DDCE - II - S - MCA - CS - 2.1 - DS

2018

Full Marks - 70

Time - As in the Programme

The figure in the right hand margine indicate marks.

Answer ALL questions.

1. Answer All. [2×5

(a) How is row major order of 2D array representation different from that of column major order ? [2

(b) What is the number of comparisons needed to search a single linked list in worst case ? Explain. [2

(c) How is a node of double linked list created in C ? [2

(d) Describe the different variants of a Queue. [2

(e) Why is BFS so named ? What makes it different from DFS ? [2

[Cont...

2. Answer any THREE : [8×3

(a) Describe the various ways for searching an element in a single dimensional array ? Which among them is better ? [8

(b) Write down a C program to carry out Push() and Pop() operations on a stack implemented as an array. [8

(c) Write down a function in C to reverse a single linked list. [8

(d) Construct a binary search tree with the following nodes : 30 36 45 47 50 60 65 70 75 90 85 83 95. Demonstrate the three different cases of delection on this binary search tree. [8

(e) Illustrate the difference between various ways of representing directed and undirected graphs with examples. [8

3. Answer any THREE : [12×3

(a) What is the need for analysing algorithms ? Explain with examples. Differentiate between iterative and recursive algorithms. [12

[Cont...

(b) Write down the algorithm for evaluating a postfix expression using stack. [12

Evaluate the following postfix expression using stack.

8 2 3 ^ / 2 3 * + 5 1 * -

(c) Write down pseudocode for insertion and deletion of nodes in linear and circular queue. [12

(d) What is an AVL tree ? Insert the given nodes into an AVL tree : Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sept, Oct, Nov, Dec. (Consider the alphabetical order to be the order of priority) [12

(e) Differentiate between : [4×3

(i) Malloc () & Calloc ()

(ii) Array & Linked List

(iii) Complete binary tree & strictly binary tree

DDCE - II - S - MCA - CS - 2.2 - DC & LD

2018

Full Marks - 70

Time - As in the Programme

The figure in the right hand margine indicate marks.

Answer ALL questions.

1. Answer All questions. [2×5=10

(a) What do you mean by character code ?

(b) Define Multiplexer ?

(c) Define Super computer and give an example ?

(d) What is pseudo instruction and give one example ?

(e) Define DVD ?

2. Answer any THREE : [8×3=24

(a) Define Boolean algebra ? Write down boolean rules and explain uses of these rules with a suitable example ?

/ Cont...

(b) What is a flip-flop ? Explain different types of flip-flops with suitable diagrams and truth tables ?

(c) Perform the following operations using 1's and 2's complement :

(i) Add - 21 with 25

(ii) Add - 13 with - 7

(iii) Subtract 31 with - 45

(d) What is an instruction set ? Discuss the instruction set of ARM processor ?

(e) Define Secondary Memory along with its characteristic and with a suitable diagram explain hard disk ?

3. Answer any THREE : [12×3=36

(a) What is K-Map ? What are its characteristics ? Minimize the below expression using K-map :

$f(p,q,r,s)=*\Sigma(1,2,3,4,5,6,7,10)+d(9,11,12,13,14)$

Draw the circuit using AND-OR gates.

(b) Define PLD ? Explain PLA, PAL and CPLD with suitable diagrams and examples ?

[Cont...

(c) What is instruction format ? Write down 3-Address, 2-Address, 1-Address & 0-Address Instructions to evaluate the following expressions :

$$Z2 = P - Q * R + S / T * U - V + W$$

(d) What do you mean by ARM Processor ? What are its characteristic ? Explain the Register structures with a suitable diagram ?

(e) Define primary memory ? Discuss different types of main memory in details along with their advantageous ?

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DDCE - II - S - MCA - CS - 2.3 - OOPUC++

2018

Full Marks - 70

Time - As in the Programme

The figure in the right hand margine indicate marks.

Answer ALL questions.

1. Answer All. [2×5

(a) Distinguish between operator precedence and associativity. [2

(b) Depict the hierarchy of datatypes available in C++. [2

(c) Write a function in C++ to find out greater among two numbers. The function must return by reference. [2

(d) What is a constant member function ? How can a function be made constant ? [2

(e) What are manipulators ? Give examples. [2

[Cont...

2. Answer any THREE : [8×3

(a) Illustrate the various uses of (i) scope resolution operator (ii) void with C++ program segments. [8

(b) List the characteristics of a friend function. Using a C++ program show how function can be friend to more than one class. [8

(c) Write a C++ program to illustrate constructor overloading. [8

(d) What is this pointer ? Show its use in a program. [8

(e) What will be the output ? Explain your answer. (Assume all header files and standard libraries have been included) [2×4

[Cont....

