Started on	Thursday, 1 July 2021, 7:01 AM
State	Finished
Completed on	Thursday, 1 July 2021, 7:01 AM
Time taken	15 secs
Marks	0.00/50.00
Grade	**0.00** out of 10.00 (**0**%)

Question **1**

Not answered

Marked out of 1.00

Evaluate the expression: (1111 ∧ 1101) ∨ 1000

Select one:

- a. 0000
- b. 0100
- c. 0101
- d. 1101

Question **2**

Not answered

Marked out of 1.00

Suppose G and W_4 are isomorphic. Select correct statement(s).

Select one:

- a. G has an Euler circuit
- b. G has a Hamilton circuit
- c. G has 10 edges
- d. G has an Euler path

Question **3**

Not answered

Marked out of 1.00

Given the adjacency matrix of an undirected graph with vertices {m, n, p}

	m	n	p
m	2	1	3
n	1	1	1
p	3	1	0

How many **paths of length 3** are there from the vertex n to the vertex m in this graph?

Select one:

- a. 21
- b. 6
- c. 13
- d. 27

Question **4**

Not answered

Marked out of 1.00

If a complete graph with 45 edges has n vertices, then n is ...

Select one:

- a. 9
- b. 11
- c. 8
- d. 10

Question **5**

Not answered

Marked out of 1.00

Study a simple graph having the degree sequence { 6,5,4,4,3,3,2,2,2,2,1}.
If the graph has n edges, then n = ...

Select one:

- a. 34
- b. 17
- c. 38
- d. 19

Question **6**

Not answered

Marked out of 1.00

Let U = {0,1,2,3,4,5,6,7,8,9}. Given the subsets A = {0,2,3,4,8}, B = {0,5,6,7,8}.

The bit string representing the subset $A \oplus B$ is ...

Select one:

- a. 00 1111 1100
- b. 10 1011 0010
- c. 00 1111 1110
- d. 01 1110 0110

Question 7

Not answered

Marked out of 1.00

Given A={0, Ø, 0}. Find the cardinality of P(A).

Select one:

- a. 8
- b. 2
- c. 4
- d. 3

Question 8

Not answered

Marked out of 1.00

What is the value of the postfix expressions?
5 2 1 - - 3 1 4 ++ *

Select one:

- a. 32
- b. None of the others
- c. 2
- d. 1/2

Question **9**

Not answered

Marked out of 1.00

Determine whether the following statements are true or false:

(i) Every graph has only one minimum spanning tree.

(ii) If all the weights of the graph are positive, then the minimum spanning tree of the graph is a minimum cost subgraph.

Select one:

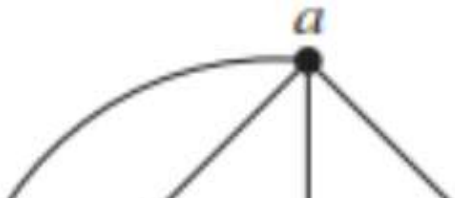
- a. true, true
- b. false, true
- c. true, false
- d. false, false

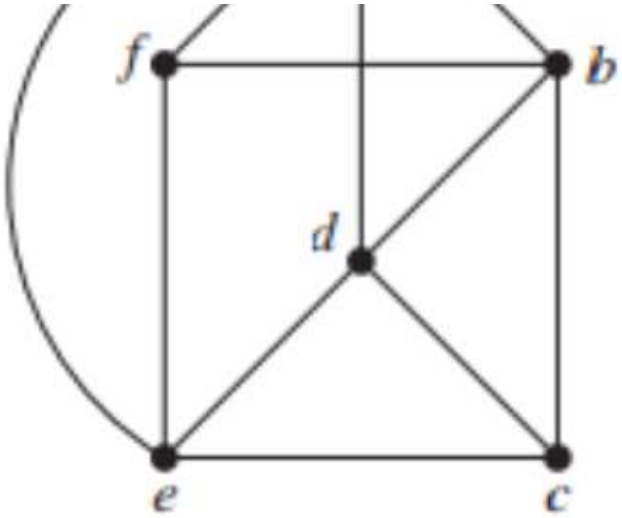
Question **10**

Not answered

Marked out of 1.00

Consider the following graph:





Select one:

- a. The graph does not have an Euler circuit, and does not have an Euler path.
- b. None of the others
- c. The graph does not have an Euler circuit, but has an Euler path.
- d. The graph has an Euler circuit, but does not have an Euler path.
- e.

