Practice Problems

(Set Theory)

Q.1 Let A = {{, {,}}, {{{}, }}}. Which of the following are true?  
1. A 2. {, {}} A 3. {, {}} A  
4. {{{}, }} A 5. {{ {}}} A

**(A) 2, 4, 5** (B) 2, 4 (C) 1, 3 (D) 1, 3, 4

Q.2 If A-B {1, 5, 7, 8}, B-A = {2, 10} and A B = {3, 6, 9}. What are A and B?

(A) A = {1, 3, 7, 8, 9}, B = {2, 3, 6, 9, 10} **(B) A = {1, 3, 5, 6,7,8 9}, B = {2, 3,6,9, 10}**

(C) A = {2,3,6,9,10}, B = {1, 3, 5, 6,7,8,9} (D) A = {1, 3, 5, 6}, B = {2, 3, 6}

Q.3 If A = {1,2} and B = {1,2,{1,2}}, then which of the following is true?  
**(A) A B and A B**  (B) A B and A B

(C) A B and A B (D) A B and A B

Q.4 Let A = {1, 2, 4, 5}, B = {1, 3, 4, 8} and C = {1, 2, 3, 5, 7}. Exactly which of the `following statements are true?   
(i) A – (B C) = {2, 4, 5}. **(ii) B (A – C) = {4}.**(iii) A U B) – (A U C) = {4, 8}. (iv) (A – B) – C = .

(A) (i) , (iii) (B) (i), (ii), (iv) (C) (i), (ii), (iii) (D) (i), (iii), (iv)

Q.5 Suppose that A U B = {1, 2, 3, 4, 5, 6, 7, 8}, A-B = {1, 3, 7}, and B-A = {2, 6, 8}. Then   
(A) A = {1, 3, 4, 5, 7} and B = {6, 7, 8} **(B) A = { 1,3,4,5,7} and B = {2,4,5,6,8}**

(C) A = {1,2,3,6,7,8} and B = {2,4,6,8} (D) A = {1,3,7} and B = {2, 4, 6, 8}.

**For the next two questions** let Universe U = {1, 2, 3, 4, 5}, set A = {1, 2, 3}, set B = {3, 5, 1} and set C = {1, 2}.

Q.6 Which of the following is true?

(A) |A x B| = 6 (B) | (A x B) x (C x B) | = 10

**(C) |(A – B) U C| = 2**  (D) None of the above

Q.7 Which of the following is false?

(A) |(U – A) x B| = 6 (B) |B – (A – C)| = 2 **(C) |A U C| = 2** (D) None of the above.

Q.8 True of false  
 (i) { , {,{}}} (ii) {} (, {, {}}}  
 (iii) {} { , { , {}}} (iv) {1, {1,2} P({1,2,3})  
 (v) P({}) = { , { , {}}} (vi) {{4}} {2,3, {4}}

(A) (i), (iii), (iv) (v) **(B) (i), (iii), (vi)** (C) (ii), (iii), (v) (D) (i), (iv), (vi)

Q.9 The statement P(A B) = P(A) P(B)

**(A) Always true** (B) Always False (C) Sometime true (D) none

Q.10 The set S is defined by 4 S and s.t S, whenever s S and t S. Which of the following elements does NOT belong to S?

(A) 16 **(B) 32**  (C) 64 (D) 256

Q.11 Which of the following is false?

(A) {x} {x} (B) {x } {x, {x}} (C) {x} {x, {x}}

**(D) {x} P({x}), where P({x}) is the power set of {x}**

Q.12 let X = {4, 8, 15, 16, 23, 42}. Which of the following is a partition of X?

**(A) ({4, 16}, {8, 15, 23}, {42})** (B) {{4, 16, 42, 4}, {15}, {4, 8, 23}}

(C) {(4, 8), (15, 23, 42)} (D) {4, 8, 15, 16, 23, 42, 25}

Q.13 Consider a universe U = {1,2,3,…,10}. Let A = {1,4,7,10}, B = {1,2,3,4,5}, and C = {2,3,6,8}. Which of the following is correct?

(A) AB={1,4,5,7,10} (B) BC={2,3,4}

(C) C ={2,3,4,5,6,8,9,10} **(D) (AB)-C = {1,4}**

Q.14 Which of the following set does not exist?

(A) Set A such that P(A) has 64 elements.

(B) Sets A and B such that A B and P(B) P(A)

**(C) Set A such that P(A) =**

(D) Sets A, B and C such that A B, B C and P(A) P(C)

Q.15 Given a set A = {x, y, z} and a set B = {1, 2, 3, 4}, what is the value of | 2A × 2B |?

**(A) 128**  (B) 8 (C) 16 (D) 64

Q.16 Given a set S, exactly which of the following are true for all subsets A, B and C of S?

(i) A B if and only if A B = A. (ii) A B if and only if B – A = .

(iii) A B = A C implies B = C. (iv) A – Bc = A U B.

1. **i only** (B) (i), (ii), (iii) (C) (i), (ii), (iv) (D) (i), (iii)

Q.17 Exactly which of the following statements are true for all sets A, B and C?  
(i) (A U B) – (B U C) = A – C.   
(ii) If A C, then (A B) U C = C.  
(iii) A U (B C) = A U B) C

(A) (i), (iii) **(B) (ii)**  (C) (i), (ii), (iii) (D) (i)

Q.18 Given a set S, exactly which of the following is not true for all subsets A, B and C of S?

(A) B if and only if A B = . (B) A B if and only if A U B = B.

**(C) A – B = A – C implies B = C.** (D) A B= and AU B = S implies A = Bc

Q.19 (A B) U (A’ B) U (A’ B’) is equivalent to:

(A) A U B **(B) A’ U B** (C) A’ U B’ (D) A’ B’

Q.20 Which of the following statements is false?

**(A) Every even integer is the sum of two distinct odd integers.**

(B) Let A, B, C be sets. If A x C = B x C then A = B.

(C) If a Z is even and b Z is odd, then a + 2b is even and 2a + b is odd.

(D) None of the above are false.