Started on	Wednesday, 25 November 2020, 10:38 AM
State	Finished
Completed on	Wednesday, 25 November 2020, 11:19 AM
Time taken	41 mins 26 secs
Marks	46.0/50.0
Grade	**9.2** out of 10.0 (**92**%)

Question **1**

Complete

Mark 1.0 out of 1.0

[7010] Let G be a complete graph with 45 edges. G has:

Select one:

- 9 vertices.
- 8 vertices.
- 10 vertices.
- None of the others
- 7 vertices.

The correct answer is: 10 vertices.

Question **2**

Complete

Mark 1.0 out of 1.0

[636] How many strings of five ASCII characters contain the character @ at least once? [Note: There are 128 different ASCII characters.]

Select one:

- 127^4
- None
- 5 * 128^4
- 132
- 128^5 – 127^5

The correct answer is: 128^5 – 127^5

Question **3**

Complete

Mark 0.0 out of 1.0

[121] Which of these following statements are valid (true)?

a.	$(\neg p \vee q) \rightarrow r$ $r \rightarrow s \vee t$ $\neg s \wedge \neg u$ $\neg u \rightarrow \neg t$ --- $\therefore \mathbf{p}$
b.	p $\neg p \rightarrow q$ $(q \wedge r) \rightarrow s$ $t \rightarrow r$ --- $\therefore \neg \mathbf{s} \rightarrow \neg \mathbf{t}$
c.	$p \rightarrow r$ $r \rightarrow s$ $t \vee \neg s$ $\neg t \vee u$ $\neg u$ --- $\therefore \neg \mathbf{p}$
d.	$p \rightarrow q$ $\neg p$ --- $\therefore \neg \mathbf{q}$

Select one:

- c.
- b.
- a.
- b. and d.
- d.
- a. and c.

The correct answer is: a. and c.

Question **4**

Complete

Mark 1.0 out of 1.0

[423] How may prime numbers are there between 1 to 20?

Select one:

- 7
- 5
- 8
- 6

The correct answer is: 8

Question **5**

Complete

Mark 1.0 out of 1.0

[217] Let A = {a, b, c, d, e} and B = {d, e, f, g, h}. Determine the intersection of two sets of (A \ B) and (B \ A).

Select one:

- {f, g, h}
- {a, b, c, f, g, h}
- {a, b, c}
- empty

The correct answer is: empty

Question **6**

Complete

Mark 1.0 out of 1.0

[413] Find least common multiple of 120 and 500 by their prime factorizations

Select one:

- 5 * (2^5)
- None of the others
- (2^3) * 3 * (5^3)
- (2^5) * 3 * (5^3)

The correct answer is: (2^3) * 3 * (5^3)

Question **7**

Complete

Mark 1.0 out of 1.0

[429] Encrypt the message "DY" using the function f(p) = (p + 11) mod 26.

Select one:

- OK
- None of those
- NJ
- OJ

The correct answer is: OJ

Question **8**

Complete

Mark 1.0 out of 1.0

[241] Which of the following two sets are equal?

Select one:

- A = {1, 2, 4} and B = {1, 2, 3}
- A = {1, 2, 3} and B = {2, 1, 3}
- A = {1, 2} and B = {1}
- A = {1, 2} and B = {1, 2, 3}

The correct answer is: A = {1, 2, 3} and B = {2, 1, 3}

Question **9**

Complete

Mark 1.0 out of 1.0

[427] If the function f(p) = (p + 11) mod 26 is used to encrypt a message, which of the following functions can be used to decrypt the message?

