CBT CLASS XII MATHS APRIL 2024

GENERAL INSTRUCTION :
CHAPTER: RELATIONS AND FUNCTIONS

Sr.No	Question	Marks
	Farmers plant sapling along straight lines parallel to each other as in figure. Let us assume that saplings are planted along the line y = x +1 and parallel to it. Let L be the set of all lines on the field *Answer the following using the above information* 	
1	R_1 **be a relation defined on L as** $R_1 = \{(l_1, l_2): l_1 \parallel l_2$, **where** $l_1, l_2 \in L\}$ **then** R_1 **is ……..** (a) **Equivalence relation** (b) **Only Reflexive** (c) **Not reflexive** (d) **Symmetric but not transitive**	1
2	**Which of the following line is related the line y=x+1 as per definition of the relation** $R1$ (a) **2x – y + 5=0** (b) **2x + y=5** (c) **2x - 2y=10** (d) **x + y=1**	1
3	R_2 **be a relation defined on L as** $R2 = \{(l_1, l_2): l_1 \perp l_2$, **where** $l_1, l_2 \in L\}$ **then** R_2 **is ……..** (a) **Symmetric but neither Reflexive nor Transitive** (b) **Reflexive and Symmetric but not Transitive** (c) **Reflexive but neither Symmetric not Transitive** (d) **R is an Equivalence Relation**	1
4	**If set L contain only three such lines l1 ,l2, and l3 then how many relation can be define** (a) 2^6 (b) 2^9 (c) 2^3 (d) 2^0	1
	Case Study 2: Consider the mapping f:A→B is defined by $f(x) = \frac{x-1}{x-2}$ **such that f is a bijection** **Based on the above information answer the following questions.**	
5	Domain of *f* is (a) $R - \{2\}$ (b) R (c) $R\text{-}\{1,2\}$ (d) $R - \{0\}$	1
6	Range of *f* is (a) R (b) $R-\{1\}$ (c) $R\text{-}\{0\}$ (d) $R - \{1,2\}$	1
7	*g:* $R - \{2\} \to R - \{1\}$ is defined by *g(x)* = 2 *f(x)* -1 then, *g(x)* in terms of *x* is (a) $\frac{x+2}{x}$ (b) $\frac{x+1}{x-2}$ (c) $\frac{x-2}{x}$ (d) $\frac{x}{x-2}$	1
8	**Que.8.** A function *f(x)* is said to be one-one iff (a) $f(x_1) = f(x_2) \Rightarrow -x_1 = x_2$ (b) $f(-x_1) = f(-x_2) \Rightarrow -x_1 = x_2$ (c) $f(x_1) = f(x_2) \Rightarrow x_1 = x_2$ (d) None of these	1

	Directions: (Q.9 – Q.10) Each of these questions contains two statements: **Assertion (A) and Reason (R).** Each of these questions also has four alternative choices, any one of which is the correct answer . You have to select one of the options **(a) , (b) , (c) and (d) given below :** **(a) A is true , R is true and R is a correct explanation for A** **(b) A is true , R is true and R is not a correct explanation for Assertion** **(c) A is true and R is false** **(d) A is false and R is true**	

9	**Assertion: R₁ = { (1,1),(2,2),(3,3), (1,2),(2,3)} is a transitive relation**
	          Reason : A relation R on set A is transitive if aRb and bRc ⇒ aRc
	
	          a b c d
		1

10	**Assertion: Relation R in the set Z of integers given by R = {(a, b) : 2 divides a – b} is an equivalence relation.**
	     Reason : Equivalence Class containing 0 is shown by [0] = {.....-4,-2,0,2,4,....}
	
	     a b c d
		1

Answer Key

Ans1	**(a)**
Feedback	*Option a is correct, Since R1 is Reflexive Symmetric and Transitive so R1 is equivalence relation*
Ans2	**(c)**
Feedback	*Option C is Correct, Since slope of given line y=x+1 is 1 and slope of line 2x-2y =10 is also 1*
Ans3	**(a)**
Feedback	*Option a is correct, Since relation R2 is* **Symmetric but neither Reflexive nor Transitive**
Ans4	**(b)**
Feedback	*Option b is correct, Since total elements in L X L are 9 and no. of relations are 2^9*
Ans5	*(a)*
Feedback	*Option a is correct, Since f(x) is define all x except x=2 so domain = R-{2}*
Ans6	*(b)*
Feedback	*Option b is correct, Since for all x except 2, f(x) is not equal to 1 so range is R – {1}*
Ans7	**(d)**
Feedback	*Option d is correct, Since by putting value of f(x) in g(x) we will get g(x) = x/(x-2)*
Ans8	**(c)**
Feedback	*Option c is correct, Since f(x_1) = f(x_2) ⇒ x_1 = x_2*
Ans9	*(d)*
Feedback	*Option (d) is correct, since Assertion is false, (Here relation is not transitive) and Reason is true*
Ans10	*(b)*
Feedback	*Correct option is (b), since R is equivalence relation and reason (equivalence class of zero is also correct) is also correct but reason is not explaining scalar product*