Roll No. _____ [Total No. of Pages : 2

4E2923

4E2923

B.Tech. IV Semester (Back) Examination, May - 2018
Computer Sc. & Engg.
4CS6.3(O) Logic Functional Programming
CS, IT

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

*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. i) Prove that
   a) If $p \Rightarrow q$ is true then $(p \wedge -q) \Rightarrow -q$
   b) From -p=q follows -(p=q).
   ii) Give an example to show that ingeneral $\forall_x \exists y p(x,y)$ and $\exists_x \forall y p(x,y)$ have different meanings?

OR

1. i) Give detail description of Inference Rules?
   ii) What is inter pretation of $\forall_x \exists y p(x,y)$? When is this quantified expression true? When it is false?

Unit - II

2. i) Explain how a query is processed in PROLOG?
   ii) Explain two approaches to matching goals to facts in a database.

OR

2. i) Explain the facts and rules of PROLOG programming.
   ii) What is the syntactic form and usage of fact and rule statements in PROLOG?

Unit - III

3. Write a PROLOG program that returns the last element of a given list.

OR

3. What is literal? Describe various steps of unification algorithm.

Unit - IV

4. i) How is a factorial function defined in LISP programming.

   ii) What are the predicate functions? Explain in the context of LISP?

OR

4. i) Explain list processing. Mention its fundamental and related expression.

   ii) Give the Boolean & conditionai set provided by LISP?

Unit - V

5. i) How can we perform input output in Haskell.

   ii) Discuss in brief the concept of MONAD in Haskell.

OR

5. i) How arrays are different in Haskell? Explain the creation of 1-D & 2-D array in Haskell.

   ii) What are higher order functions? Explain.

4E4165

Roll No. _____ [Total No. of Pages : 3

4E4165

B.Tech. IV semester (Main/Back) Examination May - 2018
Computer Science and Engineering
4CS6A Principles of Programming Languages
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 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 four basic computational models that describe most programming languages by giving examples of each. **(8)**

OR

1. a) Explain the most common functions of the semantic analyzers in language translation process. **(8)**

   b) Explain the six major features of a computer system from which languages are designed. **(8)**

Unit - II

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

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

OR

2. a) What are arrays? Derive formulae to compute l - value of a component in one - dimensional and two - dimensional arrays. **(8)**

   b) What are sequential access files? Explan major operations on sequential access files. **(8)**

Unit - III

3. a) What is sequence control? Explain implicit and explicit sequence control structures. **(4)**

   b) Explain the precedence and associativity rules of operators with examples. **(4)**

   c) What are exceptions? Explain exception handling mechanism with giving example in C++. **(8)**

OR

3. a) What are subprogram definition and activation? Construct the structure of the subprogram activation for the following 'C' subprogram : **(8)**

```
float sub (float x, int y)
{ const int val = 2,
# define final 10
float A[10], Int n;
n = val;
if (n>final) {...}
return (20*x+A[n]; }
```

   b) What is recursive sub program? Explain its specifications and implementation. **(8)**

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 environment of a subprogram with their advantages and disadvantages. **(8)**

OR

4. a) Consider the following subprograms, where P is calling subprogram and Q is called subprogram, what values are printed when P is executed.

```
P ( )
{ int c[4];
int m,
c[1]=6; c[2] = 7; c[3] = 8;
Q (c[1], & c[2]);
for (m = 1; m< = 3, m++)
printf ("%d\n", c[m]);
}
```

```
Q (int i, int *j)
{ i = i + 10;
*j = *j + 10;
printf ("%d %d\n", i, *j);
}
```

(4)

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

c) Explain the concept of block structure. **(4)**

Unit - V

5. a) Write short notes on :

i) Abstract data type

ii) Type definition **(2×4=8)**

b) Explain static storage management with its advantages and disadvantages. **(8)**

OR

5. a) What are garbage and dangling references? Write 'C' codes that create garbage and dangling reference. **(4)**

b) Explain the phases of variable size heap storage management. **(12)**

4E 4164

Roll No. _____ [Total No. of Pages : 3

4E 4164

B.Tech. IV Semester (Main/Back) Examination, May 2018
Computer Sc. & Engg.
4CS5A Principles of Communication
CS, IT

Time : 3 Hours **Maximum Marks : 80**
Min Passing Marks : 26

*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) Explain in detail FDM? **(8)**

   b) An angle modulated signal is given by $X_C(t) = 6\cos(2\pi \times 10^7 t + 0.2\sin(10^4)\pi t)$.

   i) If $X_C(t)$ is phase modulated signal with $K_p = 5$ rad | volt, and

   ii) If $X_C(t)$ is frequency modulated signal with $k_f = 5 \times 10^2$ Hz | volt.