(i) $f^{-1}(p) = (11 - p) \bmod 26$

(ii) $f^{-1}(p) = (p - 11) \bmod 26$

Select one:

- (i)
- (ii)
- Both
- None

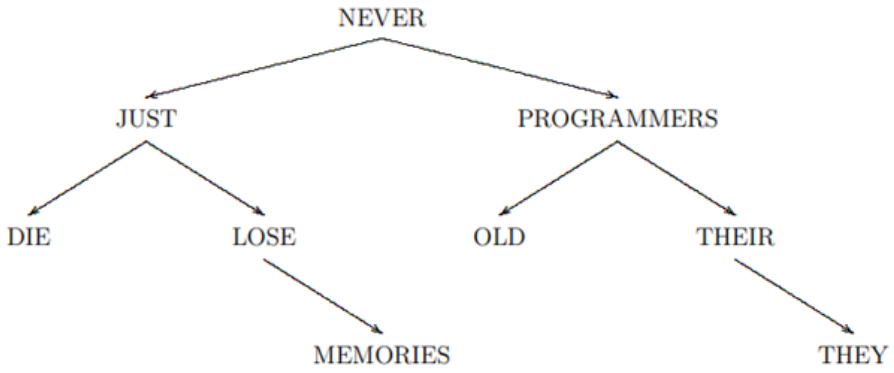
The correct answer is: (ii)

Question **10**

Complete

Mark 1.0 out of 1.0

[867] Which is the ARRAY of strings that can be used to BUILD the following binary search tree?



Select one:

- "DIE JUST LOSE MEMORIES NEVER PROGRAMMERS OLD THEIR THEY"
- "OLD PROGRAMMERS THEY NEVER DIE JUST LOSE THEIR MEMORIES"
- None of the others
- "OLD PROGRAMMERS NEVER DIE THEY JUST LOSE THEIR MEMORIES"
- "NEVER JUST DIE PROGRAMMERS THEIR THEY LOSE OLD MEMORIES"

The correct answer is: "NEVER JUST DIE PROGRAMMERS THEIR THEY LOSE OLD MEMORIES"

Question **11**

Complete

Mark 1.0 out of 1.0

[331] Choose the correct increasing order if the functions commonly used in big-O estimates.

Select one:

- None
- 1 << log(n) << n << n•log(n) << n^2 << n! << 2^n << 3^n
- 1 << log(n) << n << n•log(n) << n^2 << 2^n << 3^n << n!
- 1 << n << log(n) << n^2 << n•log(n) << 2^n << 3^n << n!

The correct answer is: 1 << log(n) << n << n•log(n) << n^2 << 2^n << 3^n << n!

Question **12**

Complete

Mark 1.0 out of 1.0

[627] There are 26 characters in which there are 5 vowels. Suppose that a “word” is any string of seven letters of the alphabet, with repeated letters allowed.(i) How many words begin with R and end with T?(ii) How many words begin with A or B?

Select one:

- (i) 26^7 (ii) 2 * 26^7
- (i) 26^5 (ii) 26^7
- (i) 26^5 (ii) 2 * 26^6
- (i) 26^6 (ii) 2 * 26^5
- None

The correct answer is: (i) 26^5 (ii) 2 * 26^6

Question **13**

Complete

Mark 1.0 out of 1.0

[326] Which of the following functions is O(x^2) ?

Select one:

- h(x) = x(x+1)(x+2)
- f(x) = 100x^2 + 3
- g(x) = (xlogx + 1)x
- k(x) = 2^x

The correct answer is: f(x) = 100x^2 + 3

Question **14**

Complete

Mark 1.0 out of 1.0

[7029] The adjacency matrix for K9 has ___ 1s.

Select one:

- 72
- 36
- 81
- 18
- 9

The correct answer is: 72

Question **15**

Complete

Mark 1.0 out of 1.0

[552] Which of the following function can be used to locate an element x in a DECREASING array by binary search method?

```
int bsearch(int a[100], int x, int dau, int cuoi)
{
    int giua = a[(d + c)/2];
    if (x > a[giua]) return bsearch(a, x, giua + 1, cuoi);
    if (x < a[giua]) return bsearch(a, x, dau, giua - 1);
    return giua; // x is at giua
}

int bsearch_1(int a[100], int x, int dau, int cuoi)
{
    if (dau > cuoi) return -1; // not found
    int giua = a[(d + c)/2];
    if (x > a[giua]) return bsearch_1(a, x, giua + 1, cuoi);
    if (x < a[giua]) return bsearch_1(a, x, dau, giua - 1);
    return giua; // x is at giua
}

int bsearch_2(int a[100], int x, int dau, int cuoi)
{
    if (dau > cuoi) return -1; // not found
    int giua = a[(d + c)/2];
    if (x < a[giua]) return bsearch_2(a, x, giua + 1, cuoi);
    if (x > a[giua]) return bsearch_2(a, x, dau, giua - 1);
    return giua; // x is at giua
}
```

