

Course outline

How does an NPTEL online course work?

Propositional Logic

Predicate Logic, Proof Strategies and Induction

Sets and Relations

- Sets
- Relations
- Operations on Relations
- Transitive Closure of Relations
- Warshall's Algorithm for Computing Transitive Closure
- Tutorial 3

 Quiz : Week 3 Assignment

Equivalence Relations, Partitions, Partial Orderings and Functions

Theory of Countability

Combinatorics Part I

Combinatorics Part II

Graph Theory Part I

Graph Theory Part II

Number theory

Abstract Algebra : Part I

Abstract Algebra : Part II

Video download

Live Session

Text transcripts

Week 3 Assignment

The due date for submitting this assignment has passed.

Due on 2021-02-10, 23:59 IST.

As per our records you have not submitted this assignment.

 1) Given set $A = \{1,2,3\}$ and $B = \{a,b,c,d\}$. Let PA be the cardinality of the power set of A and PB be the cardinality of the power set of B . Which of the following is true? **1 point**

- $PA + PB = 7$
- $PA * PB = 32$
- $PB = PA + 1$
- None of given options

No, the answer is incorrect.
Score: 0

Accepted Answers:
None of given options

 2) Consider a set $A = \{1,2,3\}$. The binary relation $R = \{(1,1), (1,2), (1,3), (3,1), (3,2)\}$ on A is **1 point**

- R is both symmetric and antisymmetric
- R is not symmetric but antisymmetric
- R is neither symmetric and nor antisymmetric
- R is symmetric but not antisymmetric

No, the answer is incorrect.
Score: 0

Accepted Answers:
 R is neither symmetric and nor antisymmetric

 3) Consider a relation $R = \phi$ on a set $A = \{1,2,3,4,5\}$. The number of elements in the reflexive closure of R is **1 point**

- 5
- 25
- 32
- None of given options

No, the answer is incorrect.
Score: 0

Accepted Answers:
5

 4) Select the correct option(s) from the following: **1 point**

- The transitive closure of the relation $\{(1,3), (3,4), (1,1), (5,5), (4,5)\}$ on the set $\{1,2,3,4\}$ is $\{(1,3), (3,4), (1,4), (1,1), (5,5), (4,5)\}$
- Given the set P whose relation matrix is $\begin{pmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{pmatrix}$, the transitive closure of the relation is $\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \\ 0 & 1 & 1 \end{pmatrix}$
- The time complexity to compute the transitive closure of a binary relation on a set of n elements is $O(n^2)$
- None of the given options are correct

No, the answer is incorrect.
Score: 0

Accepted Answers:
Given the set P whose relation matrix is $\begin{pmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{pmatrix}$, the transitive closure of the relation is $\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \\ 0 & 1 & 1 \end{pmatrix}$

 5) Choose the incorrect statement(s) from the following **1 point**

- Given $A = \{x \in \mathbb{Z} : 21 \text{ divides } x\}$ and $B = \{x \in \mathbb{Z} : 7 \text{ divides } x\}$. Then, $A \subseteq B$.
- Given the relation $R = \{(x,y) : y = x - 1\}$ over the set $A = \{1,2,3,4\}$ is both asymmetric and transitive relation
- Given the relation $R = \{(1,3), (2,2), (3,4)\}$ on the set $\{1,2,3,4\}$, then the transitive closure of symmetric closure of R is a reflexive relation
- None of the given options

No, the answer is incorrect.
Score: 0

Accepted Answers:
Given the relation $R = \{(x,y) : y = x - 1\}$ over the set $A = \{1,2,3,4\}$ is both asymmetric and transitive relation

 6) Given $R = \{(a,b) : (a+b) \geq (a-b)\}$ over the set of integers. The relation R is **1 point**

- Reflexive
- Symmetric
- Antisymmetric
- Asymmetric
- None of the given options

No, the answer is incorrect.
Score: 0

Accepted Answers:
None of the given options

 7) Choose the correct statement(s) from the following: **1 point**

- Let A, B and C be arbitrary sets. Then, $(A \cap B) \cap (B \cup C) = (A \cap B)$
- A non-empty relation ($R \neq \emptyset$) cannot be both symmetric and antisymmetric
- Warshall's algorithm is used to determine the connectivity between any given pair of vertices
- None of the given options

No, the answer is incorrect.
Score: 0

Accepted Answers:
Let A, B and C be arbitrary sets. Then, $(A \cap B) \cap (B \cup C) = (A \cap B)$
Warshall's algorithm is used to determine the connectivity between any given pair of vertices

 8) Choose the correct statement(s) from the following where A, B and C are arbitrary sets: **1 point**

- If $A \cup C = B \cup C$ then $A = B$
- If $A \cap C = B \cap C$ then $A = B$
- If $A \cup C \subseteq B \cup C$ and $A \cap C \subseteq B \cap C$ then $A \subseteq B$
- None of the given options

No, the answer is incorrect.
Score: 0

Accepted Answers:
If $A \cup C \subseteq B \cup C$ and $A \cap C \subseteq B \cap C$ then $A \subseteq B$

 9) Let R be the relation on the set \mathbb{R} of all real numbers defined by aRb iff $|a-b| \leq 1$. Then R is: **1 point**

- Reflexive and symmetric
- Symmetric only
- Transitive only
- Anti-symmetric only

No, the answer is incorrect.
Score: 0

Accepted Answers:
Reflexive and symmetric

 10) Let R be the relation on the set of all students defined by $\alpha R \beta$ iff student α and student β are in at least one common class and $\alpha \neq \beta$. Choose the correct statement(s) from the following **1 point**

- If $(\alpha, \beta) \in R^2$ then α and β are in at least two common classes
- If $(\alpha, \beta) \in R^2$ then there exists γ such that α, β and γ are in at least one common class
- If $(\alpha, \beta) \in R^+$ then α and β have all classes in common
- None of the given options

No, the answer is incorrect.
Score: 0

Accepted Answers:
None of the given options