MA102MIDSEMMOODLE

Question 1
Correct
Mark 1.00 out of 1.00
Flag question

If A = {φ, {φ}} then which is the correct cardinality of P(A)?

- a. 2
- b. 3
- c. 4 ✔

The correct answer is:
4

Question 2
Correct
Mark 1.00 out of 1.00
Flag question

Let f : {1, 2, . . . , 11} → {1, 2, . . . , 11} be a bijective function. Let
R = (1 − f (1)) × (2 −f (2)) × (3 − f (3))× . . . (11 - f(11)). Which of the following is true?

- a. R is even ✔
- b. can't say anything about R.
- c. R is odd

The correct answer is:
R is even

Question 3
Incorrect
Mark 0.00 out of 1.00
Flag question

Let A be the set of all 2×2 matrices with entries from $\mathbb{N}$ and B be the set of all 2×2 matrices with entries from $\mathbb{Z}$. Which of the following is/are correct sentences?

- a. A is countable ✔
- b. |A|=|B|
- c. |A|<|B| ✖
- d. B is countable ✔

The correct answers are:
|A|=|B|,
A is countable,
B is countable

Question 4
Incorrect
Mark 0.00 out of 1.00
Flag question

Sum of two irrational numbers is irrational

- a. False
- b. True ✖
- c. not a proposition

The correct answer is:
False

Question 5
Incorrect
Mark 0.00 out of 1.00
Flag question

Let $f : \mathbb{N} \to P(\mathbb{N})$ be a function defined as for every $x \in \mathbb{N}$, $f(x)$ is the set of positions where the decimal writing of x has 3. For example f (353) = {1, 3} . Which of the following statement is correct? Here $\mathbb{N}$ is the set of natural numbers.

- a. f is injective
- b. f is bijective ✖
- c. f is sujective

The correct answer is:
f is sujective

Question 6
Incorrect
Mark 0.00 out of 1.00
Flag question

Let A be the relation ``to be wife of'' and $B$ ``to be father of '' on the set of all humans. What does the relation $B\circ A$ mean in this case?

- a. "to be child of"
- b. none of these ✖
- c. "to be mother of"

The correct answer is:
"to be mother of"

Question **7**
Incorrect
Mark 0.00 out of 1.00
Flag question

The set Q denotes the set of all rational numbers. Consider the set S = Q × Q × ⋯ × Q (200 cartesian products). Which of the following is true?
Here Q is the set of rational numbers.

- a. |S|>|Q|
- b. |S|=|Q|
- c. |S|<|Q| ✗

The correct answer is:
|S|=|Q|

Question **8**
Incorrect
Mark 0.00 out of 1.00
Flag question

Is it possible to construct two sets A, B such that |B| ≥ |A| but for c does not belong to $A, |A \cup \{c\}| > |B|$?

- a. No ✗
- b. Yes

The correct answer is:
Yes

Question **9**
Correct
Mark 1.00 out of 1.00
Flag question

Let M be the matrix corresponding to a relation R on A = {1, 2, 3, 4}.
Where M =

```
1 0 0 0
1 0 1 0
1 0 0 1
1 0 1 0
```

The matrix representation of the corresponding transitive closure of R will be

- a. none of these
- b. ✓

```
1 0 0 0
1 0 1 1
1 0 1 1
1 0 1 1
```

- c.

```
1 0 1 1
1 0 1 1
1 0 1 1
1 0 1 1
```

- d.

```
1 0 1 0
1 0 1 1
1 0 1 1
1 0 1 1
```

Question **10**
Incorrect
Mark 0.00 out of 1.00
Flag question

What is the cardinality of the set $P(\mathbb{N} \times \mathbb{N})$

- a. c
- b. 2^c
- c. aleph not ✗

The correct answer is:
c

Question **11**
Incorrect
Mark 0.00 out of 1.00
Flag question

Which of the following is/are correct statements?

- ☐ a. Empty subset of $\mathbb{N} \times \mathbb{N}$ is a function from $\mathbb{N}$ to $\mathbb{N}$.
- ☑ b. If a relation is symmetric then it can not anti symmetric. ✗
- ☐ c. A relation R on a finite set is symmetric if and only if corresponding matrix is symmetric with respect to any ordering of the elements.
- ☐ d. Empty subset of $\mathbb{N} \times \mathbb{N}$ is a relation from $\mathbb{N}$ to $\mathbb{N}$.

