system and h(t) be the hazard rate function of the same system, then using $f(t)=\lambda^2 t e^{-\lambda t}$, find h(t) and MTTF. **(6)**

c) The first four moments of a distribution about the value '5' of the variable are 2,20,40 and 50. Find the mean, variance, β_1 and β_2 **(4)**

Unit - II

2. a) The probability of a man hitting a target is 1/4. Then find:

i) If he fires 7 times, what is the probability of his hitting the target atleast twice

ii) How many times must he fire so that the probability of his hitting the target at least once is greater than 2/3 **(4+4=8)**

b) For Poisson distribution find first four moments about origin and hence find first four central moments **(8)**

OR

2. a) The average monthly sales of 5000 firms are normally distributed. Its mean and standard deviation are Rs 36000 and Rs 10,000 respectively then find:

i) The number of firms the sales of which are over Rs. 40,000

ii) The number of firms the sales of which are between Rs. 38,500 and Rs.41000 **(4+4=8)**

b) Subway trains from karolbagh to chandani chowk run every half an hour between midnight and six in the morning what is the probability that a man entering the station at a random time during this period will have to wait at least twenty minutes. **(4)**

c) State and derive memory less property of exponential distribution **(4)**

Unit - III

3. a) Calculate the karl person's coefficient of correlation between x and y from the following data:

x :	25	27	30	35	33	28	36
y :	19	22	27	28	30	23	28	**(8)**

b) In a partially destroyed laboratory, record of an analysis of correlation data, the following results only are legible: variance of x = 9.

Regression equations: 8x-10y+66=0, ·

40x-18y=214 then find

   i)   The mean values of x and y

   ii)   Coefficient of correlation between x and y

   iii)   The standard deviation of y   **(8)**

OR

3. a) Use method of least squares to fit a straight line to the following data treating y as the dependent variable

x :	1	2	3	4	5
y :	5	7	9	10	11

     (8)

b) Ten competitors in a beauty contest are ranked by three judges in the following order: **(8)**

I judge :	1	6	5	10	3	2	4	9	7	8
II judge :	3	5	8	4	7	10	2	1	6	9
III judge :	6	4	9	8	1	2	3	10	5	7

Then find that which two judges have better correlation.

Unit - IV

4. a) If for a period of 2 hours in a day(7 A.M to 9. A.M) customers arrive in a barber's shop that has space to accommodate only 4 customers. Arrival rate of customers is 3 per hour and service time is 36 minutes per customer. Then, find:

   i)   The probability that there is no customer in the shop and

   ii)   Average number of customers in the shop   **(8)**

b) In a shop there are two computers for carrying out the job work. the average time per job on each computer is 20 minutes per job and the average arrival rate is 2 jobs per hour. Assume the job times to bedistributed exponentially. If the maximum number of jobs accepted on a day be 6, then find:

   i)   The expected number of jobs waiting for computer

   ii)   The total time lost per day consists of 8 working hours   **(8)**

OR

4. a) On a telephone booth, arrivals of customers follow the Poisson process with an average time of 10 minutes between one arrival and next arrival. The length of a phone call is assumed to be distributed exponentially with mean 3 minutes. Then find: **(8)**

   i)   Average number of customers present in the system

   ii)   The probability that a customer spends more than 10 minutes in the booth.

iii) The fraction of a day that the phone will be in use

b) A supermarket has two girls serving at the counters. The customers arrive in a Poisson fashion at the rate of 12 per hour. The service time for each customer is exponential with mean 6 minutes. Then find:

i) The probability that an arriving customer has to wait for service

ii) The average number of customers in the system

iii) The average time spent by a customer in the supermarket **(8)**

Unit - V

5. a) A housewife buys three kinds of food A,B and C. She never buy the same food on successive weeks. If she buys food A, then the next week she buys food B. However if she buys B or C. Then the next week she is three times as likely to buy A as to the other brand. Find the transition probability matrix
  (8)

b) An automata car station has one bay where service is done. The arrival pattern is Poisson with 4 cars per hour and may wait in the parking lot in the street if the bay is busy then find the time spent in the station by a car if service time distribution is normal with mean 12 minutes and $\sigma = 3$ minutes. Also, find the average number of cars in the station, if service - time distribution is uniform between 8 and 20 minutes
  (8)

