Started on	Thursday, 15 July 2021, 7:01 AM
State	Finished
Completed on	Thursday, 15 July 2021, 7:02 AM
Time taken	1 min 31 secs
Marks	0.00/50.00
Grade	**0.00** out of 10.00 (**0**%)

Question **1**

Not answered

Marked out of 1.00

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

Select one:

- a. 32
- b. 16
- c. None of the others
- d. 10
- e. 12

Question **2**

Not answered

Marked out of 1.00

The length of the longest simple circuit in W_{10} is:

Select one:

- a. 15
- b. 20
- c. None of the others
- d. 18
- e. 10

Question **3**

Not answered

Marked out of 1.00

How many edges must be removed from a connected graph with 60 vertices and 180 edges to produce a spanning tree?

Select one:

- a. 3
- b. 179
- c. 121
- d. 59

Question **4**

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(3.1)= 3
- b. f(-5.3) = -5
- c. g(-9.5) = - 10
- d. g(2021) = 2022

Question **5**

Not answered

Marked out of 1.00

Which of the following statements is true?

Select one:

- a. $\{0\} \subseteq \{x\}$
- b. $\emptyset \subset \{0\}$
- c. $0 \in \emptyset$
- d. $\{x\} \subset \{x\}$

Question **6**

Not answered

Marked out of 1.00

What is the negation of the proposition “If it is raining then it is not hot”

Select one:

a. If it is hot, then it is not raining.

b. If it is raining then it is hot.

c. It is not raining, then it is hot.

d. It is raining and it is hot.

Question 7

Not answered

Marked out of 1.00

Determine whether each of these sequences is graphic

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(i) 7, 4, 3, 2, 2, 0

(ii) 8, 6, 5, 3, 2, 1

Select one:

a. Nether (i) nor (ii)

b. Both (i) and (ii)

c. (i) only

d. (ii) only

Question 8

Not answered

Marked out of 1.00

Consider the algorithm:
procedure alg(a_1, a_2, a_3, ..., a_n: integer)
k:=0

```
for i:=1 to n:
   for j:= i to n:
     if (a_i = a_j ) then k:=k+1
print (k)
```

Determine the time complexity of the algorithm.

Select one:

- a. O(n)
- b. $O(n^2)$
- c. O(nlogn)
- d. O(1)

Question **9**

Not answered

Marked out of 1.00

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

Select one:

- a. 2^64

b. 256
c. 16
d. 8

Question **10**

Not answered

Marked out of 1.00

If f: Z → Z; f(x) = 4x-8
Which of the following statements is true?

(i) f is one-to-one

(ii) f is onto

Select one:

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

Question 11

Not answered

Marked out of 1.00

How many bit strings of length 8 begin with 10 or 01?

Select one:

a. 2^7
b. 2^5
c. 2^6
d. 2^8

Question 12

Not answered

Marked out of 1.00

Study the following sequences:

$a_n = 3n - 4$, n = 1, 2, 3, ...

$b_n = b_{n-1} + 3$ for $n>1$ and $b_1 = 1$

Find $a_5 - b_3$

Select one:

- a. 4
- b. 2

c. None of the others
d. 3

Question 13
Not answered
Marked out of 1.00

Find the base 7 expansion of 370

Select one:
a. 136
b. 1234
c. 1036
d. 2134

Question 14

Question 14

Not answered

Marked out of 1.00

Study the following prefix expression: + - * 1 6 4 / * 1 8 4 It will be evaluated to ....

Select one:

- a. 1
- b. 2
- c. 3
- d. 4

Question **15**

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 2** are there from the vertex n to the vertex m in this graph?

Select one:

- a. 6

b. 4
c. 5
d. 3

Question 16
Not answered
Marked out of 1.00

Which of the following is false?

Select one:
a. It is tree that spans G
b. Removing one edge from the spanning tree will make the graph disconnected
c. The spanning trees can have a cycle.
d. It is a subgraph of the G

Question 17
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: 11000010110111

Select one:

- a. dabbce
- b. daabce
- c. abcde
- d. abcdee

Question **18**

Not answered

Marked out of 1.00

Find (-28 div 5) + (-27 mod 5)?

Select one:

- a. -1
- b. 0
- c. -4
- d. -3

Question **19**

Not answered

Marked out of 1.00

Let P is the statement “An is a student”

Let Q is the statement “Binh is a pupil”

Which of the following English statements can be used for "P → Q"?