The correct answers are:
A relation R on a finite set is symmetric if and only if corresponding matrix is symmetric with respect to any ordering of the elements., Empty subset of $\mathbb{N} \times \mathbb{N}$ is a relation from $\mathbb{N}$ to $\mathbb{N}$.

Question **12**
Incorrect
Mark 0.00 out of 1.00
Flag question

Let A = {0, 1, 2, 3, 4, 5, 6, 7} and define a relation R on A, where R = {(x, y) | x + y ≤ 2x}. Which of the following is true

- a. R is Reflexive and Symmetric ✗
- b. R is only Reflexive
- c. R is Reflexive and Transitive

The correct answer is:
R is Reflexive and Transitive

Question **13**
Incorrect
Mark 0.00 out of 1.00
Flag question

Is the set $S = \{x \in C \mid ax^3 + bx^2 + cx + d = 0, a, b, c, d \in N\}$ countable? Here C is the set of all complex numbers and N is the set of all natural numbers.

- a. No
- b. Yes

The correct answer is:
Yes

Question **14**
Incorrect
Mark 0.00 out of 1.00
Flag question

Let R1 and R2 be any two relations. Let T1 be the transitive closure of R1 and T2 be the transitive closure of R2 . Let T be the transitive closure of R1 ∪ R2 . Which of the following is true?

- a. (T1 ∪ T2) = T
- b. (T 1 ∪ T 2) ⊂ T
- c. (T 1 ∪ T 2) ⊃ T

The correct answer is:
(T 1 ∪ T 2) ⊂ T

Question **15**
Incorrect
Mark 0.00 out of 1.00
Flag question

Let R be a relation on ℤ that is defined by a R b if and only if b = a + 1. Let R^* denote transitive closure of R. Then a R^* b if and only if

- a. a ≥ b
- b. a = b + 1
- c. a < b
- d. none of these
- e. a ≤ b

The correct answer is:
a < b

Question **16**
Correct
Mark 1.00 out of 1.00
Flag question

Which of the following set is empty? Here R stands for the set of real numbers

- a. {x ∈ R | x = x}
- b. {x ∈ R | x is not equal to x^2 }
- c. {x ∈ R | x = x^2 }
- d. {x ∈ R | x is not equal to x}

The correct answer is:
{x ∈ R | x is not equal to x}

Question **17**
Not answered
Marked out of 1.00
Flag question

Let R1 and R2 be any two relations on a set A. Let T1 be the symmetric closure of R1 and T2 be the symmetric closure of R2. Let T be the symmetric closure of R1 ∪ R2 . Which of the following is true?

- a. (T1 ∪ T2) = T
- b. (T 1 ∪ T 2) ⊂ T
- c. (T 1 ∪ T 2) ⊃ T

The correct answers are:
(T 1 ∪ T 2) ⊂ T,
(T1 ∪ T2) = T

Question **18**
Incorrect
Mark 0.00 out of 1.00
Flag question

Let f be a function on $\mathbb{R}$ with the property that f (a) < f (b) for all a < b.

- a. f is bijective
- b. f need not be one to one
- c. f is onto
- d. f is one to one

The correct answer is:
f is one to one

Question **19**
Correct
Mark 1.00 out of 1.00
Flag question

Let A_1 , A_2 , A_3 be three sets then ($A_2 \setminus A_1$) ∩ ($A_1 \setminus A_3$) will be

- a. $A_2 \cap A_3$
- b. $A_1 \cap A_3$
- c. φ

The correct answer is:
φ

Question **20**
Incorrect
Mark 0.00 out of 1.00
Flag question

Suppose that you meet three people A, B, and C on an island of knights and knaves. What can you determine what A, B, and C are if A says "All of us are knaves" and B says "Exactly one of us is a knave."?

- a. A-knave, B-knight, C-knight
- b. A-knave, C-knight
- c. All three are knaves
- d. can not conclude anything
- e. A-knight, B-knave, C-knight
- f. A-knave, B-knave, C-knight

The correct answer is:
A-knave, C-knight

Question 21
Correct
Mark 1.00 out of 1.00
Flag question

Let A and B be two finite sets. Which is the following statement is true?

a. $|P(A) \times P(B)| = 2^{|A||B|}$, $|P(A \times B)| = 2^{|A|}, 2^{|B|}$

b. $|P(A) \times P(B)| = 2^{|A|}, 2^{|B|}$, $|P(A \times B)| = 2^{|A||B|}$ ✔

c. $|P(A) \times P(B)| = |P(A \times B)|$

The correct answer is:
$|P(A) \times P(B)| = 2^{|A|}, 2^{|B|}$, $|P(A \times B)| = 2^{|A||B|}$

