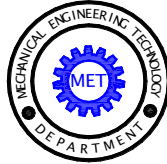


## DEPARTMENT OF MECHANICAL ENGINEERING TECHNOLOGY

## قسم تقنية الهندسة الميكانيكية



## MET 401 – Power Plant Engineering

Quiz # 1 , 2<sup>nd</sup> SEMESTER 2009/2010G (1430/31H)

Time Allowed: 50 mins

Maximum Marks: 15

Student Name: _____ I.D. No.- - - - -
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A steam power plant with inlet steam to the HP turbine at 10 MPa and 550 °C, and condensation at 40°C produces 600 MW. It has one stage of reheat optimally placed as shown in Figure 1, which raises the steam temperature back to 550°C. One closed type feedwater heater with drains cascaded back to the condenser receives bled steam at the reheat pressure which is 2 MPa, and the remaining steam is reheated and expanded in the LP turbine. The HP and LP turbines have isentropic efficiencies of 92% and 90% respectively. The isentropic efficiency of the pump is 80%. On leaving the feedwater heater, the feed water is heated to a temperature of 5°C below the saturation temperature of the bled steam. **Sketch the cycle on the *TS* diagram and calculate the following;**

- a- the mass flow rate of steam at the turbine inlet in kg/s.
- b- the cycle efficiency.