Select one:

- None
- bsearch_1
- bsearch
- bsearch_2

The correct answer is: bsearch_2

Question **16**

Complete

Mark 1.0 out of 1.0

[277] Determine whether rule f is a function from Z to R. (i) f(x) = 1 for all x (ii) f(x) is a number greater than x

Select one:

- (i) fuction; (ii) not a function
- (i) fuction; (ii) function
- Both (i) and (ii) are not functions
- (i) not a fuction; (ii) function

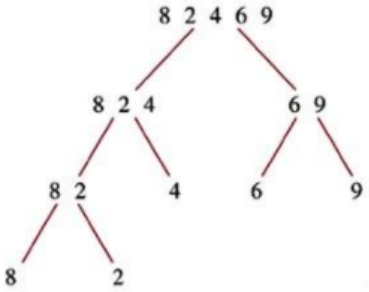
The correct answer is: (i) fuction; (ii) not a function

Question **17**

Complete

Mark 1.0 out of 1.0

[553] The following diagram can be used to describe the execution of the algorithm for ____. (i) Finding the maximum of an array (ii) Computing the summation of an array



Select one:

- (ii)
- (i)
- All
- None

The correct answer is: All

Question **18**

Complete

Mark 1.0 out of 1.0

[508] Suppose that f(n) satisfies the divide-and-conquer relation f(n) = 2*f(n/3) + 5 and f(1) = 7. What is f(81)?

Select one:

- 187
- 189
- 185
- 183

The correct answer is: 187

Question **19**

Complete

Mark 1.0 out of 1.0

[503] By induction hypothesis, the series 1.1 + 2.2 + 3.3 + ... + p.p can be proved equivalent to _____.

Select one:

- (p^2 + 2)/7
- [p * (p+1)] / 4
- [p * p * (p+1) * (p+1)] / 4
- [p * (p+1) * (2*p + 1)] / 6

The correct answer is: [p * (p+1) * (2*p + 1)] / 6

Question **20**

Complete

Mark 0.0 out of 1.0

[248] Stydy the following functions: F: R --> R, F(x) = |x| G: Z --> Z, G(x)= 5x

Select one:

- Both F and G are invertible.
- None of the others
- F is not invertible and G is invertible
- F is invertible and G is not.
- Both F and G are not invertible.

The correct answer is: F is not invertible and G is invertible

Question **21**

Complete

Mark 1.0 out of 1.0

[156] Let p, q be the propositions as follows p: you can pass the final exam, s: you study hardWrite the proposition "You can pass the final exam if you study hard" using p, q and logical connectives.

Select one:

- p v s
- p ^ s
- s → p
- p → s

The correct answer is: s → p

Question **22**

Complete

Mark 1.0 out of 1.0

[327] Give a big-O estimate for the number of additions used in the following algorithm:

```
procedure sum(n: positive integer)
    s := 0
    for i := 1 to n
        for j := 1 to n
            s := s + i + j
```

Select one:

- O(2n)
- O(log n)
- O(n)
- O(n^2)

The correct answer is: O(n^2)

Question **23**

Complete

Mark 1.0 out of 1.0

[7062] How many edges does a graph have if its degree sequence is 5, 5, 4, 3, 2, 2, 1?

