MASTER’S P.U COLLEGE, HASSAN, 573201.

KCET ONLINE TEST-22, MAY-2020  **MATHEMATICS** **TIME: 45Mins MARKS: 30**

**TOPIC**: **SETS, RELATIONS & FUNCTIONS.**

**KEY**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **A** | **B** | **B** | **D** | **B** | **A** | **C** | **C** | **C** | **A** | **D** | **D** | **A** | **A** | **D** |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| **A** | **D** | **C** | **D** | **D** | **B** | **A** | **B** | **D** | **D** | **D** | **D** | **C** | **C** | **A** |

**HINTS AND SOLUTIONS**

1. (a) Since 



,



  is a multiple of 49 for 

For , ;

For  

  is a multiple of 49 for all 

 *X* contains elements which are multiples of 49 and clearly *Y* contains all multiplies of 49.  .

1. (b) 

= {12, 24, 36......} = .

**Trick :**  [ 3, 4 are relatively prime numbers].

1. (b) *n*(*A* ∪ *B*) = *n*(*A*) + *n*(*B*) – *n*(*A* ∩ *B*) = 

Since, maximum number of elements in 

 Minimum number of elements in .

1. (d) *A* = Set of all values (*x, y*) : 



*x*2 + *y*2 = 52

*B* =  *i.e.,*  + .

Clearly, *A* ∩ *B* consists of four points.

1. (b) *A* – *B* = *A* ∩ *B*c = *A* ∩ .
2. (a) Clearly, *A* = {2, 3}, *B* = {2, 4}, *C*  = {4, 5}

*B* ∩ *C*  = {4}  *A*  × (*B* ∩ *C*) = {(2, 4); (3, 4)}.

1. (c) Let number of newspapers be *x*. If every students reads one newspaper, the number of students would be 

Since, every students reads 5 newspapers

∴ Numbers of students , .

1. (c) Here *A* and *B* sets having 2 elements in common, so  and  have  *i.e.*, 4 elements in common.

Hence, .

1. (c) ,  .
2. (a)  

 *R*is reflexive.

Again *a R b* ⇒ 

 *R* is symmetric, Again  and  but 

 *R*is not anti-symmetric.

Further, 1 *R* 2 and 2 *R* 3 but , []

**** *R* is not transitive.

1. (d) Since.  Relation  is reflexive.

Since 

 Relation  is transitive.

But ⇒,  Relation is not symmetric.

1. (d) Since *n* | *n* for all , therefore *R* is reflexive. Since 2 | 6 but , therefore *R* is not symmetric.

Let *n R m* and *m R p* ⇒ *n*|*m* and *m*|*p* ⇒ *n*|*p* ⇒ *nRp*. So, *R* is transitive.

1. (a) Let  and *R* = {(1, 1), (1, 2)}, *S* = {(2, 2) (2, 3)} be transitive relations on *A*.

Then *R* ∪ *S* = {(1, 1); (1, 2); (2, 2); (2, 3)}

Obviously, *R* ∪ *S* is not transitive. Since (1, 2)  *R* ∪ *S* and  but (1, 3) .

1. (a) We first find  we have . We now obtain the elements of  we first pick the element of *R* and then of . Since  and , we have 

Similarly, 











Hence,{(1, 1); (4, 4); (4, 7); (7, 4), (7, 7); (3, 3)}.

1. (d) On the set *N* of natural numbers,

.

Since as . So, *R* is not reflexive.

but . So *R* is not symmetric (20, 1)

(1, 39 . But , So *R* is not transitive.

1. (a) ⇒ 

⇒ 

⇒  ⇒ .

1. (d) 

Put ⇒ 

Put  ⇒ 

Similarly  and so on

 = .

1. (c) By verification, 

Hence .

1. (d) Here, 

Thus,  which is neither continuous nor derivable at 0. Note that



and .

∴ , ∴ *f* is not derivable at .

1. (d)  ⇒  ⇒ .

This is true for .

1. (b) [*x*] denotes the integral part of *x*. Hence, after term  each term will be one. Hence the sum of given series will be 50.
2. (a) Since domain of *f* and domain of composite function *gof* are same.
3. (b)  *i.e.*, 

 ⇒ ⇒ 

Again  ⇒  ⇒ 

All these can be combined as  and .

1. (d) ; *y* is real, if  ⇒ 

⇒ ⇒ 

1. (d) 



∴ , so range of .

1. (d) For to be defined, 

; 

∴ ⇒ 

So, the range of function .

1. (d)  

 

  ....(i)

and  

 .....(ii)

From (i) and (ii), .

1. (c) 

 and ,  .

 \* is not commutative on *R*.

Next, 



 

 *o* is not commutative



  on  is commutative.

1. (c) Since a binary operation on *S* is a function from *S* × *S* to *S*, therefore the total number of binary operations on *S* is the total number of functions from *S* × *S* to *S*, which is .
2. (a) We have 

So, \* is commutative on *R*.

For any, *a, b, c*  *R*, we have 

and 

 

So, \* is not associative on *R*.