Name - Tillyay I man servi (non) a Rolling - CSI7BTECHIIO40

ar a) yes

of (a, a) ER & (a, a) ES Reflecive: then (a,a) ERNS

Symmetric: Let (a, b) & R ns then (a, b) ER 6 (a, b) ES =) (b, a) er & (b, a) es

) (b) a) € R AS

Transitive: (Let, (a, b) 6 (b, c) & RNS They both belong R&S) (a,c) ER and (a,c) ES half, historia and difference, c), ERNS

tribarily adjust one to made and the

P) No

Egb. T. = La, b, c) Estauros Con

R = d (a, a), (b, b), (c, c), (b, c), (c, b))

S= 4(a,a),(b,b),(cc,c),(a,b),(b,a)

Since R & S are agrimalance rela

But 1000 a (a, c) & RUS

while (a,b) & (b, DERUS

: Not transitive

Q Q2 Given. O is a congruence on a lattice L Toprove: Q=b(mato) 05 a 90 $a = b \pmod{0}$ & $c = c \pmod{0}$) avc=bvc(nodo) & anc=bnc(nodo) given: Que, b, c & L () avc = bvc (mod o) and ancebre(modo) -0 (Dolase) consider (a, b, c, d &L D.t has=b (modo) & c=d(modo) Dei hound then, ave = bve (modo) (From 0) -0 6 CVB = dVb (mod t) (from O) : bvc = boadvb (modo) = -3 (200 = (CVb,) From @ 63 avc = bvd (modo) Dimilarly by duality anc=bnd(modo) Honce proved tomme

Part I g is well defined

[a] = [b]

(a) a = b (modo),

⇒ f(a) = f(b)

([b]) = g([b])

: 9 is well-defined & one one

Part 2 9 us isomorphism

g is onto

To show trek, J[N] = L/o s.t. g([N]) = k

: f is onto : . ILEL s.t

 $f(\lambda) = R \Rightarrow g(C\lambda) = f(\lambda) = k$

9 : s homomorphism:

g([a]v[b])=g[avb])

= f(avb) = f(a)vf(b)

= 9((a)) v 9 ((b))

and using duality principle, we can show the same for meet

Thus 9 is one-one of onto & homomorphism
: 9t is isomorphism

Part II (a, b) = 0

(a, b) = 0

(a, b) = 0

(b) [a] = [b] o

(c) a, b) = kn q

Part II (a) p = f

(a) a = f(1)

(b) a = f(1)

(c) a = f(1)

(d) a = f(1)

let X = <x = L | x = f(x)} Q 4. and a = Sun(X) () Sound) of To prove: f(a) = a so broad & so Nour, OEX since L'is complete Syp(X) exists because Lis complète trex, xEa $\Rightarrow \forall x \in X \quad \varphi(x) \not\subseteq \varphi(a) \quad (9sotone)$ $x \in f(x) \leq f(a)$: F(a) is upper bound : a < f(a) (since least upper bound is a) =) f(a) \le f(f(a)) (Instance) : f(a) + X $\phi \Rightarrow f(a) \leq a$

From 1 LO

: Fath such that f(a) =a