   In each case determine modularity signal $X_C(t)$. **(8)**

OR

1. a) Calculate the percentage power saving when the carrier and one of the side bands are suppressed in an AM wave modulated to a depth of

   i) 100%

   ii) 50% **(8)**

   b) With the help of a block diagram explain the FM demodulation method using phase locked loop. **(8)**

UNIT - II

2. a) State and prove Sampling theorem for low-pass signals. **(8)**

   b) A signal $M_1(t)$ is bandlimited to 3.6 KHZ and three other signals - $M_2(t)$, $M_3(t)$, $M_4(t)$ are bandlimited to 1.2 KHz each. These signals are to be transmitted by mean of Time-Division-Multiplexing (TDM).

   i) Set-up a scheme for accomplishing this multiplexing requirement with each signal sampled at its Nquist rate.

   ii) What must be the speed of commutator (in samples / sec). **(8)**

OR

2. a) Explain the method of generation & detection of PPM. **(8)**

b) The signal $x(t) = 2\cos 200zt + 6\cos 180zt$ is ideally sampled at frequency of 150 samples per sec. The sampled version is passed through a unit gain ideal low-pass filter (LPF) with cut-off of 110Hz. What frequency component will be present in the output of the LPF? Write down an expression for its O/P signal. **(8)**

UNIT - III

3. a) A PCM system uses a step size of Δ. Assuming quantization error is uniformly distributed, determine the mean square value of the quantization error. Also find the signal-to-quantization noise ratio for an n-bit binary PCM with sinusoidal message signal. **(10)**

b) With help of block diagram explain the working of a Delta Modulator (DM) transmitter and Receivers. **(6)**

OR

3. Describe and derive expression for the average probability of error for a binary encoded PCM receiver using matched filter. Assume that PCM wave uses the NRZ unipolar format E_{max} and T_b are peak signal energy and bit duration respectively. **(16)**

UNIT - IV

4. a) Derive the equation of Nyquist criterion for distortion-less baseband Transmission in the absence of Noise. **(8)**

b) With the help of block diagram explain the Coherent detection of binary FSK signal. **(8)**

OR

4. a) What do you mean by ISI in baseband transmission? Explain the method to minimize ISI. **(8)**

b) Derive the expression of average probability of symbol error for binary PSK using Coherent detection. **(8)**

UNIT - V

5. a) List and explain the properties of Pseudo-Noise (PN) sequence. (8)

   b) What are the modulation techniques used in FHSS systems. (8)

OR

5. a) What are the important application of Spread Spectrum (SS) system. (8)

   b) What is meant by Spreading a signal? (4)

   c) What are the modulation techniques used in DSSS systems. (4)

4E4163

Roll No. _____ [Total No. of Pages : 2

4E4163

B.Tech. IV Semester (Main/Back) Examination, May - 2018
Computer Sc. & Engg.
4CS4A Software Engineering
CS, IT

Time : 3 Hours **Maximum Marks : 80**
Min Passing Marks : 26

*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. What is system? Differentiate between system engineering and software engineering. **(16)**

OR

a) Discuss the problem that occur while developing the system and suggest the possible solutions. **(8)**

b) Define software? What is software engineering concept? **(8)**

Unit - II

2. Describe the software development life cycle (SWDLC). **(16)**

OR

Explain the prototype model? Under what circumstances it is beneficial to construct a prototype model? **(16)**

