EXAMINATION PAPER

FACULTY	**:**	**COMPUTER SCIENCE AND MULTIMEDIA**		
COURSE	**:**	**BACHELOR OF INFORMATION TECHNOLOGY (HONS)**		
YEAR/ SEMESTER	**:**	**SECOND YEAR / SEMESTER FOUR**		
MODULE TITLE	**:**	**FUNDAMENTAL OF ALGORITHM**		
CODE	**:**	**BIT 242**		
DATE	**:**	**22 SEPTEMBER- 2019, SUNDAY**		
TIME ALLOWED	**:**	**3 HOURS**		
START	**:**	**1:00 PM**	**FINISH**	**: 4:00 PM**

Instruction to candidates

1. This question paper has THREE (3) Sections.
2. Answer **ALL** questions in Section A, MCQ.
3. Answer **5** questions in Section B, MSAQ.
4. Answer **2** questions in Section C, MEQ.
5. No scripts or answer sheets are to be taken out of the Examination Hall.
6. For Section A, answer in the OMR form provided.

Do not open this question paper until instructed

(Candidates are required to give their answers in their own words as far as practicable)

SECTION A
Multiple Choice Questions
Attempt All Questions **[30×1=30]**

1. **The running time of quick sort depends on the selection of:**
   A. No of elements
   B. Pivot element
   C. Size of element
   D. All of the above

2. **Finding the location of the element with the given value is called_____.**
   A. traversal
   B. sort
   C. search
   D. all of the above

3. **Merge sort uses:**
   A. Divide and conquer strategy
   B. Greedy
   C. Array
   D. List

4. **Which of the following uses memorization?**
   A. Greedy approach
   B. Divide and conquer approach
   C. Dynamic programming approach
   D. None of the above

5. **Heap is an example of _____.**
   A. complete binary tree
   B. spanning tree
   C. sparse tree
   D. binary search tree

6. **There are four algorithms A1, A2, A3, A4 to solve the given problem with the order log(n), nlog(n), log(log(n))n/log(n), Which is the best algorithm?**
   A. A1
   B. A2
   C. A3
   D. A4

7. **The worst-case time complexity of Quick Sort is_____.**
   A. $O(n^2)$
   B. O(log n)
   C. O(n)
   D. O(n logn)

8. **Plane sweep algorithm is better than brute force algorithm because_____.**
   A. plane sweep algorithm takes less input
   B. the complexity of brute force is maximum
   C. brute force algorithm takes more inputs
   D. none of the above

9. **The total time Complexity of 3-sum Brute force algorithm is:**
   A. $O(n^3)$
   B. $O(n^2)$
   C. O(nlogn)
   D. O(n)

10. **The characteristics of Algorithms are_____.**
   A. input/output
   B. correctness
   C. effective
   D. all of the above

11. **The time complexity of brute force maxima algorithm is:**
   A. $O(n^2)$
   B. O(n)
   C. $O(n^3)$
   D. None of the above

12. **The constant order of growth is represented as:**
   A. n
   B. 1
   C. n^2
   D. 0

13. **The tilde approximation of $\frac{n}{2} + n + 1$ is:**
   A. n
   B. 2n
   C. n / 2
   D. 1

14. **The amortize notation is considered as _____ model of analysis.**
   A. mathematical
   B. scientific
   C. theory of algorithm
   D. both B and C

15. What is the complexity of adding an element to the heap?

A. O(log n)
B. O(n)
C. O(log n) & O(h)
D. None of the above

16. Dijkstra's Algorithm cannot be applied on _____.

A. directed and weighted graphs
B. graphs having negative weight function
C. unweighted graphs
D. undirected and unweighted graphs

17. The maximum number of times the decrease key operation performed in Dijkstra's algorithm will be equal to _____.

A. total number of vertices
B. total number of edges
C. number of vertices – 1
D. number of edges – 1

18. Bellmann ford algorithm provides solution for _____ problems.

A. all pair shortest path
B. sorting
C. network flow
D. single source shortest path

19. DFS uses_____ as data structure.

A. stack
B. array
C. list
D. queue

20. The total number of edges required to make minimum spanning tree is:

A. V times
B. V-1
C. E
D. E-1

21. Bellmann Ford Algorithm can be applied for _____.

A. undirected and weighted graphs
B. undirected and unweighted graphs
C. directed and weighted graphs
D. all directed graphs

22. Which data structure is used for implementing recursion?

A. Queue
B. Array
C. Stack
D. List

23. What is the time complexity of the above recursive implementation to find the factorial of a number?

A. O(1)
B. O(nlogn)
C. O(n)
D. None of the above

24. Which of the following is the base case for Fibonacci series?

A. If(n==1)
B. Else if(n==2)
C. Return fibo(n-1) + fibo(n-2)
D. Both if (n==1) and else if (n==2)

25. How many children does Binary tree have?

A. 0 or 1 or 2
B. Any number of children
C. 2
D. 1

26. Bellmann Ford Algorithm is an example for _____.

A. dynamic programming
B. greedy algorithms
C. linear programming
D. branch and bound

27. What is the time complexity of Kruskal's algorithm?

A. O(log V)
B. O(E log V)
C. O(E2)
D. O(V log E)

28. Which of the following is true?

A. Prim's algorithm can also be used for disconnected graphs
B. Kruskal's algorithm can also run on the disconnected graphs
C. Prim's algorithm is simpler than Kruskal's algorithm
D. In Kruskal's sort edges are added to MST in decreasing order of their weights.

29. Prim's algorithm is also known as:

A. Dijkstra–Scholten algorithm
B. Borůvka's algorithm
C. Floyd–Warshall algorithm
D. DJP Algorithm

30. The Bellmann Ford algorithm returns _____ value.

A. boolean
B. integer
C. string
D. double

SECTION B

Short Answer Questions

Answer any five (5) questions out of eight (8) questions [5×6=30]

1. Give appropriate reason why we need to analyze algorithms. Explain with practical example.

2. Explain Tilde approximation and order of growth with its types and suitable example.

3. How Recursive algorithm makes program effective? Write the merits and demerits of recursion in programming.

4. Analyze Brute- force algorithm with appropriate example.

5. Quick sort is best in average case analysis. Prove it.

6. Explain how Huffman encoding works with example.

7. Sort the following array by using merge sort and analyze it.

[10, 20, 5, 27, 33]

8. Explain bellman-ford algorithm.

SECTION C

Long Answer Questions

Attempt any two (2) questions out of three (3) questions. [2×20=40]

1. Explain in detail about plane sweep algorithm. Why plane sweep algorithm is better than brute-force maxima algorithm? Explain with suitable example. [4+4+12]

2. Explain in detail with example and analyze following algorithms. **(Any two)** [2 × 10=20]

A. Kruskal's algorithm

B. Huffman encoding

C. Prim's algorithm

3. Define sorting. List out the different types of sorting techniques. Also explain and analyze any three sorting techniques with example of each. [2+2+16]

******BEST OF LUCK******