Question **11**

Not answered

Marked out of 1.00

Which the following propositions is FALSE:

Select one:

a. 1+1 = 2 if and only if 2 + 2 = 2
b. If 1 < 0, then 1 = 0
c. If 2 + 1 = 3 or 3 - 2 = 2 , then 2 = 3 - 1
d. If 1 + 1 = 3 and 1 + 1 = 2, then 2 + 2 = 4 and 2 + 2 = 1

Question **12**

Not answered

Marked out of 1.00

Let A = {a,b,c,d} and B = {1,2,3,4,5}

If f: A → A is a function such that f(a) = 1, f(b) = 3, f(c) = 4, f(d) = 2.
Which of the following statements is true?

(i) f is one-to-one

(ii) f is onto

Select one:

a. (i)
b. Both

b. Both

c. None of the others

d. (ii)

Question 13

Not answered

Marked out of 1.00

Consider the algorithm:

Procedure T(m: integer, n: positive integer)
If n=1 then T(m, n) := m
else T(m, n) := m + T(m, n-1)

Find T(2,3)

Select one:

a. 6

b. 8

c. 9
d. 5

Question **14**
Not answered
Marked out of 1.00

Let P is the statement “Mr. Bean has an invention”
Let Q is the statement “Mr. Bean gets a prize”
Which of the following English statements can be used for "Q → P"?

(i) He will get a prize whenever he has an invention
(ii) A prize is necessary for having an invention

Select one:
a. Both
b. None of the others
c. (ii)

d. (I)

Question 15

Not answered

Marked out of 1.00

Let B be the set {a, {b}}. How many functions are there from B to B^3 ?

Select one:

a. 16

b. 256

c. 64

d. 56

Question 16

Not answered

Marked out of 1.00

How many edges do the graph Q_5 have?

Select one:

- a. 32
- b. 80
- c. 160
- d. 10

Question **17**

Not answered

Marked out of 1.00

Use **Huffman coding algorithm** to encode the word "corona".
What is the **average number** of bits required to encode a character?

Select one:

- a. 13/6
- b. 8/3
- c. 14/6
- d. 15/6

Question **18**

Not answered

Marked out of 1.00

Consider the algorithm:
procedure fun(a_1, a_2, a_3, ..., a_n: integer)

k:=0

for i=1 to n:

    if (a_i = 0) then k:=k+1

return n - k

Find fun(-1,0,1,2)

Select one:

- a. 2
- b. 1
- c. None of the others
- d. 3

Question **19**

Not answered

Marked out of 1.00

Study the statements:
(i) $K_{2,3}$ does not have no a Hamilton circuit, but has a Hamilton path.

(ii) $K_{2,3}$ has a Hamilton circuit.

Which statement is true?

Select one:

- a. None of the others
- b. (i) only
- c. Both (i) and (ii)
- d. (ii) only

Question 20

Not answered

Marked out of 1.00

How many vertices does a full 5-ary with 45 leaves have?

Select one:

- a. 50
- b. 61
- c. 65
- d. 56

Question 21

Not answered

Marked out of 1.00

How many comparisons are required to locate number 2 in the binary search tree for the sequence 5, 1, 9, 0, 4, 6, 8, 2 ?

Select one:

- a. 2

b. 5
c. 3
d. 4

Question 22
Not answered
Marked out of 1.00

How many integers in {1, 2, 3, ..., 100} are divisible by 3 but not by 5 ?

Select one:
a. 27
b. 40
c. 13
d. 30

Question 23
Not answered
Marked out of 1.00

The function $f(x) = 10x + x^2 \log x + 2 \log x$ is ...

Select one:
a. O(x)
b. $\Theta(2^x)$
c. $\Theta(x^3)$
d. $\Theta(x^3)$

d. O(x)

Question **24**

Not answered

Marked out of 1.00

Determine whether each of the following arguments is valid or not valid

(1) All parrots like fruit. My pet bird is not a parrot. Therefore, my pet bird does not like fruit.

(2) Everyone who eats granola every day is healthy. Linda is not healthy. Therefore, Linda does not eat granola every day.

Select one:

a. Both the arguments are not valid.

b. (i) is not valid and (2) is valid.

c. (1) is valid and (2) is not valid.

d. Both the arguments are valid.

Question **25**

Not answered

Marked out of 1.00

If the adjacency matrix of the graph $K_{2,3}$ has n 0s, then n = ...