(i) class Test

```
{
staticinti;
intj;
};
intTest : : i;
intmain ( )
{
cout <<size of (Test);
return0;
}
```

(ii) classBasel {

```
public :
Base 1 ()
{cout << "Base1's constructor called" <<end 1;}
};
```

[Cont...

```
class Base2 {
public :
Base2 ( )
{cout << "Base2's constructor called"<<end1;}
};
classDerived: publicBase1, publicBase2 {
public :
Derived ()
{cout<<"Derived's constructor called"<<end1;}
};
intmain ()
{
Derived d;
return0;
}
```

[Cont...

(iii)
```
intmain ()
{
inti = 0;
cout << (i = 0 ? 1 : 2 ? 3 : 4);
return0;
}
```

(iv)
```
intmain ()
{
void * ptr; // Creating void pointer
deleteptr; // Destroying void pointer
cout << "ptr deleted successfully";
return0;
}
```

[Cont...

3. Answer any THREE : [12×3

(a) What is an inline function ? What is the syntax for making a function inline ? List the situations where inline expansion may not work. Differentiate between inline function and macro expansion. [12

(b) How is overloading unaryj operator different from overloading binary operator ? Write C++ programs to overload unary and binaryk operator using friend function. [12

(c) Describe the different types of inheritance using program segments for illustration. [12

(d) Illustrate various unformatted I/O operations used in C++ programs. [12

[Cont...

(e) Describe the following with appropriate example program. [4×3

(i) Constant Object

(ii) Nesting of Member Functions

(iii) Ambiguity Resolution in Inheritance

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DDCE - II - S - MCA - CS - 2.4 - QT

2018

Full Marks - 70

Time - As in the Programme

The figure in the right hand margine indicate marks.

Answer ALL questions.

1. Answer All questions. [2×5

(a) What are the methods used to solve an LPP involving artificial variable ?

(b) Define Dual of LPP.

(c) State the difference between Transportation problem and Assignment problem.

(d) What is dummy activity and when it is needed ?

(e) What is economic order quantity ?

2. Answer any THREE questions : [8×3

(a) Solve the following linear programming problem by using Big-M method :

[Cont...

Minimize

$$Z = 3x_1 + 4x_2$$

Subject to the constraints :

$$4x_1 + x_2 \geq 30$$
$$-x_1 - x_2 \leq -18$$
$$x_1 + 3x_2 \geq 28$$
$$x_1, x_2 \geq 0.$$

(b) Solve the following linear programming problem by using two phase method :

Minimize

$$Z = x_1 + 2x_2 + 3x_3$$

Subject to the constraints :

$$x_1 - x_2 + x_3 \geq 4$$
$$x_1 + x_2 + 2x_3 \leq 8$$
$$x_1 - x_3 \geq 2$$
$$x_1, x_2, x_3 \geq 0.$$

[Cont....]

(c) A car hiring company has one car at each of the 5 depots a, b, c, d and e. A customer in each of five cities A, B, C, D and E require a car. The distance (in kms.) between depots and the cities are as follows. How should the cars be assigned to the customers so as to minimize the distance travelled ?

Depots

Cities	a	b	c	d	e
A	160	130	175	190	200
B	135	120	130	160	175
C	140	110	155	170	185
D	50	50	80	80	110
E	55	35	70	80	105

(d) Explain the role of duality in Linear programming Problem and then find the dual of the following problem.

Minimize : $Z = x_1 + x_2 + x_3$

[Cont...]

Subject to : $x_1 - 3x_2 + 4x_3 = 5$

$x_1 - 2x_2 \geq 3$

$2x_2 - x_3 \geq 4$

$x_1, x_2, x_3 \geq 0.$

(e) A project consists of nine jobs (A, B, C, ... I) with the following precedence relations and time estimates :

Job :	A	B	C	D	E	F	G	H	I
Predecessor :	–	–	A,B	A,B	B	D,E	C,F	D,E	G,H
Time (days)	15	10	10	10	5	5	20	10	15

(i) Draw the project network.

(ii) Identify the critical path.

3. Answer any THREE questions : [12×3

(a) A diet for a sick person must contain at least 4000 units of vitamins, 50 units of minerals and 1400 calories. Two foods A and B are available at a cost of Rs. 4/- and Rs. 3/- per unit respectively.

[Cont...

If one unit of A contains 200 units vitamins, 1 unit of mineral and 40 calories and one unit of food B contains 100 units of vitamins, 2 units of minerals and 40 calories, what combination of foods be used to have least cost ?

(b) There are three factories F_1, F_2 and F_3 situated in different areas with supply capacities as 200, 400 and 350 units respectively. The items are shipped to five markets M_1, M_2, M_3, M_4 and M_5 with demands as 150, 120, 230, 200, 250 units respectively. The cost matrix is given as follows :

	M_1	M_2	M_3	M_4	M_5
F_1	2	5	6	4	7
F_2	4	3	5	8	8
F_3	4	6	2	1	5

Determine the optimal shipping cost and shipping patterns.

