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Class: 10

1 = 14

# Sri Vinayaga Tuition centre

## anaimalai

## WEEKLY TEST II (CH 1)

MATHEMATICS

Total Marks: 100 Marks Duration: 3 Hrs

# SEC I

### **CHOOSE THE CORRECT ANSWERS**

1.	Let f and g be two functions given by				
	$\mathbf{f} = \{(0,1), (2,0), (3,-4), (4,2), (5,7)\}$				
	$g = \{(0,2), (1,0), (2,4), (-4,2), (7,0)\}$ then the range of $f \circ g$ is				
	a) {0,2,3,4,5}	b) {-4,1,0,2,7}	c) {1,2,3,4,5}	d) $\{0,1,2\}$	
2.	If there are 1024 relations from a set $A = \{1, 2, 3, 4, 5\}$ to a set B, then the number of				
	elements in B is				
	a) 3	b) 2	c) 4	d) 8	
3.	The range of the relation $R = \{(x, x^2) \mid x \text{ is a prime number less than } 13\}$ is				
	a) {2,3,5,7}		b) {2,3,5,7,11}	b) {2,3,5,7,11}	
	c) {4,9,25,49,121	}	d) {1,4,9,25,49	9,121}	
4	If $\{(a,8),6,b\}$ rep	resents an identity	ty function, then the value of a and b are		
	respectively	2			
	a) (8,6)	b) (8,8)	c) (6,8)	d) (6,6)	
5.	$f(x) = (x + 1)^3 - (x - 1)^3$ represents a function which is				
	a) linear	b) cubic	c) reciprocal	d) quadratic	
6.	A = {a,b,p}, B = {2,3}, C = {p,q,r,s} then n[(A \cup B) \times B] is				
	a) 8	b) 20	c) 12	d) 16	
7.	If the ordered pairs $(a + 2,4)$ and $(5,2a + b)$ are equal then $(a,b)$ is				
	a) (2, -2)	b) (5,1)	c) (2,3)	d) (3, -2)	
8. If $A = \{1,2\}$ , $B = \{1,2,3,4\}$ , $C = \{5,6\}$ and $D = \{5,6,7,8\}$ then state				then state which of the	
	following statement is true.				
	a) $(A \times C) \subset (B \times D)$		b) $(\mathbf{B} \times \mathbf{D}) \subset (\mathbf{A} \times \mathbf{D})$	b) $(B \times D) \subset (A \times C)$	
	c) $(A \times B) \subset (A \times D)$ d		d) $(D \times A) \subset (A)$	d) $(D \times A) \subset (B \times A)$	
9.	Let $A = \{1,2,3,4\}$ and $B = \{4,8,9,10\}$ . A function f: $A \rightarrow B$ given by $f = \{(1,4), \dots, (1,4)\}$ .				
	$(3,9),(4,10)$ } is a				
	<ul><li>a) Many-one function</li><li>c) One-to-one function</li></ul>		b) Identity fun	b) Identity function	
			d) Into function	d) Into function	
10. Let $n(A) = m$ and $n(B) = n$ then the total number of non-empty re-				n-empty relations that can be	
	defined from A to B is				
	a) m <sup>n</sup>		b) n <sup>m</sup>		
	c) 2 <sup>mn</sup> - 1		d) 2 <sup>mn</sup>		
			/		

