Total No. of Questions : 12]

SEAT No. :

P1014

[Total No. of Pages : 2

[4661]-21

F.Y. M.C.A. (Engineering)

OBJECT ORIENTED PROGRAMMING

(Semester - II) (510909) (2008 Pattern)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) What is object oriented programming? List out the differences between C programming language and C++ programming language. **[6]**

b) What is procedure oriented programming? Why procedure oriented programming is called top down approach? **[5]**

OR

Q2) a) What is abstraction? Why is it important? Should abstraction be user centric or developer centric. **[6]**

b) What is object oriented programming? Why object oriented programming called bottom up approach? **[5]**

Q3) a) What are the advantages of using **new** operator as compared to the function **malloc ()?** Write a program to allocate memory to array using new operator. **[6]**

b) What is inline function? List out the situations in which it will not work as inline? **[6]**

OR

Q4) a) What is function overloading? Write a C++ program to overload volume Function that Calculate volume of circle, rectangle, Square. **[6]**

b) What is class? Explain difference between structure and class with example. **[6]**

P.T.O.

Q5) a) What is a destructor and what are the uses of declaring a destructor member function in a program? **[6]**

b) What is friend function? What are the characteristics of friend function? Give one example of friend function. **[6]**

OR

Q6) a) What is a constructor? What are the rules governing the declaration of constructor? **[6]**

b) Write a c++ program to print the factorial of given number using a constructor and a destructor member function. **[6]**

SECTION - II

Q7) a) Write a program in c++ using operator overloading to overload binary + operator using friend function. **[6]**

b) Explain binary and unary operator overloading using friend function. **[6]**

OR

Q8) a) What is a type conversion? Explain type conversion from class type to basic type using example. **[6]**

b) What is the difference between unary and binary operator? List operator overloading rules. **[6]**

Q9) a) Explain mechanism of passing parameters to the base class constructor in inheritance with example. **[6]**

b) Explain virtual base class and abstract base class with example. **[6]**

OR

*Q10)*a) What is polymorphism? Explain run time polymorphism with example. **[6]**

b) What are the different visibility modifiers in inheritance? Explain the effect of inheritance on the visibility of members. **[6]**

*Q11)*a) What is an exception? Write a program to handle user define exception. **[5]**

b) List Formatted I/O and unformatted I/O Functions in c++. Explain any two functions of each type. **[6]**

OR

*Q12)*a) What is Manipulator? Explain user-defined manipulators with example. **[5]**

b) What is file handling? What are the different file modes in C++? Explain the parameters and their meaning. **[6]**

Total No. of Questions : 12]

SEAT No. :

P1015

[Total No. of Pages : 4

[4661]-22
F.Y. M.C.A. (Engg.)
DATA STRUCTURES AND FILES
(Semester - II) (510910) (2008 Course)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) What is Abstract data type (ADT)? Give the difference between ADT and data structure. Explain array as an ADT in detail. **[8]**

b) What is sparse matrix? How to represent the sparse matrix? **[4]**

OR

Q2) a) What is array? Explain 2 D array in detail. Consider an array declaration float a[20][10]. If the base address is 3000, find the address of element a[15][8] in row major and column major representation.

(NOTE - Assume 4 byte storage for each array element). **[8]**

b) Define the following terms: **[4]**

i) Data structure.

ii) Data Object.

Q3) a) Write a function to delete the node from doubly linked list. **[6]**

b) Represent addition of following polynomials in the form of circular linked list. **[6]**

i) $A(X) = X^9 - X^4 + X^3 + X - 2$

$B(X) = 3X^3 - 2X^2 + 7X - 4$

ii) $A(X) = 9X^8 - 6X^5 + 2X^2 - 9$

$B(X) = X^7 + 7X^3 + 4X^2 - 9X + 7$

(Clearly show the node structure)

OR

P.T.O.

Q4) a) Write a function to reverse a singly linked list. **[5]**

b) Differentiate between singly linked list and circular linked list. **[3]**

c) Write a function to search a particular element from circular linked list. **[4]**

Q5) a) What is queue? Give the different types of queue. Represent queue as an array. **[6]**

b) Convert the following infix expression into postfix form

3 + 5*(7 – 4)^2

And also evaluate the postfix expression. **[5]**

OR

Q6) a) What is stack? Compare stack and queue in two column format. **[6]**

b) Explain priority queue as linked list. **[5]**

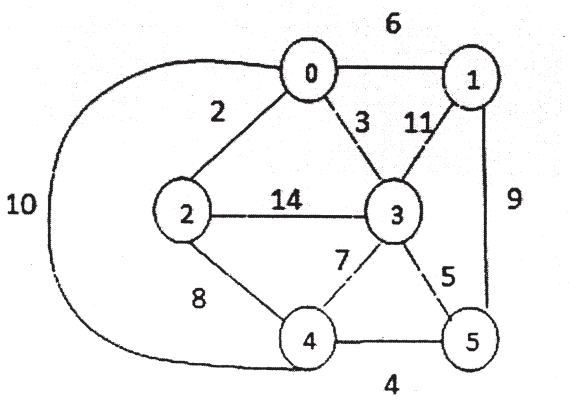
SECTION - II

Q7) a) Construct binary search tree by inserting the following data sequentially. **[4]**

Also find height of the binary search tree.