Select one:

- 10
- 8
- 11
- None of the others
- 9

The correct answer is: 11

Question **24**

Complete

Mark 0.0 out of 1.0

[510] Give a correct RECURSIVE definition of the FACTORIAL of non-negative integer n.

a.	$n! = n * (n-1)$, for $1 \le n$. $n! = 1$, for $n = 0$
b.	$n! = n + (n-1)$, for $1 \le n$. $n! = 1$, for $n = 0$
c.	$n! = (n-1) + (n-2)$, for $1 \le n$. $n! = 1$, for $n = 0$

Select one:

- a.
- c.
- b.
- None of the others

The correct answer is: a.

Question **25**

Complete

Mark 1.0 out of 1.0

[866] What is the VALUE of each of the following POSTFIX expressions? 9 3 / 5 + 7 2 - *

Select one:

- 30
- 20
- 40
- 10

The correct answer is: 40

Question **26**

Complete

Mark 0.0 out of 1.0

[141] Let P(m, n) be the statement "m divides n", where m and n are positive integers. Consider the statements:(i) P(3, 12) → P(12, 3)(ii) P(12, 3) → P(3, 19)Which one is true?

Select one:

- Both of them
- None of them
- (i)
- (ii)

The correct answer is: (ii)

Question **27**

Complete

Mark 1.0 out of 1.0

[631] How many license plates can be made using one letters from {A, B, ..., Z} followed by four digits from {0, 1, 2, ..., 9}?

Select one:

- 26 * 40
- 26 * 10^4
- 26 * 4^10
- None of the others

The correct answer is: 26 * 10^4

Question **28**

Complete

Mark 1.0 out of 1.0

[219] Determine whether f is a FUNCTION from Z to Z if f(x) = 2 / x.

Select one:

- Not well-defined because there are two distinct values assigned to each x.
- None of the others
- Not defined for x = 0.
- Yes, f is a function from Z to Z.

The correct answer is: Not defined for x = 0.

Question **29**

Complete

Mark 1.0 out of 1.0

[150] Let p denote a proposition, which one is true?(i) ¬ (p ∧ q) ≡ (¬ p ∧ ¬ q)(ii) p ∧ True ≡ True

Select one:

- None
- (i)
- (ii)
- Both

The correct answer is: None

Question **30**

Complete

Mark 1.0 out of 1.0

[619] Show the CORRECT RECURRENCE for counting the NUMBER OF ALL SUBSETS of a set with n elements?

a.	$A(n) = 2.A(n-1)$, for $n > 0$ $A(n) = 1$, for $n = 0$
b.	$A(n) = 2.A(n-1)$, for all n
c.	A(n) = 2^n with n times

Select one:

- none of them
- c.
- b.
- a.

The correct answer is: a.

Question **31**

Complete

Mark 1.0 out of 1.0

[7021] Consider the statements: (1) The adjacency matrix of a complete graph contains all 1s. (2) The graphs K2,5 and W5 have the same number of edges.Which one is true?

Select one:

- Both (1) and (2)
- (2) only
- Neither (1) nor (2)
- (1) only

The correct answer is: (2) only

Question **32**

Complete

Mark 1.0 out of 1.0

[7037] Suppose that a graph G is isomorphic to the graph K15. Which of the following statements is/are true? (i)G has 30 edges. (ii)G has a Hamilton circuit.

Select one:

- (ii)
- Both
- (i)
- Neither (i) nor (ii)

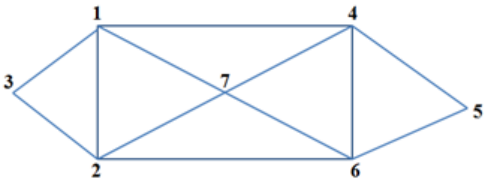
The correct answer is: (ii)

Question **33**

Complete

Mark 1.0 out of 1.0

[7094] Given the graph. Which statement(s) is (are) TRUE?



Select one:

- An Euler circuit is 1 2 3 4 5 6 7 1
- An Euler circuit is 1 4 6 7 4 5 6 2 7 1 2 3 1
- An Euler circuit is 1 3 2 7 6 5 4 1
- The graph has no Euler circuit

The correct answer is: An Euler circuit is 1 4 6 7 4 5 6 2 7 1 2 3 1

Question **34**

Complete

Mark 1.0 out of 1.0

[305] Out of following which property algorithms does not share?