OR

5. a) Write a short note on 'discrete parameter birth - death process' **(8)**

b) In a heavy machine shop the overhead crane is utilized 75%. Time study observations gave the average slinging time as 10.5 minutes with a standard deviation of 8.8 minutes. What is the average calling time for the services of the crane and what is the average delay in getting service? If the average service time is cut to 8 minutes with standard deviation of 6 minutes, how much reduction will occur on average in the delay of getting served? **(8)**

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4E 4163

4E 4163

B.Tech. IV Semester (Main) Examination, June/July - 2015
Computer Science and Engineering
4CS4 A Software Engg

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 suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Explain the system development life cycle (SDLC) in detail   (8)

    b) Discuss problems that occur while developing a system and suggest possible solutions   (8)

OR

1. a) Describe the computer based system as an organization information system with example. Explain various computer based information systems   (5+5)

    b) Explain the system development plan in detail   (6)

Unit - II

2. a) Explain the software development life cycle with diagram   (8)

    b) Explain the spiral model with advantages and disadvantages   (8)

OR

2. a) Explain the waterfall model with advantages and disadvantages   (8)

b) Write short notes on:- (any two)

    i)   RAD model

    ii)   Prescriptive model

    iii) Software characteristics   (4+4=8)

Unit - III

3. a) What is requirement analysis. Explain the requirement analysis tasks and principles.   **(8)**

   b) What do you understand by structured analysis. Explain data and control flow diagrams.   **(8)**

OR

3. a) Write short notes on:-

    i)   Software prototyping

    ii)   Behavioral modeling   **(2x6=12)**

   b) What do you understand by data dictionary where and how it is used   **(4)**

Unit - IV

4. a) Define the meaning of software design, explain the design fundamentals for software design   **(8)**

   b) Explain the effective modular design in detail   **(8)**

OR

4. a) Explain the design documentation with example   **(8)**

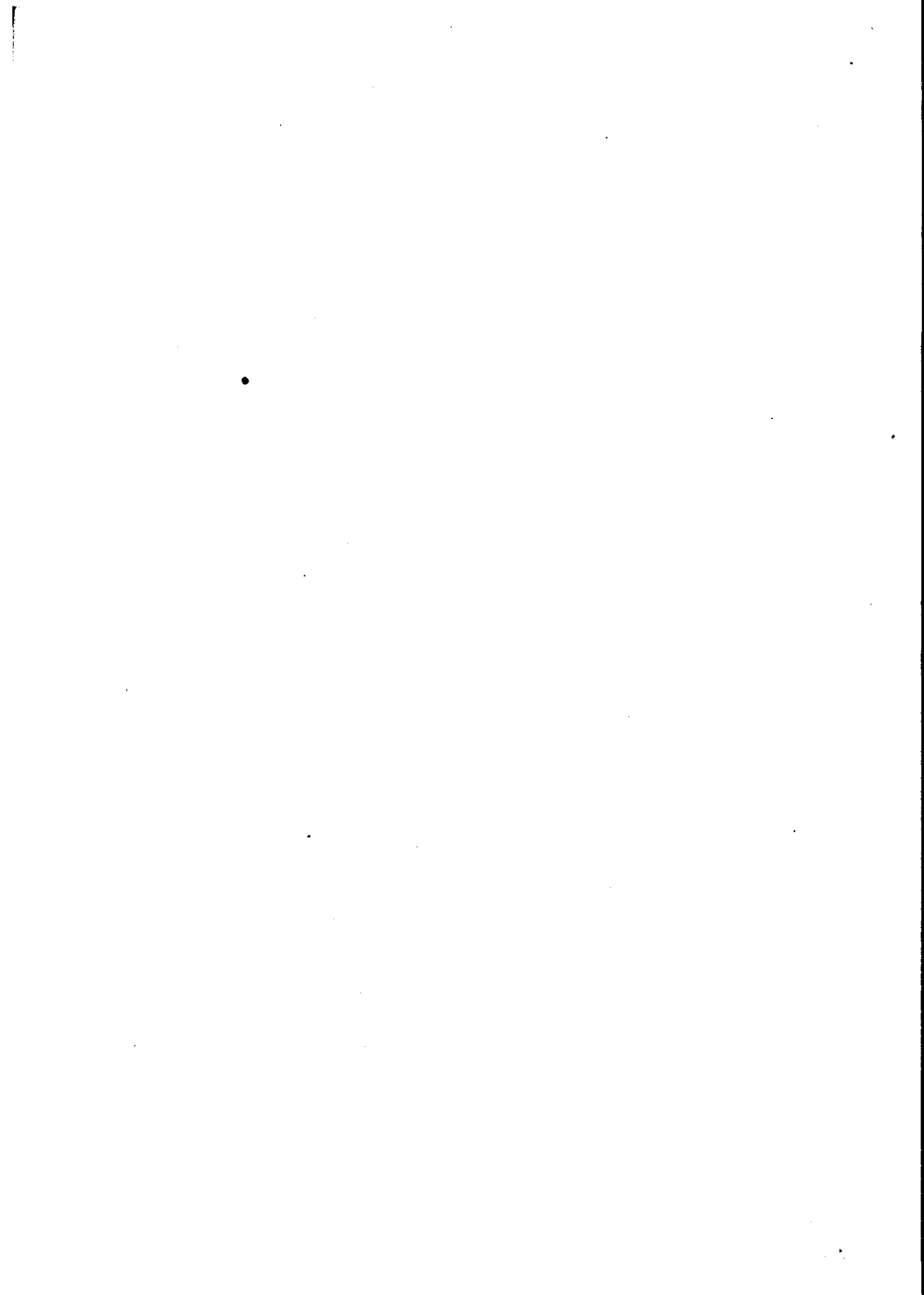   b) Explain the programming style and program quality   **(8)**

