

## UNIVERSITY OF PETROLEUM &amp; ENERGY STUDIES, DEHRADUN

Program	B. Tech SCS	Semester	II
Course	Mathematics II	Course Code	MATH 1005
Session	Jan-May 2018	Topic	Posets and Lattices

1. Consider a set  $S = \{a, b, c\}$ . Is the relation of set inclusion " $\subseteq$ " is a partial order relation on  $P(S)$ , where  $P(S)$  is power set of  $S$ ?
2. Let  $A = \{4, 5, 6, 7\}$ , and  $R$  be the relation " $\geq$ " on  $A$ . Draw the Hasse diagram of  $R$ .
3. Consider the set  $A = \{\{2\}, \{4\}, \{6\}, \{2, 4\}, \{6, 4\}, \{2, 4, 6\}\}$ . Draw the Hasse diagram of  $A$  under the set inclusion relation " $\subseteq$ ".
4. Draw the Hasse diagram of a set  $A = \{1, 3, 6, 8, 12, 24, 40\}$  under divisibility relation " $|$ ".
5. Give an example of a poset which is not a well ordered set.
6. Determine the GLB and LUB of the set  $\{10, 20\}$  in the poset  $(D_{100}, /)$ .
7. Find all minimal, maximal elements, greatest and least element in the poset  $(S, /)$  if
  - a)  $S = \{2, 3, 5, 30, 60, 120, 180, 360\}$
  - b)  $S = \{1, 2, 3, 4, 6, 9\}$
8. Do GLB and LUB of the subset  $D = \{x: x \in Q \text{ and } 8 < x^3 < 15\}$  of the set of rational numbers  $Q$  with the ordering "less than equal to" exist?
9. Is  $D_{24}$  a complemented lattice? If yes, then write complement of each element of it.
10. Give an example of a lattice which is modular, distributive but not complemented.