Unit - III

3. a) Describe how to prepare a software. Requirement specification (SRS) document. List possible users and use of SRS for each user. **(8)**

b) Explain data flow and control flow diagram with example. **(8)**

10

OR

3. a) Define software requirement engineering **(8)**

   b) What are functional and non functional software requirement **(8)**

Unit - IV

4. a) What is software design? **(8)**

   b) What are architectural and procedural software designs? Explain. **(8)**

OR

4. Explain Cohesion and coupling in modular design. **(16)**

Unit - V

5. What is UML? How it is useful in object oriented modelling? **(16)**

OR

5. Explain the following in context of UML **(16)**

   i) Use case diagram

   ii) Sequence diagram

   iii) Classes and object

   iv) Interfaces

4E 4162

Roll No. _____ [Total No. of Pages : 4

4E 4162

B.Tech. IV Semester (Main/Back) Examination, May - 2018
Computer Science and Engineering
4CS3A Statistics and Probability Theory
CS,IT

Time : 3 Hours **Maximum Marks : 80**
Min Passing Marks : 26

*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) In an examination with multiple choice answers each question has four choice answers, out of which, one is correct. A candidate ticks his answer either by his skill or by guess or by copying from his neighbours. The probability of guess is 1/3 and that by copying is 1/6. The probability of correct answer by copying is 1/8. If a candidate answers a question correctly, find the probability that he knew the answer. **(8)**

b) The first four moment in a certain probability distribution about the point 4 are -1.5, 17, -30 and 108. Calculate β_1 and β_2 and state whether the distribution is leptokurtic or platykurtic. **(8)**

OR

1. a) Given the joint probability density $f(x,y)=\begin{cases}\frac{2}{3}(x+2y), 0<x<1, 0<y<1 \\ 0 \quad\quad\quad\quad\quad\quad\quad\quad \text{,elsewhere}\end{cases}$.

Find

i) Marginal density of X and Y. **(5)**

ii) Conditional density of X given Y=y, and use it to evaluate

$$P\left(\frac{X \le 1/2}{Y=1/2}\right).$$ **(5)**

b) A sample of size 3 is taken out in a single draw from a bag containing 12 items out of which 3 are defective. Find the expected number of defectives. **(6)**

Unit - II

2. a) If 10% of the pens manufactured by the company are defective, find the probability that a box of 12 pens contain (i) exactly two defective pens (ii) at least two defective pens (iii) no defective pens. **(8)**

b) Find moment generating function of normal variate and hence find β_1 and β_2. **(8)**

OR

2. a) The time (in hours) required to repair a machine is exponentially distributed with parameter $\lambda = 1/2$.

i) What is the probability that repair time exceeds 2h. **(4)**

ii) What is the conditional probability that a repair takes at least 10 hours given that its duration exceeds 9h. **(4)**

b) Find moment generating function of Poisson's distribution and hence find mean and variance of Poisson's distribution. **(8)**

Unit - III

3. a) In a partially destroyed laboratory record of an analysis of correlation data, the following results only are legible: variance of x = 9. Regression equation: $8x - 10y + 66 = 0$; $40x - 18y = 214$. Find (i) the mean values of x and y (ii) variance of y (iii) the coefficient of correlation between x and y. **(8)**

b) Fit a second degree parabola to the following data **(8)**

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

OR

3. a) Calculate the coefficient of correlation and obtain the line of regression for the following data. **(8)**

x	1	2	3	4	5	6	7	8	9
y	9	8	10	12	11	13	14	16	15

Obtain also an estimate for y. Which would correspond to x = 6.2.

b) Find the angle between two lines of regression. Interpret the case when $r = \pm 1, 0$. **(5)**

c) Explain the method of least squares. **(3)**

Unit - IV

4. a) In a railway marshalling yard, goods trains arrive at a rate of 30 trains per day. Assuming that the inter-arrival time follows an exponential distribution and the service time distribution is also exponential with an average 36 minutes, calculate the following :

   i) The mean queue size (line length) i.e. E (n). **(3)**

   ii) The Probability that the queue size exceeds 10. **(3)**

   iii) If the input of trains increases to an average 33 per day, what will be the change in (i) and (ii)? **(2)**

   b) At a railway station, only one train is handled at a time. The railway yard is sufficient for two trains to wait while other is given signal to leave the station. Trains arrive at the station at an average of 6 per hour and the railway station can handle them on an average of 12 per hour. Assuming Poisson arrivals and exponential service distribution, find the steady state probabilities for the various number of trains in the system. Also find the average waiting time of a new train coming into the yard. **(8)**