Select one:

a. 12

b. 24

c. 13

d. 5 x 6

Question **26**

Not answered

Marked out of 1.00

Suppose that f👎 = f(n/3) + 1 when n is a positive integer divisible by 3, and f(1) = 1.

Find f(81)

Select one:

a. 5

b. 8

c. 4

d. None of the others

Question 27

Not answered

Marked out of 1.00

Give a recursive definition of the set A = {2,4,6,8,...}

Select one:

a. 0 ∈ A, and if x ∈ A then x+2 ∈ A

b. 0 ∈ A, and if x ∈ A then x-2 ∈ A

c. if x ∈ A then x+2 ∈ A

d. 2 ∈ A, and if x ∈ A then x+2 ∈ A

Question 28

Not answered

Marked out of 1.00

How many bit strings of length 8 begin with 11 and end with 00?

Select one:

a. $2^6 - 2^4$

b. 2^4

c. 2.2^4

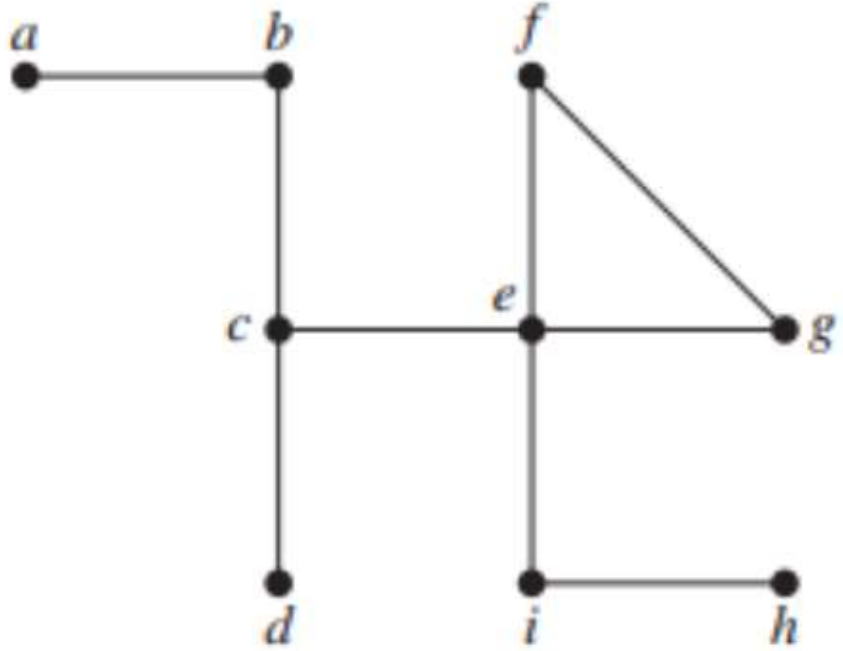
d. $2.2^6 - 2^4$

Question 29

Not answered

Marked out of 1.00

Find all the cut vertices of the given graph



Select one:

- a. b,c,e,i
- b. a,d,h
- c. a,b,c,i,h
- d. b,c,i

Question 30

Not answered

Marked out of 1.00

Suppose a_n is defined recursively by: $a_0=1$, $a_{n+1}=3.a_n$, $n>0$.
What is a_n ?

Select one:

- a. $a_n=3n+1$
- b. $a_n=3^n$
- c. $a_n=3n - 2$
- d. $a_n=3^{n+1}$

Question **31**

Not answered

Marked out of 1.00

Study the following prefix expression:

- * 2 4 / 6 * 2 3

It will be evaluated to ....

Select one:

- a. 6
- b. 5
- c. -2
- d. 2

Question **32**

Not answered

Marked out of 1.00

Which codes are prefix codes?
(i) a: 0101, b: 010, c: 1101, d: 100
(ii) a: 10, b: 0101, c: 1110, d: 1001

Select one:
- a. Both (i) and (ii)
- b. (i) only
- c. None of the others
- d. (ii) only

Question **33**
Not answered
Marked out of 1.00

What are -124 div 15 and -107 mod 15?

Select one:
- a. -4 and 7
- b. -9 and 13
- c. -8 and -2
- d. 11 and -8

Question **34**
Not answered
Marked out of 1.00

How many rows appear in a truth table for the following proposition?
(p ∨ ¬t) ∧ (p ∨ ¬s) ∧ t

(p ∨ ¬t) ∧ (p ∨ ¬s) ∧ t

Select one:

- a. 8
- b. 5
- c. 32
- d. 16

Question **35**

Not answered

Marked out of 1.00

How many edges must be removed from a connected graph with 8 vertices and 10 edges to produce a spanning tree?

