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**BCA(IV) — Dgn.  
& Anal. of Algo.  
(401) Core – 8**

**2019**

*Time : 3 hours*

*Full Marks : 70*

*Candidates are required to give their answers in  
their own words as far as practicable.*

*The figures in the margin indicate full marks.*

*Answer from **all** the Sections as directed.*

**Section – A**  
**(Compulsory)**

1. Select the correct option of the following multiple choice questions :  $2 \times 10 = 20$

(a) There are \_\_\_\_\_ steps to solve the problem.

(i) Seven

(ii) Four

~~(iii)~~ Six

(iv) Two

(b) The true and false value represent

~~(i)~~ Logical data

(ii) Numeric data

(iii) Character data

(iv) Alpha numeric data

(c) The worst case time complexity of merge sort is \_\_\_\_\_.

(i)  $O(n^2)$

(ii)  $O(\log n)$

(iii)  $O(n)$

(iv)  $O(n \log n)$

(d) Which of the following sorting procedures is the slowest ?

(i) Quick sort

(ii) Heap sort

(iii) Shell sort

(iv) Bubble sort

(e) Which of the following case does not exist in complexity theory ?

- (i) Best case
- (ii) Worst case
- (iii) Average case
- (iv) Null case

(f) The running time of insertion sort is :

- (i)  $O(n^2)$
- (ii)  $O(n)$
- (iii)  $O(\log n)$
- (iv)  $O(n \log n)$

(g) Heap is defined to be a \_\_\_\_\_

- (i) Complete binary tree
- (ii) Binary tree
- (iii) Tree structure
- (iv) None of the above

(h) In heap sort the input is arranged in the form of a \_\_\_\_\_

- (i) Heap
- (ii) Tree
- (iii) Queue
- (iv) None of the above

(i) Evaluate for  $a = 5, b = 4, c = 3, d = 12$  for the equation :

$$E = a * b + d / c$$

- (i) 40
- (ii) 24
- (iii) 10
- (iv) 66

(j) Following are called logical operators :

- (i) AND, OR, NOT
- (ii) +, -, \*, /
- (iii) \, MOD
- (iv) <, >, <=, >=

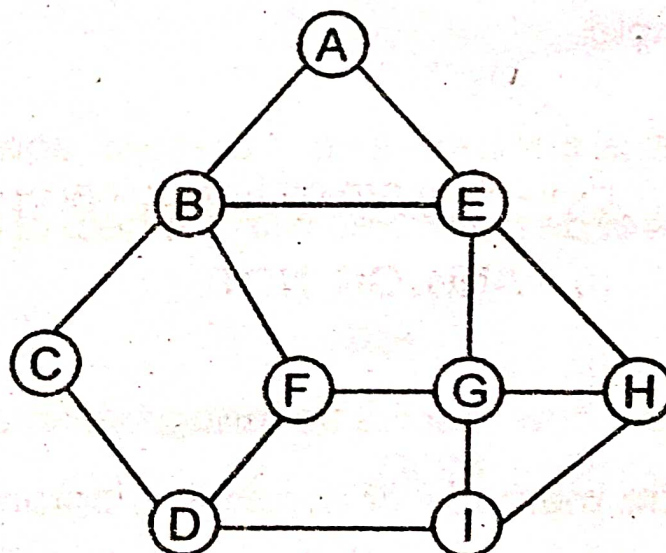


## Section – B

Answer any **four** questions of the following :

5×4 = 20

2. Explain merge sort algorithm and find the complexity of the algorithm.
3. Define searching techniques.
4. What is basic design and analysis techniques ?
5. Difference between best case, average case and worst case time complexity of an algorithm.
6. Write the algorithm of DFS of a graph. Find the DFS of the following graph. Take "A" start node :



7. What is Breadth First Search (BFS) give an suitable example ?
8. Explain Greedy Algorithm to generate Shortest Path with the help of example.
9. Explain Prim's algorithm and its complexites. Give an example.

### Section – C

Answer any **two** questions of the following :

10. What is meant by minimum spanning tree ? Explain Prim's algorithms can be used to find a spanning tree of a connected graph with example. 15
11. What is decision tree ? Discuss about various types of decision tree with the help of example. 15
12. Explain how to solve travelling salesman problem by the methods of dynamic programming and analyze complexity of the algorithm. 15

13. Write short notes on any **three** of the following :

**5×3 = 15**

- (a) NP – Complete
- (b) Iterative techniques
- (c) Searching techniques
- (d) Bucket Sort
- (e) Radix Sort



PM – 12/3 (200) ( 7 )

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