Unit - V

5. a) List out the various activities that are encompassed by system design process under object oriented design (OOD) and explain each one briefly   **(10)**

   b) Explain the object modularization with example   **(6)**

OR

5. Write short notes on:- **(any two)**

    i)   Unified modeling language(UML)

    ii)   Object Oriented Analysis modeling

    iii)   Object Oriented design concepts and methods   **(8x2=16)**

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4E 4164

B.Tech. IV Semester (Main) Examination, June/July - 2015
Computer Science and Engineering
4CS5A Fundamental of Communication

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 suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. (a) What are modulation & its need? Explain the working principle of envelope detector for demodulation of AM wave using suitable diagrams. **(8)**

    (b) The Antenna current of an AM Broadcast transmitter, modulated to a depth of 40% by an audio sine wave is 11 ampere. It is Increase to 12 amp. As a result of sinusoidal modulation by another audio sine wave. What is the modulation index due to second wave. **(8)**

OR

1. (a) Explain the role of pre-emphasis and de-emphasis in FM system. **(8)**
    (b) Find the modulation index, modulating frequency, carrier frequency and maximum deviation of FM wave represented by the voltage equation

    $e=12 Sin (6 \times 10^8 t + 5 \sin 1250t)$. What power will be the FM dissipate

    in a 10 ohm resister. **(8)**

Unit - II

2. (a) State the Sampling theorem for band limited signal. What is aliasing and how it is reduced? **(8)**

(b) Determine the nyquist sampling rate and nyquist sampling interval for the following signals:-

   (i) $1/2 \pi \cos (4000 \pi t) \cos (1000 \pi t)$

   (ii) $\mathrm{SinC} (100 \pi t) + 3 \, \mathrm{SinC}^2 (60 \pi t)$ **(8)**

OR

2. (a) Describe modulation & Demodulation method for PAM. **(8)**

    (b) Explain natural and flat top sampling. **(8)**

Unit - III

3. a) What is companding? Explain a μ-law and A-law for non-uniform quantization. **(8)**

    b) Consider a sinusoidal signal $m(t) = A \cos W_m t$ applied to a delta modulator with step size Δ. Show that the slope overload distortion will occurs if

$$A > \frac{\Delta}{W_m T_s}$$ **(8)**

OR

3. a) Draw the block diagram of PCM system and discuss each block in detail. **(8)**

    b) Explain T-1 carrier system (digital) using suitable diagram. Also calculate bitrate & bandwidth of it. **(8)**

Unit-IV

4. (a) The bit sequence 1110110011 is to be transmitted using different coding techniques (a) unipolar RZ and NRZ (b) polar RZ and NRZ.

