Started on	Saturday, 17 July 2021, 1:14 PM
State	Finished
Completed on	Saturday, 17 July 2021, 2:59 PM
Time taken	1 hour 45 mins

Question 1

Complete

Marked out of 1.00

Let R be a relation on a set X such that xRy means $xy = 24$ (Consider $X = N$). Check whether R is an equivalence relation.
(Note: Enter the appropriate word yes or no all in lower case).

Answer: no

Question 2

Complete

Marked out of 1.00

Determine whether the set {1, 2, 3, 4, 5} is a group under addition modulo 6.
(Note: Enter the appropriate word yes or no all in lower case)

Answer: yes

Question 3

Complete

Marked out of 1.00

Four persons enter a bus where there are 6 vacant seats. In how many ways can they take their places?

Note: Write the direct numeric value e.g., 2

Answer: 360

Question 4

Complete

Marked out of 1.00

A Euler graph is one in which:

(A) Only two vertices are of odd degree and rests are even.
(B) Only two vertices are of even degree and rests are odd.
(C) All the vertices are of odd degree.
(D) All the vertices are of even degree

Select one:

- a. D
- b. A
- c. B
- d. C

Question 5

Complete

Marked out of 1.00

The complete bipartite graph $K_{r,s}$ is the bipartite graph $(X \cup Y, E)$ in which $|X| = r$, $|Y| = s$, and every pair xy with $x \in X$ and $y \in Y$ is an edge. Determine the degree of each vertex in X.

Answer: s

Question 6

Complete

Marked out of 1.00

$< Z_6, +, \times >$ is a Field .

Select one:

- True
- False

Question 7

Complete

Marked out of 1.00

A computer company receives 350 applications from computer graduates for a job planning a line of new web servers. Suppose that 220 of these people majored in CSE, 147 majored in Business, and 51 majored both in CS and Business. How many of these applicants majored neither in CS nor in Business?

Note: Write the direct numeric value e.g., 2

Answer: 34

Question 8

Complete

Marked out of 1.00

$$a \equiv b \ (mod\ m\ and\ m|n) \Rightarrow a \equiv b \ (mod\ n)$$

Select one:

- True
- False

Question 9

Complete

Marked out of 1.00

Let L be a lattice. Then for every a and b in L which one of the following is correct?

(A) $a \vee b = a \wedge b$ (B) $a \vee (b \vee c) = (a \vee b) \vee c$

(C) $a \vee (b \wedge c) = a$ (D) $a \vee (b \vee c) = b$

Select one:

- a. D
- b. A
- c. C
- d. B

Question 10

Complete

Marked out of 1.00

Graph in which all nodes are of equal degrees is known as:

Select one:

- a. Regular Graph
- b. Complete Lattice
- c. Multi Graph
- d. Non-regular Graph

Question 11

Complete

Marked out of 1.00

In a group of 50 people, 35 like tea and 25 like coffee. What can be the number of people who like both tea and coffee?

a) 27
b) 12
c) 9
d) 32

Select one:

- a. B
- b. A
- c. C
- d. D

Question 12

Complete

Marked out of 1.00

How many words can be formed out of the letters of the word 'PECULIAR' beginningwith P and ending with R?

Select one:

- a. 720
- b. 120
- c. 100
- d. 150

Question 13

Complete

Marked out of 1.00

Let $A = \{2,3,4\}$ and $B = \{3,4,5\}$. List the elements of relation R defined below:

$a \epsilon A$ is related to $b \epsilon B$, that is, aRb if a and b are both odd numbers.

(Note: Enter the ordered pairs in set representation notation of the relation R in the increasing order of the first element of the ordered pair separated by , without any spaces like {(2,3),(5,2),(7,5)})

Answer: {(3,3),(3,5)}

Question 14

Complete

Marked out of 1.00

Let N = {1, 2, 3, ...} be ordered by divisibility, which of the following subset is totally Ordered?

(A) (2, 6, 24). (B) (3, 5, 15).
(C) (2, 9, 16). (D) (4, 15, 30).

Select one:

- a. C
- b. B
- c. D
- d. A

Question 15

Complete

Marked out of 1.00

In how many ways can a president and vice president be chosen from a set of 30 candidates?

(A) 820 (B) 850
(C) 880 (D) 870

Select one:

- a. B
- b. A
- c. C
- d. D

Question 16

Complete

Marked out of 1.00

Let R be a relation on a set X such that xRy means $xy = 24$ (Consider $X = N$). Check whether R is reflexive.
(Note: Enter the appropriate word yes or no all in lower case).

Answer: no

Question 17

Complete

Marked out of 1.00

In a simple language there are the usual 26 letters, and all words have four letters. Any arrangement of the letters including repetitions, is allowed. Determine how many words are there that do not contain the letter b?
(Note: Enter the final numeric value without commas)

Answer: 390625

Question 18

Complete

Marked out of 1.00

The proposition $p \wedge (q \wedge \sim q)$ is a

a. Contradiction b. Tautology c. Contingency d. none

Select one:

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

Question 19

Complete

Marked out of 1.00

Cardinality of a Singleton Set is ----.

(Note: Enter the direct numeric value if it exists, else type null)

Answer: 1

Question 20

Complete

Marked out of 1.00

Let $A = \{2,3,4\}$ and $B = \{3,4,5\}$. Determine the Range of relation R defined below:

$a \epsilon A$ is related to $b \epsilon B$, that is, aRb if a and b are both odd numbers.

