MATHS

BOOKS - MODERN PUBLICATION MATHS (KANNADA ENGLISH)

RELATIONS

Mcq Level I

1. Let $n(A) = m$ and $n(B) = n$. Then the total number of non-empty relations that can

be defined from A to B is :

A. m^n

B. $n^m - 1$

C. $mn - 1$

D. $2^{mn} - 1$

Answer: D

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2. Let $A = \{1, 2, 3\}$. The total number of distinct relations which can be defined over A is :

A. 6

B. 8

C. 2^9

D. None of these

Answer: C

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3. Let A= {1,2,3,4} and R= {(2,2),(3,3),(4,4),(1,2)} be relation on A. Then A is :

A. reflexive

B. symmetric

C. transitive

D. None of these

Answer: C

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4. The void relation on a set A is :

A. reflexive

B. symmetric and transitive

C. reflexive and symmetric

D. reflexive and transitive

Answer: B

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5. The relation 'is subset of' on the power set P(A) of a set A is :

A. symmetric

B. anti-symmetric

C. equivalence relation

D. None of these

Answer: B

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6. The relation 'congruence modulo m` is :

A. reflexive only

B. symmetric only

C. transitive only

D. an equivalence relation

Answer: D

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7. Let R be the relation over the set $N \times N$ and is defined by $(a, b)R(c, d) \Rightarrow a + d = b + c$. Then R is :

A. reflexive only

B. symmetric only

C. transitive only

D. an equivalence relation

Answer: D

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8. Let $P = \{(x, y) : x^2 + y^2 = 1, x, y \in R\}$.

Then P is :

A. reflexive

B. symmetric

C. transitive

D. anti-symmetric

Answer: B

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9. Let R be a relation on a set A such that $R = R^{-1}$. Then R is :

A. reflexive

B. symmetric

C. transitive

D. None of these

Answer: B

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10. Let a relation R in the set of natural number be defined by $(x, y) \in R \Leftrightarrow x^2 - 4xy + 3y^2 = 0$ for all $x, y \in N$. Then the relation R is :

A. reflexive

B. symmetric

C. transitive

D. an equivalence relation

Answer: A

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11. Let A= {1,2,3}. Then the relation R= {(2,3)} in A is :

A. symmetric only

B. transitive only

C. symmetric and transitive only

D. None of these

Answer: B

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12. Two points A and B in a plane are related if OA=OB, where O is a fixed point. This relation is :

A. reflexive but only symmetric

B. reflexive but not transitive

C. equivalence relation

D. partial order relation

Answer: C

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Mcq Level Ii

1. The relation R defined in A= {1,2,3} by a R b if $\left|a^2 - b^2\right| \leq 5$. Which of the following is not true?

A. Domain of $R = \{1, 2, 3\}$

B. Range of R= {5}

C. $R^{-1} = R$

D. R= {(1,1),(2,2),(3,3),(2,1),(1,2),(2,3),(3,2)}

Answer: B

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2. Let R be a relation in the set of natural numbers defined by $R = \{(1+x, 1+x^2) : x \leq 5, x \in N\}$.

Which of the following in false :

A. Domain of $R = \{2, 3, 4, 5, 6\}$

B. Range of R = {2,5,10,17,26}

C. R= {(2,2),(3,5),(4,10),(5,17),(6,26)}

D. At least one is false

Answer: C

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3. R is a relation over the set of real numbers and it is given by $mn \geq 0$. Then R is :

A. reflexive and symmetric

B. symmetric and transitive

C. an equivalence relation

D. partial order relation

Answer: C

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4. R is a relation over the set of integers and it is given by $(x, y) \in R \Leftrightarrow |x - y| \leq 1$. Then R is :

A. reflexive and symmetric

B. reflexive but not transitive

C. symmetric and transitive

D. an equivalence relation

Answer: A

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5. Let L be the set of all straight lines in the Euclidean plane. Two lines l_1 and l_2 are said to be related by the relation R iff $l_1 \| l_2$. Then the relation R is :

A. reflexive

B. symmetric

C. transitive

D. equivalence

Answer: D

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6. Let R be the relation over the set of straight lines in a plane such that $lRm \Leftrightarrow l \perp m$. Then R is :

A. reflexive

B. symmetric

C. transitive

D. an equivalence relation

Answer: B

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7. Let R be the relation over the set of integers such that $lRm \Leftrightarrow l$ is a multiple of m. Then R is :

A. reflexive

B. symmetric

C. an equivalence relation

D. None of these

Answer: A

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8. Which one of the following relations on R is an equivalence relation ?

A. $aR_1b \Leftrightarrow |a| = |b|$

B. $aR_2b \Leftrightarrow a \geq b$

C. $aR_3b \Leftrightarrow a$ divides b

D. $R_4b \Leftrightarrow a < b$

Answer: A

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9. Let $R = \{(x, y) : x, y \in A, x + y = 5\}$,

where A= {1,2,3,4,5}. Then :

A. R is reflexive, symmetric but not transitive

B. R is not reflexive, not symmetric but transitive

C. R is not reflexive, symmetric and not transitive

D. R is an equivalence relation

Answer: C

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10. For $x, y \in R$, define a relation R by x R y if and only if $x - y + \sqrt{2}$ is an irrational number. Then R is :

A. symmetric

B. transitive

C. an equivalence relation

D. None of these

Answer: D

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11. Given the relation R= {(1,2),(2,3)} is the set A= {1,2,3}. Then the minimum number of ordered pairs which when added to R make it an equivalence relation is :

A. 5

B. 6

C. 7

D. 8

Answer: C

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12. Let A= {a,b,c}. Which of the following is not an equivalence relation in A?

