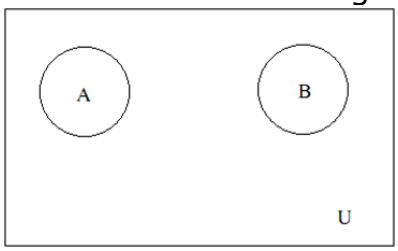
THE VILLAGE
INTERNATIONAL SCHOOL
"We Nurture Dreams"

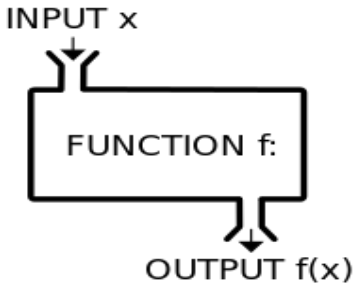
GRADE: XI Date:	MONTHLY TEST -01 (2023-24) APPLIED MATHEMATICS (241)	Marks: 20 Time: 50 minutes

Name:

Class & Section:

Q.No.	Questions	Mark
	SECTION A	
1	Let U = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}, P = {1, 2, 5}, Q = {6, 7}. Then P ∩ Q′ is : (a) P (b) Q (c) Q′ (d)U	**1**
2	The cardinality of the subset set of {x: x∈N, x≤10} is _____. (a) 1024 (b) 1023 (c) 2048 (d) 2043	**1**
3	If $A = \{a, b, c\}$, B= $\{b, c, d\}$, C= $\{a, d, c\}$, then $(A - B) \times (B \cap C)$= (a)$\{(a, c), (a, d)\}$ (b)$\{(a, b), (c, d)\}$ (c) $\{(c, a), (a, d)\}$ $(d)\{(c, a), (a, d), (b, d)\}$	**1**
4	The third term of a GP is 4.The product of the five terms is: (a)4^3 (b)4^4 (c)4^5 (d)4^6	**1**

5	Which of the following statement is correct?  a) A is subset of B b) B is subset of A c) U is subset of A and B d) A and B are subsets of U	**1**
	SECTION B	
6	Find the sum of the series 6 + 66 + 666 + …….upto n terms.	**2**
7	Let A =$\{1,2,3,4,5,6\}$.Let R be the relation defined on A by $\{(a,b): a,b \in A, b \text{ is exactly divisible by } A\}$ (1) Write R in roster form (2) Find the domain, co-domain, range of R.	**2**
8	(1)Let A = { {a},b,{c, d},e}. Insert the appropriate symbol $\in$ or $\subset$ in the blank spaces. (b) {c,d}-------- A (c) {{a},b} --------- A (2)Write the interval (-2 , 2] in set builder form and represent it on the number line .	**2**
	SECTION C	
9	Let U = {x : x $\in$ N, x $\leq$ 9}; A = {x : x is an even number, 0 < x < 10}; B = {2, 3, 5, 7} and c= $\{1,2,4,7\}$ Find : (1) (A U B)' (2) (B – A) $\cap$ (A – C)	**3**

10	Answer the following questions: (1)One day you saw an awesome video on YouTube. At 1pm you shared a video link to 5 unique people. Then at 2pm each of your friends shared it to 5 unique people. Then at 3pm each of their friends shared it with 5 unique people. If it this pattern kept happening, then how many unique people received this link by 6 pm. (2)An insect population is growing in such a way that each generation is 2.5 times as large as the previous one. If there are 10,000 insects in the first generation, how many are there in the 5th generation.	**3**
11	**<u>Case Study:</u>** Let f and g be two real functions defined by : $f(x) = \sqrt{x-1}$ and $g(x) = 3 - 2x$.  Based on the above information ,answer the following questions:: (a) Find the domain of f(x). (b) Find the domain of $\frac{1}{g(x)}$ (c) Find the domain of $\frac{g}{f}(x)$	**3**

1) P
2) 1024
3) (a)$\{(a,c),(a,d)\}$
4) (c)4^5
5) d) A and B are subsets of U
6) We need to find Sn=6+66+666+...to n terms
   Sn=6(1+11+111+....to n terms)
   $=\frac{6}{9}$(9+99+999+....to n terms)
   $=\frac{6}{9}$[(10−1)+(100−1)+(1000−1)+.... to n terms]
   $=\frac{6}{9}$[(10+10^2+10^3+....n terms)−n]
   Thus, Sn=$\frac{6}{81}$[(10[10^n −1)−n]
7) A={1,2,3,4,6}
   R={(a,b):a,b∈A,b is exactly divisible by a}
   (i) R={(1,1),(1,2),(1,3),(1,4),(1,6),(2,2),(2,4),(2,6),(3,3),(3,6),(4,4),(6,6)}
   (ii) Domain of R={1,2,3,4,6}
   Range of R={1,2,3,4,6}
   Codomain = A
8) (1) (a) {c,d} ∈ A
   (b) {{a},b} ⊂ A
   (2){$x: x \in$ R, $-2 < x \leq 2$}
9)U= {1,2,3,4,5,6,7,8,9}
   $A = \{2,4,6,8\}$
   B = {2, 3, 5, 7} and c= {1,2,4,7}
   1) (A U B)={2,3,4,5,7,8}
   (A U B)'= {1,9}
   2) (B – A)={3,5,7}
   (A – C)={6,8}
   (B – A) ∩ (A – C)={}
10) (1)GP is 5,25,125,…..
   a=5 , r=5

$S_6 = \frac{5(5^6-1)}{5-1} = \frac{78120}{4} = 19530$

(2) a =10,000 r =2.5

$a_5 = ar^4 = 10{,}000 \times 2.5^4$

$= 39.0625 \times 10{,}000$

$= 390625$

11) $(a)[1, \infty)$

(b) $R - \{\frac{2}{3}\}$

(c) $(1, \infty)$