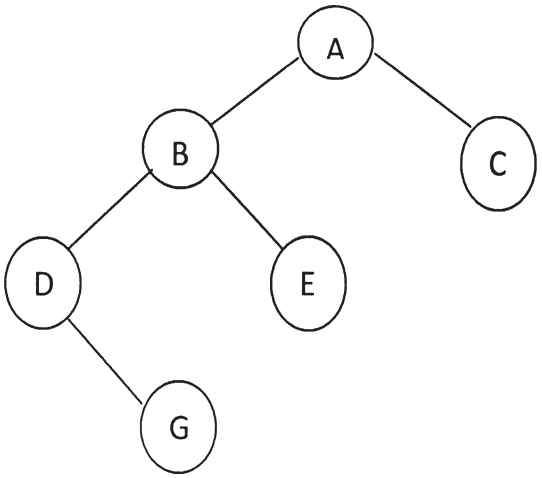
81 62 12 87 45 96 38 29 78 67

b) Construct and plot the minimum spanning tree of the following graph. Assume starting vertex as 0. **[8]**

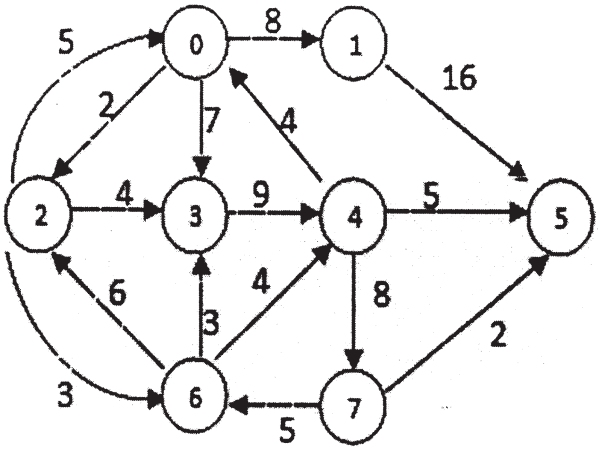


OR

Q8) a) What is binary tree? Construct inorder, preorder and post order traversal of following binary tree. **[4]**



b) Find the shortest path of the following graph using Dijkstra's algorithm. Assume starting vertex as 0. **[8]**



Q9) a) Sort the following list in ascending order using merge sort. Show step by step process.

25, 17, 31, 13, 2, 89, 75, 12, 7, 21 **[6]**

b) Write a c program to find the desired element in an array using linear search and compute its time complexity. **[6]**

OR

Q10)a) Sort the following list in ascending order using quick sort. Show step by step process. 48, 44, 19, 59, 72, 80, 42, 65, 82, 8, 95, 68. **[7]**

b) What is Binary search? Explain with suitable example by computing its time complexity. **[5]**

Q11)a) Write a short note on - "Simple index File organization". **[3]**

b) What is hashing and hash function? Enlist application areas in which hashing are used and also explain good characteristic of hash function. **[8]**

OR

Q12)a) Compare sequential file access and direct file access. **[4]**

b) What do you mean collision resolution? Explain various techniques of collision resolution in hashing. **[7]**

Total No. of Questions : 12]

SEAT No. :

P1016

[Total No. of Pages : 4

[4661]-23
F.Y. M.C.A. (Engineering Faculty)
OPERATIONS RESEARCH
(2008 Pattern) (510911)

Time : 3 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Figures to the right indicate full marks.***
2) ***All questions are compulsory.***

SECTION - I

Q1) a) The ABC company has been a producer of picture tubes for television sets and certain printed circuits for radios. The company has just expanded into full scale production and marketing of AM and AM-FM radios. It has built a new plant that can operate 48 hours per week. Production of an AM radio in the new plant will require 2 hours and production of an AM-FM radio will require 3 hours. Each AM radio will contribute Rs.40 to profits while an AM-FM radio will contribute Rs. 80 to profits. The marketing department after extensive research has determined that a maximum of 15 AM radios and 10 AM-FM radios can be sold each week. **[8]**

i) Formulate a linear programming model to determine the optimum production mix of AM and FM radios that will maximize profits.

ii) Solve the above problem using the graphic method.

b) Discuss the properties of LP Models. **[4]**

OR

Q2) Use the Simplex method to solve the following LPP

a) Max $Z = 3x_1 + 5x_2 + 4x_3$

subject to constraints

$$2x_1 + 3x_2 \leq 8$$

$$2x_2 + 5x_3 \leq 10$$

$$3x_1 + 2x_2 + 4x_3 \leq 15$$

$$x_1, x_2, x_3 \geq 0$$ **[8]**

b) Give the general structure of LP Model and what are the advantages and limitations of LP Model. **[4]**

P.T.O.