Question 22
Correct
Mark 1.00 out of 1.00
Flag question

Let A and B be two sets such that |A| = |B|. Let f be an injective function from A to B.
Then f will be surjective?

a. Yes, in all cases.

b. No, not always ✔

The correct answer is:
No, not always

Question 23
Correct
Mark 1.00 out of 1.00
Flag question

The proposition $(\exists X P(X)) \wedge (\forall Y \forall Z (P(Y) \wedge P(Z) \Rightarrow Y = Z))$ is true means that there is exactly one element X in the domain such that P (X) is true

a. True ✔

b. False

The correct answer is:
True

Question 24
Incorrect
Mark 0.00 out of 1.00
Flag question

If $a_n = a_{n-1} + n^2$ with $a_0 = 1$ then what is correct expression of a_n ?

a. $(2n^3 + 3n^2 + n + 1)/6$ ✖

b. $(2n^3 + 3n^2 + n + 6)/6$

c. none of these

d. $(n(n+1)/2)^2$

e. $(n^3 + 3n^2 + n + 6)/6$

The correct answer is:
$(2n^3 + 3n^2 + n + 6)/6$

Question 25
Correct
Mark 1.00 out of 1.00
Flag question

The relation $\{(a, a) | a \in \mathbb{N}\}$ on $\mathbb{N}$ is an equivalence relation.

Select one:
True ✔
False

The correct answer is 'True'.

Question 26
Correct
Mark 1.00 out of 1.00
Flag question

Let p, q be two different prime numbers. Consider the statement
S : The relation defined as R = { (x, y) | (x ≡ y mod p) or (x ≡ y mod q)} is an equivalence relation.

a. S is false ✔

b. S is true

The correct answer is:
S is false

Question 27
Correct
Mark 1.00 out of 1.00
Flag question

Let A and B be two finite sets and f be a function from A to B then which of the following is most accurate?

a. $|A| \geq |B|$ if and only if f is surjective ✔

b. none of these

c. $|A| < |B|$ if and only if f is surjective.

d. |A| is not equal to |B| if and only if f is surjective.

The correct answer is:
$|A| \geq |B|$ if and only if f is surjective

Question 28
Correct
Mark 1.00 out of 1.00
Flag question

There exist a surjective function from $\mathbb{R}$ to $P(\mathbb{R})$.

a. False ✔

b. True

The correct answer is:
False

Question **29**
Correct
Mark 1.00 out of 1.00
Flag question

If φ denotes the empty set and the set A contains n elements. The cardinality of φ × A will be

a. 2^n
b. φ
c. 0 ✔
d. n

The correct answer is:
0

Question **30**
Correct
Mark 1.00 out of 1.00
Flag question

The set {{4}, {4, {4}}} contains the element 4 or not?

a. Yes
b. No ✔

The correct answer is:
No

Question **31**
Correct
Mark 1.00 out of 1.00
Flag question

Which of the following statement is true for any sets A and B?

a. Every function from A to B is a relation ✔
b. Every relation from A to B is a function
c. Every partial order from A to A is a function from A to A.

The correct answer is:
Every function from A to B is a relation

Question **32**
Incorrect
Mark 0.00 out of 1.00
Flag question

Let S = {x | x is a rational number belongs to [0, 1]}. Whether (S, ≤) is Poset or not?

a. No ✘
b. Yes

The correct answer is:
Yes

Question **33**
Incorrect
Mark 0.00 out of 1.00
Flag question

Let A and B be two sets such that |A| = |B|. Let f be an surjective function from A to B.

Then f will be injective?

a. Yes ✘
b. No

The correct answer is:
No

Question **34**
Partially correct
Mark 0.50 out of 1.00
Flag question

Consider the following relation R on $\mathbb{Z}$: $(a, b) \in R$ **if and only if** b **divides** a. Then R is

a. not reflexive ✔
b. anti-symmetric
c. transitive
d. Partial order
e. Symmetric
f. Reflexive

The correct answers are:
transitive,

not reflexive

Question **35**
Correct
Mark 1.00 out of 1.00
Flag question

Consider the poset -({2, 4, 6, 9, 12, 18, 27, 36, 48, 60, 72), |).

a. Poset is linearly ordered
b. Poset is not linearly ordered ✔
c. can't say.

The correct answer is:
Poset is not linearly ordered