(i) If An is a student then Binh is a pupil.

(ii) A conditional necessary for statement "An is a student" is the statement "Binh is a pupil".

Select one:

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

Question 20

Not answered

Marked out of 1.00

Which the following propositions is FALSE:

Select one:

a. 1+1 = 2 xor 2 + 2 = 2

b. 1 + 1 = 3 or 1 + 1 = 2 if only if 2 + 2 = 4 xor 2 + 2 = 1

c. If 2 + 2 = 3, then 2 = 3 - 2

d. 1<0 if and only if 1 = 0

Question 21

Not answered

Marked out of 1.00

Study the following arguments:
(i) If Messi can speak Russian, then he is smart. Messi can't speak Russian. Therefore, Messi is not smart.
(ii) All Messi fans love FC Barcelona. Rooney doesn't love FC Barcelona. Therefore, Rooney is not a Messi fan

Select one:

- a. logical, illogical
- b. illogical, logical
- c. logical, logical
- d. illogical, illogical

Question 22

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 150078690

Select one:

- a. 75
- b. 63
- c. 58
- d. 12

Question 23

Not answered

Marked out of 1.00

Study the following computer code segment:

x:= 1

y:= 2

If (1+1=0) AND (2+2=4) then x:=x+1

If (1+1=2) OR (1+2=3) then y=y+1

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

Select one:

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

Question **24**

Not answered

Marked out of 1.00

Every Euler circuit in K_{11} is a path of length ___

Select one:

- a. 22
- b.
- c. 45
- d. 55
- e. 11

Question **25**

Not answered

Marked out of 1.00

Which codes are prefix codes?
(i) a: 1000, b: 010, c: 1101, d: 100
(ii) a: 10, b: 0101, c: 1110, d: 1001

Select one:

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

Question **26**

Not answered

Marked out of 1.00

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

Select one:

- a. 2^4
- b. $2^6 - 2^4$
- c. 2.2^4
- d. $2.2^6 - 2^4$

Question 27

Not answered

Marked out of 1.00

The function $f(x) = 3^x + 12x^6 + 15\log^{10}x$ is ...

Select one:

a. $O(2^x)$

b. $\theta(\log^8 x)$

c. $\theta(x^4)$

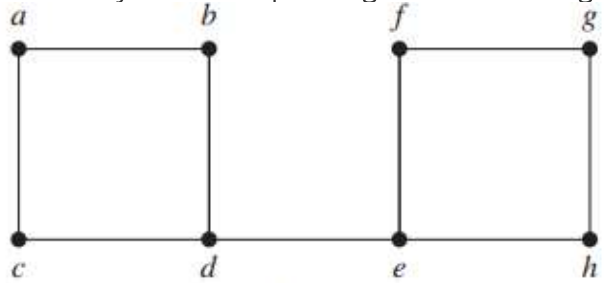
d. $\theta(3^x)$

Question 28

Not answered

Marked out of 1.00

How many different spanning trees does the graph G have?



G

Select one:

- a. 9
- b. 8
- c. 16
- d. 36
- e. None of the others

Question 29

Not answered

Marked out of 1.00

Find $f(2)$ and $f(3)$ if
$f(n) = f(n - 1) \times f(n - 2) + 1$, and $f(0) = 1, f(1) = 4$

Select one:

- a. f(2) = 15, f(3) = 20
- b. f(2) = 5, f(3) = 21
- c. f(2) = 30, f(3) = 66
- d. f(2) = 36, f(3) = 60

Question **30**

Not answered

Marked out of 1.00

Every Euler circuit in $K_{4,9}$ is a path of lengh ....

Select one:

- a. 26
- b. The graph cannot have an Euler circuit.
- c. 36
- d. 13

Question **31**

Not answered

Marked out of 1.00

Construct a binary search tree for the numbers: 6, 4, 7, 3, 5, 8. How many comparisons are used to locate the number "3"?

Select one:

- a. 1
- b. 3
- c. 2
- d. 4

Question 32

Not answered

Marked out of 1.00

Let U = {0,1,2,3,4,5,6,7,8,9}.

Given the subsets A = {1,2,3,4,8}, B = {0,5,6,7,8}. The bit string representing the subset A - B is ...