(Note: Enter the elements in set representation notation in the ascending order separated by , without any spaces like {a,b,c})

Answer: {3,5}

Question 21

Complete

Marked out of 1.00

California license plates consist of one of the digits 1-9 followed by one letter, andthen five of the digits 0-9 (not necessarily distinct). (The same digit or letter can be used morethan once.) Find out how many license plates of this type can be made?

(Note: Enter the final numeric value without commas)

Answer: 23400000

Question 22

Complete

Marked out of 1.00

Write all the generators in $(Z_4, +_4)$

(Note: Write the generators in ascending order separated by comma and without any space like a,b,c if it exists, else write null)

Answer: 1,3

Question 23

Complete

Marked out of 1.00

Consider the divides relation on the set S = {1, 2, 3, 4, 6, 9}. Find the greatest element of the POSET.

(Only enter the element/elements. If the required element does not exist, then please type **nil**)

Answer: {(1,2),(1,3),(1,4),(1,6),(1,9),(2,4),(2,6),(3,6),(3,9)}

Question 24

Complete

Marked out of 1.00

Let A be a fuzzy set on a set X. X= {10,20,30,40,50} whose membership function is defined as: $\mu_A(x) = x/(x+10)$. Find A_α for $\alpha = 0.6$.

(Note: Write the answer in set form in ascending order like {a,b,c,d})

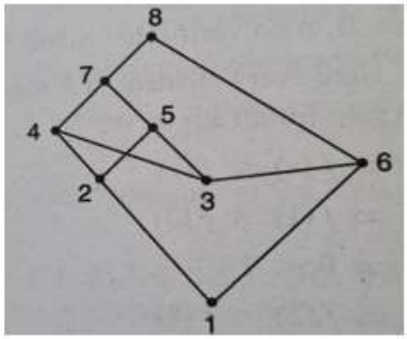
Answer: {20,30,40,50}

Question 25

Complete

Marked out of 1.00

In the POSET P shown below, determine the upper bound of $A = \{2,3\}$:



(Enter the elements using the set notation. All the elements should be stated in proper ascending order. If there are more than one element, they may be separated using commas without any spaces like {a,b,c}. If the required element does not exist, then please type **nil**)

Answer: {4,7,8}

Question 26

Complete

Marked out of 1.00

The number of functions from an m element set to an n element set is:

(A) m^n (B) $m + n$
(C) n^m (D) $m * n$

Select one:

- a. D
- b. B
- c. A
- d. C

Question 27

Complete

Marked out of 1.00

The relation {(1,2), (1,3), (3,1), (1,1), (3,3), (3,2), (1,4), (4,2), (3,4)} is:

(A) Reflexive. (B) Transitive.
(C) Symmetric. (D) Asymmetric.

Select one:

- a. C
- b. A
- c. B
- d. D

Question 28

Complete

Marked out of 1.00

Determine the number of edges present in an undirected graph with two vertices of degree 7, four vertices of degree 5, and the remaining four vertices of degree is 6?

(Note: Enter the direct numeric value)

Answer: 29

Question 29

Complete

Marked out of 1.00

Using Pascal's Identity, C(7,5)+ C(7,6) is equal to
(Note: write the coefficient in the given format: C(n,r) for ^nC_r)

Answer: C(8,6)

Question 30

Complete

Marked out of 1.00

Consider the divides relation on the set S = {1, 2, 3, 4, 6, 9}. Find all the minimal elements of the POSET.

(Enter the elements using the set notation. All the elements should be stated in proper ascending order. If there are more than one element, they may be separated using commas without any spaces like {a,b,c}. If the required element does not exist, then please type **nil**)

Answer: {1}

Question 31

Complete

Marked out of 1.00

Find an integer that has a remainder of 3 when divided by 7 and 13 but is divisible by 12.
Note: Write the direct numeric value as the answer.

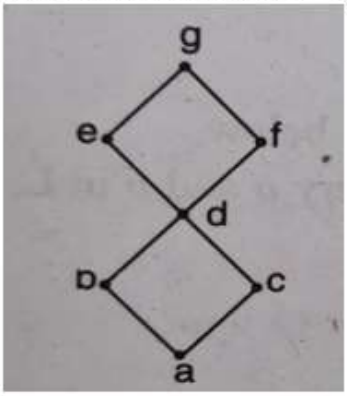
Answer: 276

Question 32

Complete

Marked out of 1.00

Check whether the POSET represented by the following Hasse diagram is a lattice:



(Note: Enter the appropriate word yes or no all in lower case)

Answer: no

Question 33

Complete

Marked out of 1.00

Let $A = \{2,3,4\}$ and $B = \{3,4,5\}$. Determine the Domain of relation R defined below:

$a \epsilon A$ is related to $b \epsilon B$, that is, aRb if a and b are both odd numbers.

(Note: Enter the elements in set representation notation in the ascending order separated by , without any spaces like {a,b,c})

Answer: {3}

Question 34

Complete

Marked out of 1.00

What is the minimum number of students required in a class to be sure that at least 6 will receive the same grade if there are five possible grades A, B, C, D and F?

Answer: 26

Question 35

Complete

Marked out of 1.00

Some license plates in California consist of one of the digits 1-9, followed by three (not necessarily distinct) letters and then three of the digits 0-9 (not necessarily distinct). Find out how many possible license plates can be produced by this method?

(Note: Enter the final numeric value

without commas)

Answer: 23400000