National University of Computer and Emerging Scienc

CLO #2: *Analyze energy of a system using energy equation*

[marks 2

Q1:

A steam turbine receives steam at its inlet at 3 Kg/s, 1000 Kpa, 400°C, at a height of 6m, and 40 m/s. The heat loss is 10KJ/Kg. Exit is at 100°C, at a height of 1m and 5 m/s as saturated vapor. Find out power produced and specific work done.
Now if the condenser at the output of the turbine improves its performance such that the exit state becomes 50°C, and 5 m/s as saturated vapor, keeping everything else constant. How much additional power is produced in the second case?

CLO #3: *Analyze modes of heat transfer*

Q2: **[marks =20]**

An electric water-heater has the shape of a perfect cylinder. The heating rods are present inside the heater. All the surface area of heater is covered up with insulation boards. The diameter of the water heater (excluding the insulation) is 0.2m and its length is 1.5m. The inner insulation surface is at 80°C and the outside surface is at 25°C and the board material has a conductivity of 0.09 W/m K. Find out thickness of insulation board required to limit the heat transfer loss to 200 W?
Assuming that the outside air temperature is 9°C find out heat lost through radiation. Also find out two different values of co efficient of convection ignoring heat radiation and not ignoring heat radiation.