Select one:

- a. 00 1011 0010
- b. 01 1110 0000
- c. 01 1110 0010
- d. 01 1110 0110

Question 33

Not answered

Marked out of 1.00

How many integers in {1, 2, 3, ..., 113} are divisible by 3 but not by 7 ?

Select one:

- a. 37
- b. 30
- c. 32
- d. 40

Question **34**

Not answered

Marked out of 1.00

A full 5-ary tree with 49 leaves has ____ internal vertices

Select one:

- a. 61
- b. 11
- c. 10
- d. 12

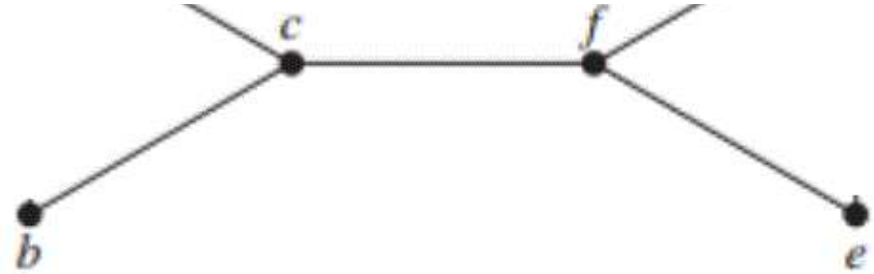
Question **35**

Not answered

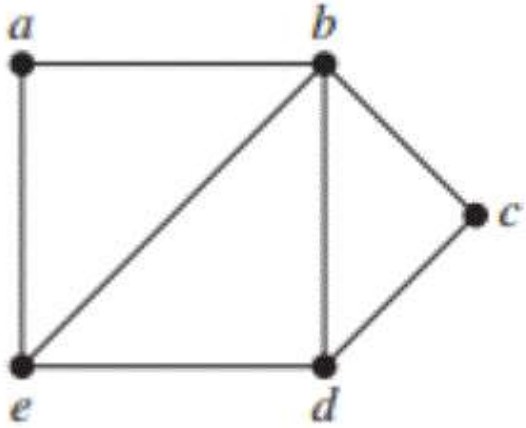
Marked out of 1.00

Determine whether the given graph has a Hamilton circuit.

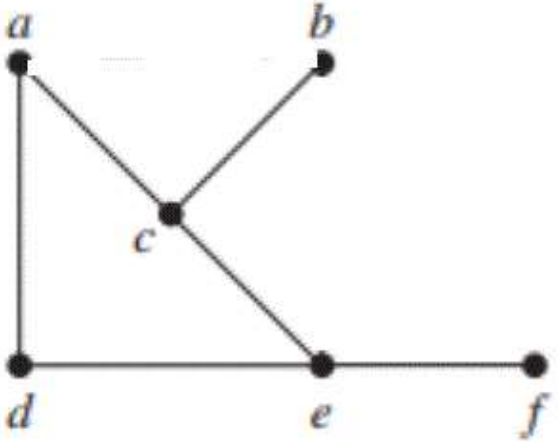
a) 



b)



c)



Select one:

- a. a) and c)
- b. c) only
- c. All of these
- d. b) only

Question **36**

Not answered

Marked out of 1.00

Let S be the set defined recursively by: 5 is in S, and if x is an element of S then x+5 is an element of S. What is S ?

Select one:

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

Question **37**

Not answered

Marked out of 1.00

How many rows appear in a truth table for the proposition

$(q \rightarrow \neg p) \vee (\neg p \rightarrow \neg q) \oplus r$

Select one:

- a. 5
- b. 32

c. 8
d. 3

Question **38**

Not answered

Marked out of 1.00

Suppose a_n is defined recursively by: $a_0=3$, $a_{n+1}=3.a_n$, $n>0$.
What is a_7 ?

Select one:

a. 24
b. 6561
c. 2123
d. 2187

d. 2187

Question 39

Not answered

Marked out of 1.00

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

Select one:

a. None of the others
b. 2
c. 1.5
d. 2.5
e. 1.75

Question **40**

Not answered

Marked out of 1.00

Encrypt the message LP by translating the letters into numbers (the character A is translated to 0), applying the encryption function $f(p) = (p - 23) \bmod 26$, and then translating the numbers back into letters. Encrypted form:

Select one:

a. OA

b. HG

c. OM

d. OS

Question **41**

Question 41

Not answered

Marked out of 1.00

How many 0-entries are there in the adjacency matrix of graph $K_{2,3}$?

