

**I/IV-B.Tech-(ODD Sem), Academic Year: 2023-2024**

**B. Tech. (AIDS,CSE,CSIT,ECE), 2023 Batch I/IV, ODD Semester**

**Subject Code: 23MT1002**

**TITLE: Discrete Structures**

**CO-1: Home Assignment Problems**

* 1. Let S={4, 5, 6}. Write all the possible partitions of S?
  2. In a survey of 80 people, it was found that 35 people read newspaper H, 20 read newspaper T, 15 read the newspaper I, 5 read both H and I, 10 read both H and T, 7 read both T and I, 4 read all three newspapers. Find the number of people who read at least one of the newspapers?
  3. In a school, all pupils play either Hockey or Football or both. 400 play Football, 150 play Hockey, and 130 play both the games. Find

(i) The number of pupils who play Football only,

(ii) The number of pupils who play Hockey only,

(iii) The total number of pupils in the school.

* 1. In a town 85% of the people speak Tamil, 40% speak English and 20% speak Hindi. Also 32% speak Tamil and English, 13% speak Tamil and Hindi and 10% speak English and Hindi, find the percentage of people who can speak all the three languages.
  2. At a certain conference of 100 people there are 29 Indian women and 23 Indian men. Out of these Indian people 4 are doctors and 24 are either men or doctors. There are no foreign doctors. Find the number of women doctors attending the conference(ans;1)
  3. In a survey of university students, 64 had taken mathematics course, 94 had taken chemistry course, 58 had taken physics course, 28 had taken mathematics and physics, 26 had taken mathematics and chemistry, 22 had taken chemistry and physics course, and 14 had taken all the three courses. Find how many had taken one course only.(Ans:m=24,c-60,p=22)
  4. There are 350 farmers in a large region. 260 farm beetroot, 100 farm yams, 70 farm radish, 40 farm beetroot and radish, 40 farm yams and radish, and 30 farm beetroot and yams. Let B, Y, and R denote the set of farms that farm beetroot, yams and radish respectively.Determine the number of farmers that farm beetroot, yams, and radish
  5. Show that f: R – {0} → R – {0}: f(x) = 1/x is a bijection.
  6. Let *A*= {−1,1} and B= {0, 2}. If the function f: *A*→ *B* defined by *f*(*x*) = *ax*+ *b*is an onto function? Find *a*and *b.*
  7. If *f*(*x*) = *x*2, *g*(*x*) = 3*x*and *h*(*x*) = *x*− 2, Prove that (*f*o *g*) o *h*= *f*o (*g*o *h*).
  8. Find *f*o *g*and *g*o *f* when *f*(*x*) = 2*x*+ 1 and *g*(*x*) = *x*2 – 2.
  9. If *f*(*x*) = 3*x*− 2, *g*(*x*) = 2*x*+ *k* and if *f*o *g*= *g*o *f,* then find the value of *k*
  10. The distance *S*an object travels under the influence of gravity in time *t*seconds is given by *S*(*t*) = 1/2 *gt*2 + *at*+ *b,*where *g*is the acceleration due to gravity and *a*, *b*are constants. Check if the function *S*(*t*) is one-one.
  11. A set of integers, a relation R is defined by xRy if and only if x-y is divisible by 4, then verify R is an equivalence relation.
  12. Examine that the relation R is an equivalence relation in the set A = { 1, 2, 3, 4, 5 } given by the relation R = { (a, b)/|a-b| is even }.
  13. Construct the Hasse Diagram for (P (S), ⊇), where P (S) is the power set of a set S={ 1,2,3}
  14. Draw the Hasse diagram representing the partial ordering {(a, b) |a divides b} on {1, 2, 3, 4, 6, 8, 12}.
  15. Draw the Hasse diagram for the set of all divisors of 30 with respect to usual divisibility.
  16. Construct the Hasse Diagram for ({1, 3, 6, 9, 12}, |)