    Draw all the wave form for given bit sequence. **(8)**

    (b) What is Inter symbol interference ? Explain Nyquist criteria for zero ISI. **(8)**

OR

4. a) Explain the generation, coherent and non-coherent detection of Binary FSK signals using suitable diagrams. **(8)**

b) Explain the generation and detection of QPSK signals using suitable diagrams (8)

Unit -V

5. (a) What is PN sequence and How it is generated ? What is maximum length sequence ? (8)

(b) What is Direct sequence spread spectrum modulation. (8)

OR

5. (a) What is frequency hop. Spread spectrum ? How does FHSS provide secured communication ? (8)

(b) Define processing gain in a CDMA system. How is the capacity calculated for a CDMA system. (8)
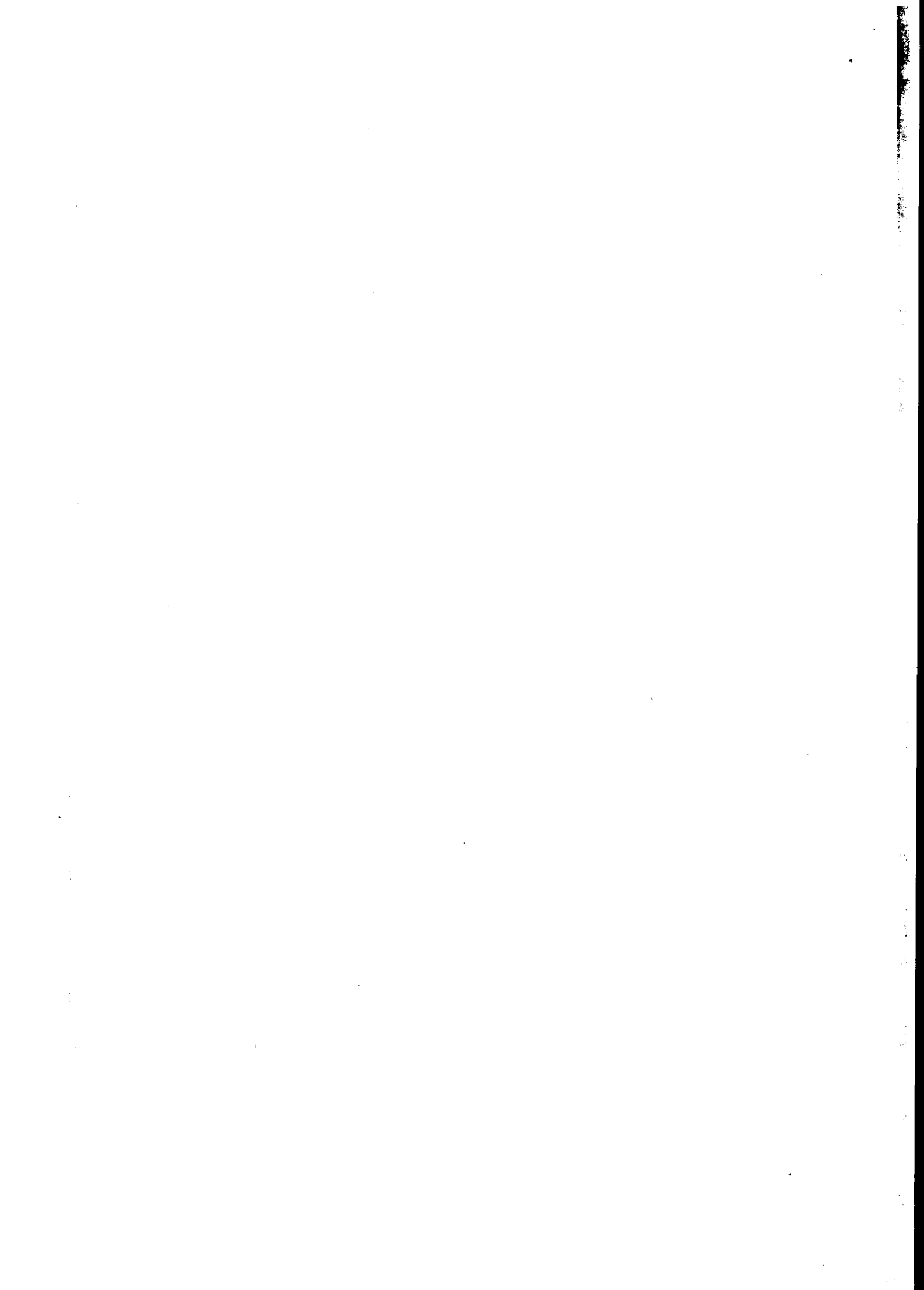
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4E 4165

B.Tech. IV Semester (Main) Examination, June/July - 2015
Computer Science and Engineering
4CS6A Principles of Programming Languages
Common with 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 suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Explain any four features of a good programming language   (8)

   b) Explain the basic computational models that describe most programming languages   (8)

OR

1. Explain the stages in which a source program is translated into executable program with the help of block diagram   (16)