Select one:

- a. 24
- b. 6
- c. 13
- d. 12

Question 42

Not answered

Marked out of 1.00

How many one-to-one functions are there from the set {1, 2, 3} to the set {1, 2, 3, 4, 5, 6}?

Select one:

- a. 6.5.4
- b. 18
- c. 0
- d. 6^3

Question 43

Not answered

Marked out of 1.00

Suppose that the domain of the propositional function P(x) consists of the integers 0, 1, and 2. Write out the proposition ∃xP(x), using disjunctions (∨), conjunctions (∧), and negations (¬)

Select one:

- a. P(0) ∧ P(1) ∧ P(2)
- b. None of the others
- c. ¬P(0) ∧ ¬P(1) ∧ ¬P(2)
- d. P(0) ∨ P(1) ∨ P(2)

Question **44**

Not answered

Marked out of 1.00

How many **edges** does a full binary tree with 100 internal vertices have?

Select one:

- a. 200
- b. 101
- c. 100
- d. 201

Question **45**

Not answered

Marked out of 1.00

Let B be the set {0, 01, 10 }. How many 1-1 functions are there from B to P(B)?

Select one:

- a. 336
- b. 27
- c. 6
- d. 512

Question **46**

Not answered

Marked out of 1.00

Which of the following statements is/are true?

(i) $\{0\} \subseteq \{1, \{0\}\}$
(ii) $\{0\} \in \{1, \{0\}\}$

Select one:

- a. Neither (i) nor (ii)
- b. (ii) only
- c. Both (i) and (ii)
- d. (i) only

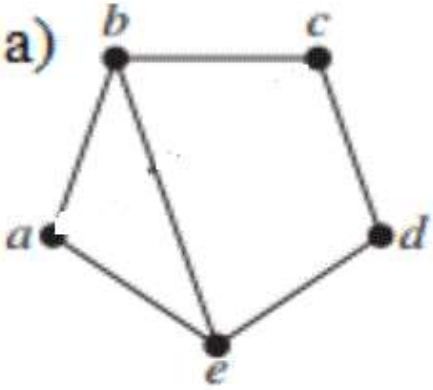
Question **47**

Not answered

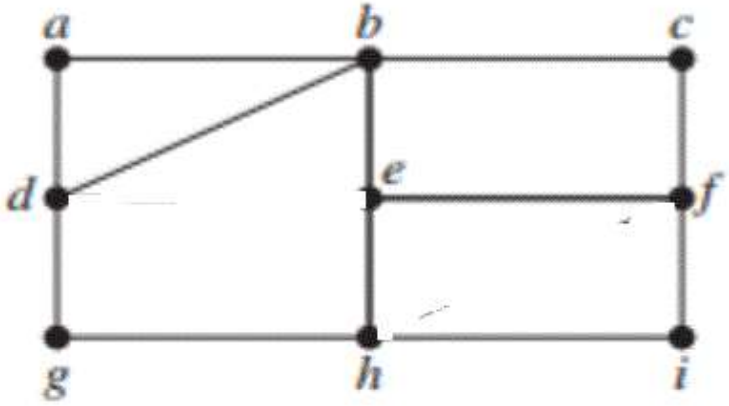
Marked out of 1.00

Determine whether the given graph has an Euler circuit.

a)



b)



Select one:

a. neither a) nor b)
b. Both a) and b)
c. b) only
d. a) only

Question **48**
Not answered
Marked out of 1.00

Which of the following integers are congruent to -15 modulo 11?

Select one:
a. -40
b. 17
c. 0
d. -48

Question **49**
Not answered
Marked out of 1.00

If a, b are positive integers such that lcm(a, b) = 240 and ab = 1200, find gcd(a, b)

Select one:
a. 5

b. 144

c. 96

d. 2880

Question **50**

Not answered

Marked out of 1.00

Let A = {27, 24, 19, 14, 11, 8}
Use backtracking to determine whether there exists a subset such that its sum is equal to
(i) 20
(ii) 41

Select one:

a. (i) and (ii) exist

b. None of the others

c. (i) does not exist and (ii) exists

d. (i) exists and (ii) does not exist

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