No. of Printed Pages : **4**

BICS-029

00306

DIPLOMA IN COMPUTER SCIENCE AND TECHNOLOGY (DCSVI)/ADVANCED LEVEL CERTIFICATE COURSE IN CSE (ACCSVI)

Term-End Examination

June, 2013

BICS-029 : ALGORITHMS AND LOGIC DESIGN

Time : 2 hours *Maximum Marks : 70*

*Note : Question no. 1 is **compulsory**. Attempt **any four** from the rest. Assume missing data, if any.*

---

1. (a) The running time of an algorithm on a particular input is the number of primitive operation or steps executed. 2

(i) True (ii) False

(b) Recursive algorithm typically follows a divide and conquer approach. 2

(i) True (ii) False

(c) Merge sort runs on θ (n logn) worst case time. 2

(i) True (ii) False

(d) θ (g(n) = {f(n) : there exist positive constants c and n_o such that $0 \leq c\, g(n) \leq f(n)$ for all $n \geq n_o$ }. 2

(i) True (ii) False

(e) A function f (n) is strictly increasing in m<n implies : 2

(i) f(m) < f (n) (ii) f (m) > f (n)

(iii) f (m) = = f (n) (iv) none of above

(f) The symbol for decision making statement in a flowchart is : 2

(i) diamond box (ii) circle

(iii) rectangle (iv) parallelogram

(g) Which of the following statement is false ? 2

(i) pseudo code is combination of algorithm and flowchart.

(ii) Algorithm is a pictorial representation of codes.

(iii) Binary search is possible for unsorted elements.

(iv) all the above

2. (a) What is efficiency of an algorithm ? Is there any relation with complexity ? Explain. best, average and worst case complexity with the help of examples. 8

(b) Write down the characteristic of a good algorithm. 6

3. (a) Write algorithm for Insertion sort and apply this algorithm to sort following data : 10 5 9 13 8 12 8

(b) When should the documentation of a program be started ? Explain. 6

4. (a) Consider the following : 6

(i) $f(n) = \frac{n(n+1)}{2}$ show f(n) is $0(n^2)$

(ii) $f(n) = x^8 + 7x^7 - 10x^5 - 2x^4 + 3x^2 - 17$ show f(n) is $\Omega(x^8)$

(b) Write an algorithm to sort top 15 number of floppy disk in a hardware computer library using quick sort algorithm. 8

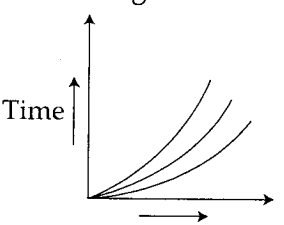
5. (a) What is optimization problem ? Is there any relation with dynamic programming. Explain ? 8

(b) Design an algorithm to find the sum of the first n terms of the series 6

$f_s = 0! + 1! + 2! + \ldots\ldots\ldots + n!, (n \geq 0)$

6. (a) Design a flow chart to implement recursive binary search algorithm. 6

(b) In the following graph (Input vs time for average case), mark the curves in relation to their algorithm viz. 8



- Insertion sort
- Quick sort
- Merge sort
- Bucket sort

7. (a) Apply divide and conquer strategy for finding coin with maximum weight among collection of coins. Write pseodo code for it. 8

(b) Explain "Validation of an algorithm" with suitable examples. 6

8. Write short notes on *any four* : 3.5x4=14

(a) Fibonacci series

(b) Recursive algorithm and its demirts it any

(c) Sort by exchange

(d) Shell sort

(e) Program testing

(f) Bucket sort