Q3) a) Compare the starting solutions obtained by

i) Northwest corner method.

ii) Least cost method.

iii) Vogel's Approximation method for the following method. **[8]**

	D_1	D_2	D_3	D_4	Supply
P_1	2	3	11	7	6
P_2	1	0	6	1	1
P_3	5	8	15	9	10
Demand	7	5	3	2	

b) Write algorithm MODI Method. **[4]**

OR

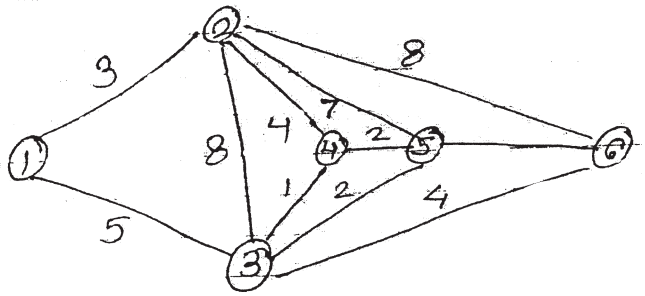
Q4) a) A company has a team of Four salesman and there are four districts where the company wants to start it's business. The following is the profit per day in Rupees for each salesman in each district **[8]**

		Districts			
		D_1	D_2	D_3	D_4
	A	16	10	14	11
SalesMan	B	14	11	15	15
	C	15	15	13	12
	D	13	12	14	15

Find the assignment of Salesman to various districts which will field maximum profit.

b) Write a short note on Transhipment model. **[4]**

Q5) a) **[7]**



i) Apply Floyd's algorithm to it and generate the final distance matrix and precedence matrix.

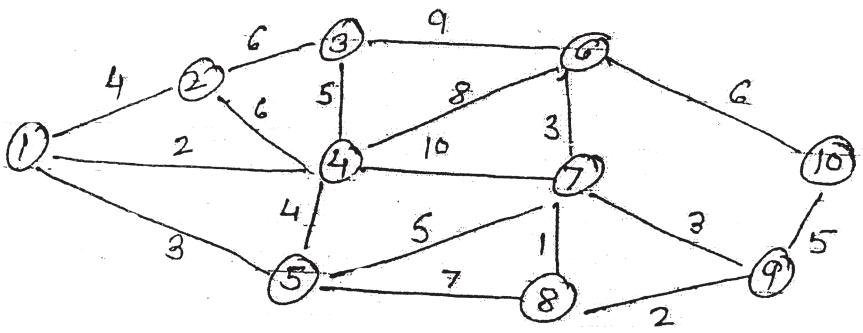
ii) Find the shortest path and the corresponding distance from the source node to the destination node in each of the cases

1-6, 5-1 and 5-2

b) Compare CPM and PERT. **[4]**

OR

Q6) a)



Consider the distance network. Find the minimum spanning tree of this network using the PRIM algorithm. **[7]**

b) Write a Algorithm Kruskal's algorithm. **[4]**

SECTION - II

Q7) a) Solve the following Integer programming problem using Branch Bound technique.

Max $z = 10x_1 + 20x_2$

Subject to $6x_1 + 8x_2 \leq 48$

$x_1 + 3x_2 \leq 12$

$x_1, x_2 \geq 0$ and integer **[7]**

b) Write a cutting plane algorithm. **[5]**

OR

Q8) a) Find the optimum integer solution to the following LPP. **[7]**

Max $z = 5x_1 + 8x_2$

Subject to $x_1 + 2x_2 \leq 8$

$4x_1 + x_2 \leq 10$

$x_1, x_2 \geq 0$ and integer.

b) List various forecasting techniques. **[5]**

Q9) a) Estimated levels of sales (units) **[8]**

Strategies	N_1	N_2	N_3
S_1	7,00,000	3,00,000	1,50,000
S_2	5,00,000	4,50,000	0
S_3	3,00,000	3,00,000	3,00,000

Which strategy should be concern executive choose the basis of

i) Maximin

ii) Minimax

iii) Maximax

iv) Laplace

b) Give the significance of Decision Analysis what are the steps of decision making process. **[4]**

OR

Q10)a) The research department of ABB has recommended the marketing department. AD launch the shampoo of three different types. The marketing manager has to decide one of the types of shampoo to be launched under the following estimated pay offs for various levels of sales. **[8]**

Types of	Estimated levels of sales (unit)		
Shampoo	Rs. 15,000	Rs. 10,000	Rs. 5,000
Egg shampoo	30	10	10
Clinic shampoo	40	15	5
Deluxe shampoo	55	20	3

What will be the marketing manager's decision.

i) Maximin

ii) Minimax

iii) Maximax

iv) Laplace

b) What is decision making under risk? Explain expected value criterion. **[4]**

Q11)a) What conditions must be satisfied by the observations of the simulation experiment? Discuss each of them. **[7]**

b) Explain in brief generation of Random number. **[4]**

OR

Q12)a) What is simulation experiment & Discuss the factors affecting simulation. **[7]**

b) Write a note on Monte Carlo simulation. **[4]**