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www.Padasalai.Net www.Trb Tnpsc.Com 11. Let  $f(x) = \sqrt{1 + x^2}$  then a)  $f(xy) = f(x) \cdot f(y)$ b)  $f(xy) \ge f(x) \cdot f(y)$ d) None of these c)  $f(xy) \le f(x) \cdot f(y)$ 12. Find k if  $f \circ f(k) = 5$  where f(k) = 2k - 1? a) 1 b) 2 c) 3 d) 4 13. A function  $f: R \to R$  defined by  $f(x) = ax^2 + bx + c$ ,  $(a \neq 0)$  is called a b) Quadratic Functions a) Linear Functions c) Cubic Functions d) Reciprocal Functions 14. If  $f(x) = x^2 + 5$ , then f(-4) =\_\_\_\_\_. b) 21 a) 26 c) 20 d) -20 **SEC-II**  $10 \ge 2 = 20$ Answer any 10 questions (Q.no 28 compulsory) 15. A function f is defined by f(x) = 2x - 3find  $\frac{f(0)-f(1)}{2}$ . 16 Find  $A \times B$ ,  $A \times A$  and  $B \times A$  $A = \{m, n\}; B = \phi$ 17. The functions f and g are defined by f(x) = 6x + 8; g(x)Calculate the value of  $gg(\frac{1}{2})$ 18. A function f is defined by f(x) = 2x - 3find x such that f(x) = f(1 - x). 19. Find  $A \times B$ ,  $A \times A$  and  $B \times A$  $A = \{2, -2, 3\}$  and  $B = \{1, -4\}$ 20. Represent the function  $f = \{(1,2), (2,2), (3,2), (4,3), (5,4)\}$  through an arrow diagram. 21. Let  $A = \{x \in \mathbb{N} | 1 < x < 4\}\,, \ B = \{x \in \mathbb{W} | 0 \leq x < 2\} \ and \ C = \{x \in \mathbb{N} | 0 \leq x < 2\}$ Then verify that  $A \times (B \cup C) = (A \times B) \cup (A \times C)$ 22. If  $A = \{1,3,5\}$  and  $B = \{2,3\}$  then Show that  $n(A \times B) = n(B \times A) = n(A) \times n(B)$ 23. Given  $f(x) = 2x - x^2$ , find (i) f(x+1) (iii) f(x) + f(1)24. Given the function  $f: x \rightarrow x^2 - 5x + 6$ , evaluate f(x - 1)25. A function f is defined by f(x) = 3 - 2x. Find x such that  $f(x^2) = (f(x))^2$ . 26. If f(x) = 3x - 2, g(x) = 2x + k and if  $f \circ g = g \circ f$ , then find the value of k. 27. Let  $A = \{1,2,3,4\}$  and  $B = \mathbb{N}$ . Let  $f: A \to B$  be defined by  $f(x) = x^3$  then. Identify the type of function 28. Let  $X = \{1, 2, 3, 4\}$  and  $Y = \{2, 4, 6, 8, 10\}$  and  $R = \{(1,2), (2,4), (3,6), (4,8)\}$ . Show that R is a function and find its domain, co-domain and range? **SEC III** 

Answer any 10 questions (Q.no 42 compulsory)  $10 \times 5 = 50$ 

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X

29. Consider the functions f(x), g(x), h(x) as given below. Show that (f • g) • h = f • (g • h) in each case.

f(x) = x - 1, g(x) = 3x + 1 and  $h(x) = x^2$ 

- 30. Let A = {1,2,3,4} and B = {2,5,8,11,14} be two sets. Let f : A → B be a function given by f(x) = 3x 1. Represent this function
  (i) by arrow diagram (ii) in a table form
  (iii) as a set of ordered pairs (iv) in a graphical form
- 31.

If the function  $f:\mathbb{R} o\mathbb{R}$  is defined by  $f(x)=egin{cases} 2x+7, & x<-2\ x^2-2, & -2\leq x<3\ 3x-2, & x\geq 3 \end{cases}$ 