Select one:

- Constancy
- Finiteness
- Input/Output
- Generality

The correct answer is: Constancy

Question **35**

Complete

Mark 1.0 out of 1.0

[848] Given the following prefix codes:M: 00, N: 010, T: 011, I: 100, U: 101, A: 11.Find the word represented by 0010001001111

Select one:

- None of the others
- MITNA
- MIUNA
- MINUA
- MINTA

The correct answer is: MINTA

Question **36**

Complete

Mark 1.0 out of 1.0

[144] Write a proposition equivalent to ¬p → q using only p, q, ¬ and ∧

(i) ¬(p ∧ ¬q)
(ii) ¬(¬p ∧ ¬q)
(iii) ¬p ∧ q
(iv) ¬(q ∧ ¬p)

Select one:

- (iv)
- None of the others
- (i)
- (ii)
- (iii)

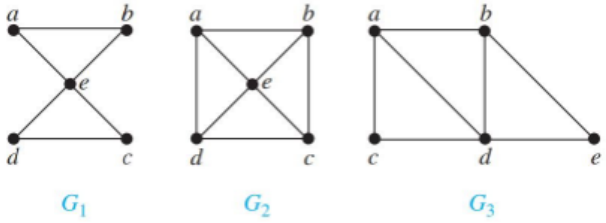
The correct answer is: (ii)

Question **37**

Complete

Mark 1.0 out of 1.0

[7113] Which of the directed graphs in the Figure have an Euler circuit? Of those that do not, which have an Euler path?



G_1 G_2 G_3

Select one:

- G3 has an Euler path
- The graph G1 has an Euler circuit.
- G2 does not have an Euler cicuit but it has an Euler path
- G2 has an Euler circuit

The correct answer is: The graph G1 has an Euler circuit.

Question **38**

Complete

Mark 1.0 out of 1.0

[435] Suppose that a computer has only the memory locations 0, 1, 2, ..., 29. Using the hashing function h where h(x) = (x + 5) mod 30 to determine the memory locations in which 97, 32, and 16 are stored, we have

Select one:

- 12, 7, 16
- None
- 12, 7, 21
- 7, 2, 16
- 12, 2, 16

The correct answer is: 12, 7, 21

Question **39**

Complete

Mark 1.0 out of 1.0

[438] A sequence of pseudo-random numbers are generated using X[n+1] = (3X[n] + 5) mod 31 with seed X[0] = 2. We have in order X[1], X[2], and X[3] are _____.

Select one:

- None
- 8, 29 and 30
- 11, 1 and 8
- 11, 7 and 13
- 11, 7 and 26

The correct answer is: 11, 7 and 26

Question **40**

Complete

Mark 1.0 out of 1.0

[278] Find the inverse function of f (x) = 2x+3

Select one:

- x / 2 – 3 / 2
- - x / 2 + 3 / 2
- x / 3 – 2 / 3
- None

The correct answer is: x / 2 – 3 / 2

Question **41**

Complete

Mark 1.0 out of 1.0

[101] Which is the NAME of the logically equivalent “p ∨ (q ∧ r) ≡ (p ∨ q) ∧ (p ∨ r)” ?

Select one:

- De Morgan
- Negation
- Distributive
- Absorption

The correct answer is: Distributive

Question **42**

Complete

Mark 1.0 out of 1.0

[617] How many bit strings of LENGTH 10 that do NOT have TWO CONSECUTIVE 0s?