Select one:

- a. 0
- b. 2
- c. 1
- d. 3

Question **36**

Not answered

Marked out of 1.00

Find $f(0)$ if f(2) = 5, f(3) = 21 and $f(n) = f(n - 1) \times f(n - 2) + 1$ for n > 1

Select one:

- a. 2
- b. 1
- c. 0
- d. -1

Question **37**

Not answered

Marked out of 1.00

How many leaves does a full 3-ary tree with 100 vertices have?

Select one:

- a. 51
- b. [illegible]

b. 67
c. 52
d. 33

Question **38**

Not answered

Marked out of 1.00

Given the coding scheme: a: 00, b: 01, c: 10, d: 110, e: 111.
Find the word represented by: 1100001

Select one:

a. abc
b. daa
c. dab
d. acb

Question **39**

Not answered

Marked out of 1.00

Let $a_n = - a_{n-2}$ for all n >1. If $a_0 = 3$ and $a_1 = 5$, find a_{2021}

Select one:

a. 3
b. -3
c. 5

d. -5

Question **40**

Not answered

Marked out of 1.00

Encrypt the message "ID" by translating the letters into numbers (the character A is translated to 0), applying the encryption function $f(p) = (p + 3) \bmod 26$, and then translating the numbers back into letters. Encrypted form:

Select one:

a. HZ

b. LG

c. HA

d. AH

Question **41**

Not answered

Marked out of 1.00

Study the following computer code segment:

x:= 5

y:= 6

If (1+1=0) AND (2+2=1) then x:=x+1

If (1+1=2) OR (1+1=0) then y:=y+1

What are values of x and y after the codes execute?

Select one:

Select one:

- a. 5; 6
- b. 6; 6
- c. 6; 8
- d. 5; 7

Question **42**

Not answered

Marked out of 1.00

How many one-to-one functions are there from the set {00, 01, 11} to the set {a, b, c, d, e, f}?

Select one:

- a. 120
- b. 729
- c. 0
- d. 216

Question **43**

Not answered

Marked out of 1.00

Which memory locations are assigned by the hashing function h(k) = k mod 101 to the records of insurance company customers with the Social Security Number 104578690?

Select one:

- a. 18
- b. 58
- c. 62
- d. 100

Question **44**

Not answered

Marked out of 1.00

How many **edges** does a full binary tree with 20 internal vertices have?

Select one:

- a. 40
- b. 41
- c. 39
- d. 42

Question **45**

Not answered

Marked out of 1.00

Consider the following algorithm:

procedure FUN(a: real number; n: positive integer)
if n = 1 return a
else return a*FUN(a, n-1).

What is the output if inputs are: n = 3, a = 5

Select one:

- a. 8
- b. 125
- c. 243
- d. 15

Question **46**

Not answered

Marked out of 1.00

Suppose a mod 3 = 2 and b mod 6 = 4, find ab mod 3

Select one:

- a. 0
- b. 2
- c. 1
- d. 8

Question **47**

Not answered

Marked out of 1.00

How many vertices and how many edges do the graph K_7 have?

Select one:

- a. 7 and 21
- b. 7 and 42
- c. 8 and 14
- d. 8 and 14

Question **48**

Not answered

Marked out of 1.00

Which of the following functions is big-oh of n?

Select one:

- a. $g(n) = 2021n + 1$
- b. $g(n) = n^2 - 2n$
- c. $g(n) = 2^n - 5n^3$
- d. $g(n) = n\log n + 2021$

Question **49**

Not answered

Marked out of 1.00

Let f be floor function and g be ceiling function.

Which of the following is true ?

Select one:

- a. f(5.001) = 6
- b. g(5.4) = 6
- c. g(5) = 6
- d. f(3.8)= 4

Question **50**

Not answered

Marked out of 1.00

Let S be the set defined recursively by: 10 is in S, and if x is an element of S then x+10 is an element of S. What is S ?

Select one:

- a. S is **the set** of all **natural numbers**
- b. S is the set of all **positive** multiples of 10.
- c. S is the set of all **positive** multiples of 5.
- d. S is the set of all **nonnegative** multiples of 10.