Unit - II

2. a) What are elementary data types? Explain the specifications of elementary data types   (8)

   b) What is type checking? Explain its types with their advantages and disadvantages   (8)

OR

2. a) Explain the implementation of direct - access files (8)

   b) What are sets? Explain the implementation of the basic operation of sets using bit-string storage representation (8)

Unit - III

3. a) Explain the forms of statement - level sequence control by giving example of each in 'C' language (8)

   b) What are exceptions? Explain the exception handling mechanism by giving example (8)

OR

3. a) Explain the implementation of a simple subprogram with the help of block diagrams. (12)

   b) Explain the different types of sub program referencing environments (4)

Unit - IV

4. a) Explain the static and dynamic scope of an identifier with their rules (8)

   b) Explain the retention and deletion approaches to local environments of a subprogram with their advantages and disadvantages (8)

OR

4. a) Explain call-by-value and call-by-reference parameter passing methods by giving examples from C/C++ languages (8)

   b) What are tasks? Explain different approaches of storage management in tasks (8)

Unit - V

5. a) Write short notes on :

   i) Information hiding

   ii) Encapsulation (2×4=8)

   b) Explain static storage management with their advantages and disadvantages (8)

OR

5. a) Explain the recovery technique of explicit return and the problems associated with the technique in fix-size heap storage management (8)

   b) Explain the phases of variable - size heap storage management (8)

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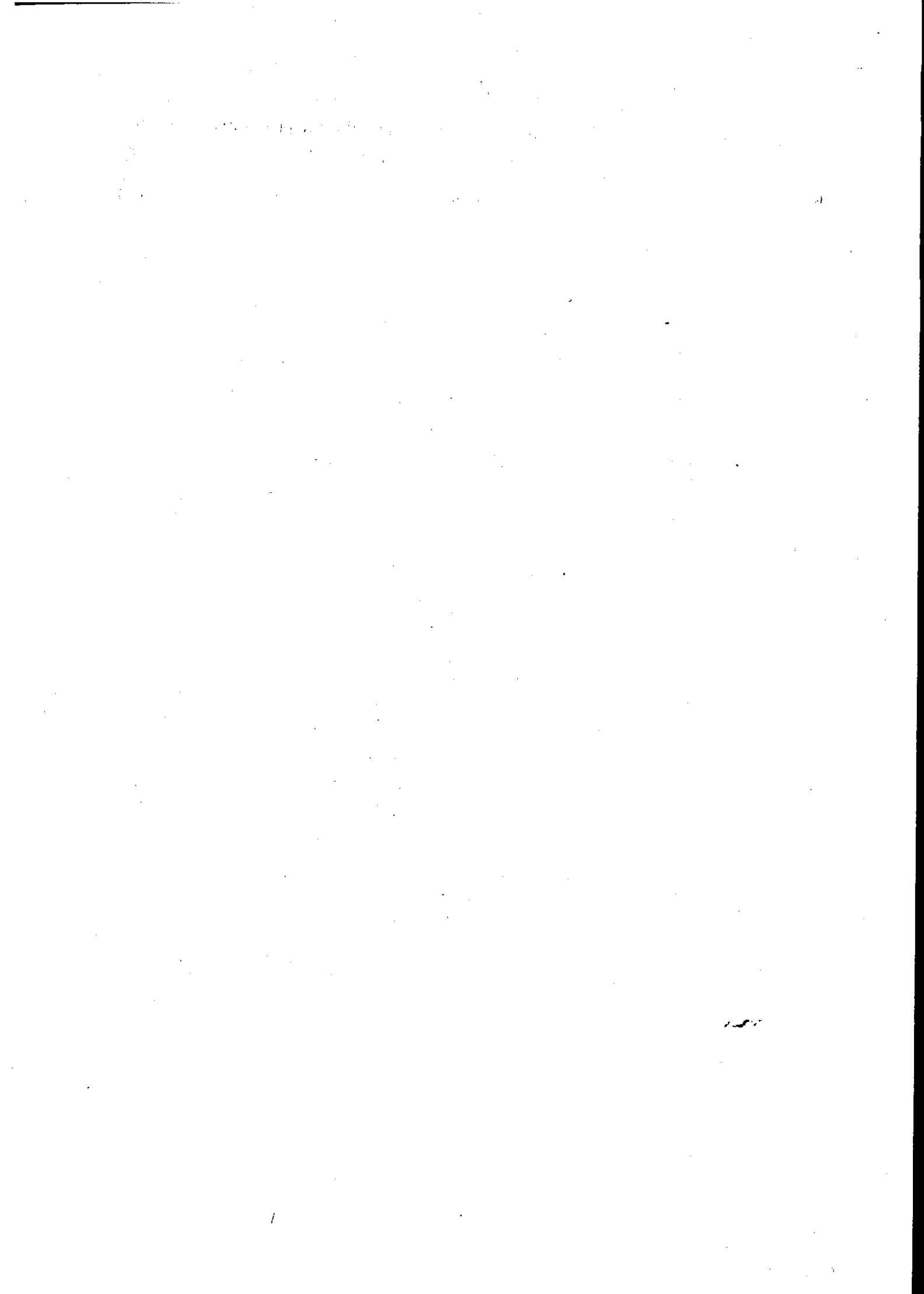
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4E2024