Select one:

- 55
- 2^8
- None of them
- 144

The correct answer is: 144

Question **43**

Complete

Mark 1.0 out of 1.0

[333] Which two of three following cases are important when evaluating the complexity of an algorithm? (i) Average-case (ii) Worst-case (iii) Best-case

Select one:

- (i), (ii)
- None
- (iii), (i)
- (ii), (iii)

The correct answer is: (i), (ii)

Question **44**

Complete

Mark 1.0 out of 1.0

[521] By induction, we can prove that

Select one:

- 3^n < n! for any integer greater than 4
- 3^n > n! for any positive integer
- 3^n < n! for any integer greater than 6
- 3^n > n! for any integer greater than 3

The correct answer is: 3^n < n! for any integer greater than 6

Question **45**

Complete

Mark 1.0 out of 1.0

[843] Given the coding scheme a: 001, b: 0001, e: 1, r: 0000, s: 0100, t: 011, x: 01010. Find the word represented by 00010010000010011011

Select one:

- barsex
- None of the others.
- barseet
- bersart

The correct answer is: barseet

Question **46**

Complete

Mark 1.0 out of 1.0

[313] Find big-O estimate of complexity of the algorithm for finding the maximum.

Select one:

- O(n)
- O(logn) /
- O(1)
- O(n^2)

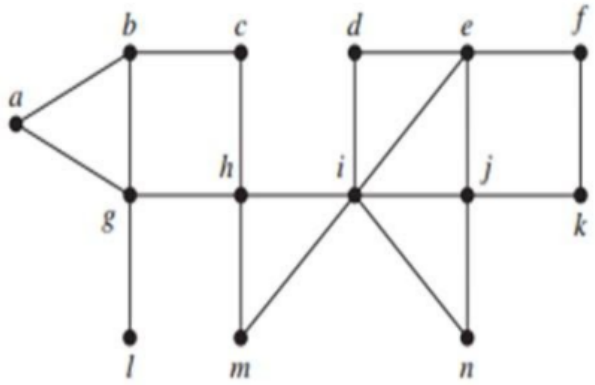
The correct answer is: O(n)

Question **47**

Complete

Mark 1.0 out of 1.0

[879] Use BREADTH-first search to produce a spanning tree for the given simple graph. Choose a as the root of this spanning tree and assume that the vertices are ordered alphabetically.



Select one:

- None
- a b c h g l i d e f k j n m
- a b g c h l m i d e j n f k
- a b c d e f g h i j k l m n
- a b c h g l i d e f j k m n

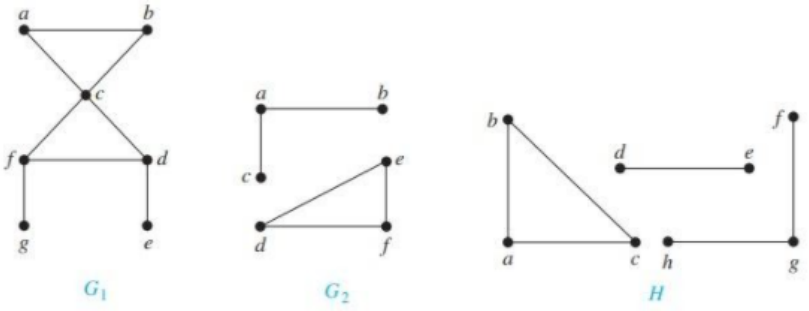
The correct answer is: a b g c h l m i d e j n f k

Question **48**

Complete

Mark 1.0 out of 1.0

[7111] Given the graphs G1, G2 and H in the figure, which of the following is/are fact(s)?



Select one:

- There is a path between every pair of distinct vertices in G2.
- G1, G2 and H are all connected.
- None
- The number of connected components of G1, G2 and H are 1, 2 and 3, respectively.

The correct answer is: The number of connected components of G1, G2 and H are 1, 2 and 3, respectively.

Question **49**

Complete

Mark 1.0 out of 1.0

[811] What is the value of following postfix expression: 3 4 * 5 3 - + 2 2 ^ *

Select one:

- 37
- 56
- 9
- 12

The correct answer is: 56

Question **50**

Complete

Mark 1.0 out of 1.0

[643] The Tower of Hanoi puzzle with ___ disks can be solved using ___ steps.

Select one:

- 3, 8
- 7, 129
- 5, 33
- 7, 127

The correct answer is: 7, 127

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