[Cont...

(c) A small project is composed of 7 activities whose time estimate are listed in the table below :

Activity	Immediate Predecessor	Estimated Duration (Weeks)		
		Optimistic	Most likely	Pessimistic
A	–	2	3	10
B	–	2	3	4
C	A	1	2	3
D	A	4	6	14
E	B	4	5	12
F	C	3	4	5
G	D, E	1	1	7

(i) Draw the project network.

(ii) What is the expected project length ?

(iii) What is the probability that the project is completed within 11 weeks ?

(iv) What is the probability that the project is completed within 16 weeks.

(d) Use Branch-and-bound technique to solve the following integer programming problem :

Maximize

$$Z = 7x_1 + 6x_2$$

[Cont...

Subject to the constratints :

$$2x_1 + 3x_2 \leq 12$$

$$6x_1 + 5x_2 \leq 30$$

$$x_1, x_2 \geq 0$$ and to be integers.

(e) A Xerox machine in an office is operated by a person who does other jobs also. The average service time for a job is 6 minutes per customer. On an average, in every 12 minutes one customer arrives for Xeroxing. Find :-

(i) The Xerox machine utilization.

(ii) Percentage of time when an arrival has not to wait.

(iii) Average time spent by a customer.

(iv) Average queue length.

(v) The arrival rate if the management is willing to deploy the person exclusively for Xeroxing when average time spent by the customer is 15 minutes.

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DDCE - IV - S - MCA - CS - 2.5 - N.A.

2018

Full Marks- 70

Time -As in the Programme

The figures in the right-hand margin indicate marks

Answer ALL questions

1. Answer all the questions : [5×2

(a) Suppose 1.414 is used as an approximation to $\sqrt{2}$. Find the absolute and relative errors.

(b) Find the polynomial of least degree that interpolates this table.

x	1.4	1.25
y	3.7	3.9

(c) Find the eigen values of the following matrix.

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$$

[Cont...

(d) Evaluate $\int_0^{\pi/2} \cos\theta d\theta$

(e) State second order Runge-Kutta method.

2. Answer any three questions [3×8

(a) Find a root of the equation $x^2 - 2x - 5 = 0$ by the method of false position correct to three decimal places.

(b) Given the data

x	0	1	2	4	6
f(x)	1	9	23	93	259

(i) Construct the divided-difference table.

(ii) Using Newton's interpolation polynomial, find an approximation to f(4.2).

(c) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using (i) Simpson's $\frac{1}{4}$ rule taking $h = \frac{1}{4}$ and (ii) Simpson's $\frac{3}{8}$ rule taking $h = \frac{1}{6}$.

[Cont...

(d) Find the largest eigen value and the corresponding eigen vector of the matrix

$$A = \begin{bmatrix} 1 & 6 & 1 \\ 1 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$$

(e) Find the curve of best fit of the type $y=ae^{bx}$ to the following data by the method of Least squares :

x :	1	5	7	9	12
y :	10	15	12	15	21

3. Answer any three questions : [3×12

(a) Derive Newton-Raphson method. Using this method evaluate $\sqrt{12}$ to four decimal places.

(b) Derive Lagrange interpolation polynomial that interpolates a set of fixed nodes $x_0, x_1, \ldots x_n$. Using the Lagrange interpolation process, find a polynomial of least degree that assumes these values.

x :	0	2	3	4
y :	7	11	28	63

[Cont...

2018

Full Marks – 70

Time - As in he Programme

The figure in the right hand margin indicate marks

Answer All Questions

1. **Answer All Questions** **2 x 5**
   a. **Write down two objectives of OB.**
   b. **What is decision making ?**
   c. **Define Organisation .**
   d. **Discuss the different resources required for setting of a Unit.**
   e. **What is attitude?**

2. **Answer Any Three Questions .** **8 x 3**
   a. **Define Personality . Discuss the personality trails .**
   b. **How will you distinguish leaders from managers ?**
   c. **What are the factors responsible for creating barriers in communication ? What steps can be taken to overcome such barriers .**
   d. **Define Planning. Discuss the different types of Planning .**
   e. **Discuss the motivation cycle . What are the financial and non financial factors motivate the individuals in the work place ?**

3. **Answer Any Three Questions** **12 x 3**
   a. **Define management ? Discuss the functions and the process management .**
   b. **Define Communication . Discuss the different types and process of communication .**
   c. **Discuss the Maslow and Hezberg's theory of motivation .**
   d. **Who can be a leader ? What are the nature and different styles of a leader ?**
   e. **What are the different skills required as per the levels of management . Briefly discuss the roles of a manager in the 21st Century .**