OR

4. a) A petrol pump has 2 pumps. The service time follows the exponential distribution with the mean time of 4 minutes and vehicles arrive for service in Poisson fashion at the rate of 10 per hour. Find :

   i) The probability that an arrival of a vehicle would have to wait. **(4)**

   ii) Find the expected percentage of idle time for each petrol pump. **(4)**

   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 average arrival rate is 2 jobs per hour. Assume the job times to be distributed exponentially. If the maximum number of jobs accepted on a day be 6, find.

   i) The expected number of jobs waiting for the computer, **(4)**

   ii) The total time lost per day. **(4)**

Unit - V

5. a) An automata car station has one bay where service is done. The arrival pattern is Poisson with 4 cars/hour and may wait in the parking lot in the street if the bay is busy. Find the time spent in the station by a car if service-time distribution is

   i) Uniform between 8 and 20 minutes **(3)**

ii) Normal with mean service rate = 12 minutes and $\sigma = 3$ minutes. **(3)**

iii) Discrete with values equal to 4, 8 and 15 minutes with probabilities 0.2, 0.6 and 0.2 respectively. **(4)**

b) Find the nature of the states of the markov chain with transition probability matrix.

$$\begin{array}{c} \\ 0 \\ 1 \\ 2 \end{array} \begin{array}{c} \begin{array}{ccc} 0 & 1 & 2 \end{array} \\ \begin{pmatrix} 0 & 1 & 0 \\ 1/2 & 0 & 1/2 \\ 0 & 1 & 0 \end{pmatrix} \end{array}$$ **(6)**

OR

5. a) A gambler has Rs. 10. He bets Rs. 5 at a time and wins Rs. 5 with probability 1/2. He stops playing if he loses Rs. 10 or wins Rs. 10.

i) Find the transition probability matrix of the corresponding markov chain. **(3)**

ii) What is the probability that he has lost his money at the end of 5^{th} play. **(4)**

iii) What is the probability that game lasts more than 7 plays? **(3)**

b) In a random walk model a person is at a distance 5 unit from the origin, on the x-axis. He takes unit step either to the right with probability 0.7 or to the left with probability 0.3, unless he is at a distance 2 unit from the origin. When he takes a step to the right to reach x=3 or he is at the point 5 when he takes a step to the left to reach x=4. Find the transition probability matrix. **(6)**

Roll No. _____ [Total No. of Pages : 3

4E 4161

4E 4161

B.Tech. IV semester (Main/Back) Examination, May 2018
Computer Science & Engg.
4CS2A Discrete Mathematical Structures
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 suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) If $A \cap C \subseteq B \cap C$ and $A \cap \overline{C} \subseteq B \cap \overline{C}$ then show that $A \subseteq B$. **(4)**

b) Determine the number of positive integers n where $1 \leq n \leq 100$ and n is not divisible by 2,3 or 5. **(4)**

c) Explain pigeonhole and extended pigeonhole principle with example. **(8)**

OR

1. a) Write short notes on

i) Principle of Inclusion and Exclusion

ii) Recursive Definition of sets **(4+4)**

b) Show that the set of odd positive integers is a countable set. **(8)**

Unit - II

2. a) Let R be the relation defined on a set of natural numbers N such that for $x, y \in N, xRy \Leftrightarrow x - y$ is divisible by 3, then show that R is an equivalence relation on N. Find equivalence classes also. **(8)**

b) Using Warshall's algorithm, find the transitive closure of the relation $R = \{(a,a),(a,b),(a,d),(c,b),(c,c),(d,b)(d,c),(d,d)\}$ on {a,b,c,d}. **(8)**

OR

2. a) If R and S be two equivalence relations in a set A, then prove that $R \cap S$ is also an equivalence relation in A. **(8)**

b) Draw the Hasse diagram and answer the following concerning the poset ({2,4,6,9,12,18,27,36,48,60,72}

i) Find the maximal and minimal elements

ii) Find the greatest and least elements, if exists

iii) Find LUB of {2,9}, if exists

iv) Find GLB of {60,72}, if exists **(8)**

Unit - III

3. a) Prove that there is no rational number $\frac{a}{b}$ whose square is 2. **(5)**

b) Give an indirect proof of the theorem "If 3n+2 is odd, then n is odd". **(5)**

c) Prove that the binary search algorithm works correctly for every ordered list of size $n \geq 0$. **(6)**