A. $R_1 = \{(a, b), (b, c), (a, c), (a, a)\}$

B. $R_2 = \{(c, b), (c, a), (c, c), (b, b)\}$

C. $R_3 = \{(a, b), (b, b), (c, c), (a, b)\}$

D. None of these

Answer: D

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13. Let R_1 and R_2 be two equivalence relations in the set A. Then:

A. $R_1 \cup R_2$ is an equivalence relation

B. $R_1 \cap R_2$ is an equivalence relation

C. $R_1 - R_2$ is an equivalence relation

D.

Answer: B

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14. If A is the set of even natural numbers less than 8 and B is the set of prime numbers less than 7, then the number of relations from A to B is :

A. 2^9

B. 9^2

C. 3^2

D. $2^9 - 1$

Answer: A

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15. Let R= {(1,3), (4, 2), (2, 4), (2, 3) , (3, 1)} be a relation on the set A= {1, 2, 3, 4}. The relation R is :

A. A function

B. transitive

C. not symmetric

D. reflexive.

Answer: C

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16. Let R= { (3, 3), (6, 6), (9, 9), (12, 12), (6, 12), (3,9), (3, 12), (3,6)} be a relation on the set A= { 3,6,9,12}.

The relation is :

A. reflexive only

B. reflexive and transitive only

C. reflexive and symmetric only

D. an equivalence relation.

Answer: B

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17. Let $x, y \in I$ and suppose that a relation R on I is defined by x R y if and only if $x \leq y$. Then :

A. R is reflexive and symmetric

B. R is symmetric and transitive

C. R is an equivalence relation

D. R is partial order.

Answer: D

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18. The relation R defined on the set A = { 1, 2, 3, 4} by :

$R = \{(x, y) : |x^2 - y^2| \leq 10, x, y \in A\}$ is given by :

A. {(1,1) , (1. 2), (1,3) ,(1, 4), (2, 1), (2, 2), (2, 3), (2, 4)}

B. {(1, 1), (1, 2), (1, 3), (2, 2), (2, 3), (3, 3), (3, 4), (4, 4)}

C. {(1, 1), (1, 2), (1, 3), (2,1), (2, 2), (2,3), (3,1), (3, 2), (3, 3), (3,4), (4, 3), (4, 4)}

D. None of these

Answer: C

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19. Let S be the set of all real numbers. Then the relation $R = \{(a, b) : 1 + ab > 0\}$ on S is :

A. Reflexive and symmetric but not transitive.

B. reflexive and transitive but not symmetric

C. symmctric and transitive but not reflexive

D. reflexive, transitive and symmctric.

Answer: A

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20. Let W denote the words in the English dictionary. Define the relation R by:

$R = \{(x, y) \in W \times W$, the words x and y have at least one letter in common $\}$

Then R is :

A. Not reflexive, symmetric and transitive

B. reflexive, symmetric and not transitive

C. relexive, symmetric and transitive

D. reflexive, not symmetric and transitive.

Answer: B

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21. Let R be the real line, Consider the following subsets of the plane $R \times R$:

$S = \{(x, y) : y = x + 1 \text{ and } 0 < x < 2\}$

$T = \{(x, y) : x - y \text{ is an integer}\}$.

Which one of the following is true ?

A. T is an equivalence relation on R but S is not

B. Neither S nor T is an equivalence relation on R

C. Both S and T are equivalence relations on R

D. S is an equivalence relation on R but T is not.

Answer: A

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Aieee Jee Examinations

1. Consider the following relations :

$R = \{(x, y) \mid x, y$ are real numbers and x= wy for some rational number w} :

$S = \left\{\left(\frac{m}{n}, \frac{p}{q}\right)\right\}$, m, n, p and q are integers such that $n, q \neq 0$ and $qm = pn$}. Then :

A. R is an equivalence relation but S is not an equivalence relation

B. neither R nor S is an equivalence relation

C. S is an equivalence relation but R is not an equivalence relation

D. R and S both are equivalence relations

Answer:

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Rcqs

1. Let R be an equivalence relation defined on a set containing 6 elements. The minimum number of orderded pairs that R should contain is :

A. 36

B. 64

C. 6

D. 12

Answer: C

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2. Define a relation R on A ={1,2,3,4} as xRy iff x divides y. Then R is :

A. reflexive and transitive

B. reflexive and symmetric

C. symmetric and transitive

D. equivalence

Answer: A

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3. Let S be the set of all real numbers. A relation R has been defined on S by a Rb $\Rightarrow |a-b| \leq 1$, then R is

A. reflexive and transitive but not symmetric

B. an equivalence relation

C. symmetric and transitive but not reflexive

D. reflexive and symmetric but not transitive

Answer: D

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4. For any two real numbers, an operation $*$ defined by $a * b = 1 + ab$ is

A. commutative but not associative

B. associative but not commutative

C. neither commutative nor associative

D. both commutative and associative

Answer: A

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5. In a group $Q - \{-1\}$ under binary operation '+' defined by $a^{*}b = a + b + ab$, then inverse of 10 is :

A. $\frac{1}{10}$

B. $\frac{11}{10}$

C. $-\frac{11}{10}$

D. $\frac{-10}{11}$

Answer: D

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6. If the operation $\oplus$ is defined by $a \oplus b = a^2 + b^2$ for all real numbers 'a' and 'b' then $(2 \oplus 3) \oplus 4$ = _____

A. 181

B. 182

C. 184

D. 185

Answer: D

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