4E2024

B.Tech. IV Semester(Back) Examination,June/July - 2015

Information Technology

4IT2 Information Theory Coding

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 24

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 suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit - I

1. Define following terms:

    a) Information

    b) Entropy

    c) Joint Entropy   (2+2+2+2=8)

    d) Information Rate.

2. Prove the following properties of mutual information.

    a) $I(X;Y) = I(Y;X)$

    b) $I(X;Y) \geq 0$ (4+4=8)

OR

1. Define following Terms:-

    a) Redundancy

    b) Efficiency

    c) Mutual Information

    d) Channel matrix   (2+2+2+2=8)

2. Define the expression for joint and conditional entropy is given form as:-

$$H(X,Y) = H(X/Y) + H(Y)$$

(8)

Unit - II

1. Explain shannon Theorem and shanno limit.

(6)

2. Derive the mathematical expression for channel capacity to transmit the information through it the channel capacity is:-

$$C = B \log_2\left(1 + \frac{S}{N}\right) b/s$$

(10)

OR

1. An analog signal having 4 KHZ BW is sampled at 1.25 times the nyquist rate and each sample is quantized into one of equally likely levels. Assume that the successive sample rate are statistically independent.

   a) What is the information rate of this source.

   b) Can the output of this source be transmitter without error over an AWGN channel with a B.W. of 10 KHZ and an S/N ratio of 20 dB.

   c) Find the S/N ratio required for error free transmission for part (a).

   d) Find the B.W. require for an AWGN channel for error free transmission of the output of this source if the S/N ratio is 20 dB.

(10)

2. Explain the channel capacity and write capacities of special channels.

(6)

Unit - III

1. State and prove the kraft inequality.

(6)

2. Apply the shannon-Fano coding and find code efficiency.

$$[x_i] = \begin{bmatrix} x_1 & x_2 & x_3 & x_4 & x_5 & x_6 \end{bmatrix}$$
$$[p(x_i)] = \begin{bmatrix} 0.30 & 0.25 & 0.20 & 0.12 & 0.08 & 0.05 \end{bmatrix}$$

(10)

4E2024

OR

1. Explain LEMPEL-ZIV (ZIP) codes. with example.

(6)

2. A message source generates eight message symbols m_1 m_2 ....m_8 with probabilities 0.25, 0.03, 0.19, 0.16, 0.11, 0.14, 0.08, 0.04 respectively. Give the Huffman code for these symbols.

(10)

Unit - IV

1. Define minimum distance d_{min} of Hamming code. Distinguish between valid and Invalid code vectors.

(8)

2. For a (7,4) block code generated by (G) below, explain how the error syndrome helps in correcting a single error.

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

(8)

OR

1. Define following terms:

   a) Code word

   b) Block length

   c) Code rate

   d) Channel data rate

(2+2+2+2=8)

2. Given a (6,3) linear block code with the following parity check matrix H:

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

   a) Find the generator matrix G.

   b) Find the code word for data bit 101.

(8)

Unit - V

1. Explain FEC and ARQ system of error control. **(8)**

2. In a binary data transmission system, the channel bit error probability is given by $\frac{1}{2}\exp(-8000/r_c)$, where r_c is channel bit rate. The normal message bit rate is 1000 bits/sec.

   a) Calculate message bit error probability with r_b=1000bits/sec. and no error control coding.

   b) What will be the value of message bit error probability is r_b reduce to 500 bits/sec. **(8)**

OR

1. Explain the state Representation and state diagram of convolutional Encoder. **(8)**

2. Explain the viterbi algorithm. **(8)**

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