then find the values of

(i) f(4) (ii) f(-2) (iii) f(4) + 2f(1) (iv) 
$$\frac{f(1)-3f(4)}{f(-3)}$$

- 32. A company has four categories of employees given by Assistants (A), Clerks (C), Managers (M) and an Executive Officer (E). The company provide 10,000, 25,000, 50,000 and 1,00,000 as salaries to the people who work in the categories A, C, M and E respectively. If A<sub>1</sub>, A<sub>2</sub>, A<sub>3</sub>, A<sub>4</sub> and A<sub>5</sub> were Assistants; C<sub>1</sub>, C<sub>2</sub>, C<sub>3</sub>, C<sub>4</sub> were Clerks; M<sub>1</sub>, M<sub>2</sub>, M<sub>3</sub> were managers and E<sub>1</sub>, E<sub>2</sub> were Executive officers and if the relation R is defined by xRy, where x is the salary given to person y, express the relation R through an ordered pair and an arrow diagram.
- 33. In each of the following cases state whether the function is bijective or not. Justify your answer.
  (i) f: ℝ → ℝ. defined by f(x) = 2x + 1 (ii) f: ℝ → ℝ. defined by f(x) = 3 4 x<sup>2</sup>
- 34. Given A={1,2,3}, B = {2,3,5}, C = {3,4} and D = {1,3,5}, check if  $(A \cap C) \times (B \cap D) = (A \times B) \cap (C \times D)$  is true?
- 35. Let f be a function  $f : \mathbb{N} \to \mathbb{N}$  be defined by  $f(x) = 3x + 2, x \in \mathbb{N}$ 
  - (i) Find the images of 1, 2, 3
  - (ii) Find the pre-images of 29, 53
  - (iii) Identify the type of function
- 36. Show that the function  $f : \mathbb{N} \to \mathbb{N}$  defined by  $f(m) = m^2 + m + 3$  is one-one function.
- 37. Consider the functions f(x), g(x), h(x) as given below. Show that  $(f \circ g) \circ h = f \circ (g \circ h)$  in each case.

f(x) = x - 4,  $g(x) = x^2$  and h(x) = 3x - 5

38. Represent each of the given relations by (a) an arrow diagram, (b) a graph and (c) a set in roster form, wherever possible.

 $\{(x,y)|x = 2y, x \in \{2,3,4,5\}, y \in \{1,2,3,4\}$ 

39. Let  $A = \{x \in \mathbb{W} | x < 2\}$ ,  $B = \{x \in \mathbb{N} | 1 \le x < 4\}$  and  $C = \{3, 5\}$ . Then verify that

 $(\mathbf{A} \cup \mathbf{B}) \times \mathbf{C} = (\mathbf{A} \times \mathbf{C}) \cup (\mathbf{B} \times \mathbf{C})$ 

40. A Relation R is given by the set  $\{(x,y)/y = x + 3, x \in \{0,1,2,3,4,5\}\}$ . Determine its domain and range.

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- 41. Let  $A = \{x \in \mathbb{N} | 1 < x < 4\}, B = \{x \in \mathbb{W} | 0 \le x < 2\} \text{ and } C = \{x \in \mathbb{N} \}$ Then verify that (i)  $A \times (B \cup C) = (A \times B) \cup (A \times C)$ (ii)  $A \times (B \cap C) = (A \times B) \cap (A \times C)$ 42. A function f: [-7, 6]  $\rightarrow 4$  R is defined as follows. 42. A function f: [-7, 6]  $\rightarrow 4$  R is defined as follows. 43.  $f(x) = \begin{cases} x^2 + 2 + 1 & -7 \le x < -5 \\ x + 5 & -5 \le x \le 2 \\ x - 1 & 2 < x < 6 \\ find (i) 2f(-4) + 3f(2) (ii) f(-7) - f(-3) f(-3) \\ sec IV \end{cases}$ ANSWER THE FOLLOWING QUESTIONS 2 X 8 = 16
- 43. Construct a triangle similar to a given triangle PQR with its sides equal to  $\frac{7}{4}$  of the corresponding sides of the triangle PQR (scale factor  $\frac{7}{4} > 1$ ).
- 44. Construct a triangle similar to a given triangle PQR with its sides equal to  $\frac{2}{3}$  of the corresponding sides of the triangle PQR (scale factor  $\frac{2}{3} < 1$ ).