OR

3. a) Find and prove a formula for the sum of the first n cubes, that is, $1^3+2^3+....+n^3$. **(5)**

b) Find gcd of 414 and 662 using Euclidean algorithm. **(5)**

c) Sort the list X = {64, 25, 12, 22, 11} using selection sort algorithm. **(6)**

Unit - IV

4. a) Explain the following terms with example

i) Ring sum of two graphs

ii) Isomorphic Graphs

iii) Eulerian Graph

iv) Hamiltonian Graph **(4×2=8)**

b) Define chromatic number of a graph. Show that a graph G with one or more edges is bipartite if and only if the chromatic number of G is 2. **(8)**

OR

4. a) Suppose that G = (V, E) be a graph with k - component, where each component is a tree. Derive a formula in terms of $|V|, |E|$ and k. **(8)**

b) Explain the krushal algorithm with example. **(8)**

Unit - V

5. a) Show that $\sim(p \vee (\sim p \wedge q)) = ((\sim p) \wedge (\sim q))$ **(4)**

b) Define conditional and biconditional statements. Explain the following terms by giving suitable example

i) Converse

ii) Contrapositive

iii) Inverse **(4)**

c) Obtain the principle disjunctive normal form of $(p \wedge q) \vee (\sim p \wedge r) \vee (q \wedge r)$ by constructing truth table. **(8)**

OR

5. a) Write an english sentence corresponding to each of the following :

a) $\forall x P(x)$

b) $\exists x Q(x)$

c) $\forall x \exists y R(x, y)$

d) $\exists x \forall y R(x, y)$

e) $\forall x (\sim Q(x))$

f) $\exists y (\sim Q(y))$

g) $\sim (\exists x P(x))$

h) $\sim (\forall x Q(y))$

Where P(x) : x is even

Q(x) : x is prime numbers

R(x,y) : (x+y) is even, $x, y \in z$ (set of integers) **(8)**

b) Examine the validity of the following arguments, "If prices are higher than wages are high. Prices are high or there are price controls. 'If there are price controls then there is not an inflation. There is an inflation therefore wages are high". **(8)**

4E 4160

Roll No. _____ [Total No. of Pages : 2

4E 4160

B.Tech. IV Semester (Main/Back) Examination, May- 2018
Computer Sc. & Engg.
4CS1 A Microprocessors & Interfaces
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 suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Explain 8085 Bus structure in detail. **(8)**

   b) Explain the basic four operations commonly performed by the Microprocessing Unit. **(8)**

OR

1. a) Differentiate between static and dynamic RAM. **(8)**

   b) i) How many bits are stared by a 256×4 memory chip? Can this chip be specified as 128- byte memory? **(6)**

   ii) What is the function of the accumulator? **(2)**

Unit - II

2. a) What are addressing modes? Explain each type in detail. **(8)**

   b) Write a set of instructions to perform an addition and a subtraction (in 2's complement). **(8)**

OR

2. a) Explain the followings: **(4×2=8)**

   i) MOV

   ii) NOP

   iii) IN and OUT

   iv) HLT

2. b) What is 'Modular design approach'? Discuss different steps to design and run assembly language program. **(8)**

Unit - III

3. a) Define the stack, stack pointer (register) and program counter. Also describe their uses. **(10)**

   b) What are counters? Explain with a suitable example. **(6)**

OR

3. a) What are subroutines? Explain its parameter passing. **(8)**

   b) Explain RST instructions and their uses in detail. **(8)**

Unit -IV

4. a) Design a block diagram of 8255 I/O parts. Also explain their modes in detail. **(10)**

   b) What is control register? **(6)**

OR

4. a) Discuss 8254 control word formats in detail. **(8)**

   b) List the major components of the 8279 keyboard/display interface and explain their functions in brief. **(8)**

Unit -V

5. a) Design a driver circuit block diagram for connecting MPV with Liquid crystal display. **(10)**

   b) Discuss different Microprocessor applications in detail. **(6)**

OR

5. Write short note on: (any two) **(2×8=16)**

   a) RS 232C

   b) Parallel interface

   c) Matrix key board
