Unit 9 - Week 7: Vapor Power Cycles

Assignment 7

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-09-18, 23:59 IST.

1) Among the followings, which one is not a consequence of irreversible expansion in a Rankine cycle? *1 point*

- reduction in cycle efficiency
- increase in turbine exit quality
- increase in pump work
- increase in heat rejection at condenser

No, the answer is incorrect.
Score: 0

Accepted Answers:
increase in pump work

2) Among the following options, which one increases both the thermal efficiency and turbine exit quality for a Rankine cycle? *1 point*

- increase in maximum cycle pressure
- increase in maximum cycle temperature
- reduction in minimum cycle pressure
- reduction in minimum cycle temperature

No, the answer is incorrect.
Score: 0

Accepted Answers:
increase in maximum cycle temperature

3) Among the following components commonly found in a steam power station, which one helps in removing dissolved gases from water? *1 point*

- open feed water heater
- closed feed water heater
- reheater
- superheater

No, the answer is incorrect.
Score: 0

Accepted Answers:
open feed water heater

4) Isentropic efficiency of a stationery steam turbine is defined as the ratio of *1 point*

- actual entropy change to the ideal entropy change
- ideal entropy change to the actual entropy change
- ideal enthalpy change to the actual enthalpy change
- actual enthalpy change to the ideal enthalpy change

No, the answer is incorrect.
Score: 0

Accepted Answers:
actual enthalpy change to the ideal enthalpy change

5) The back work ratio for a Rankine cycle with superheater and reheater is very small because *1 point*

- the steam is heated back to the maximum temperature in the reheater
- the expansion process is performed in two stages
- the quality at the exit of the low-pressure turbine is generally very high
- the pump handles only liquid phase

No, the answer is incorrect.
Score: 0

Accepted Answers:
the pump handles only liquid phase

6) Among the following desirable properties of the working fluid in a Rankine cycle, which is cannot be associated with water? *1 point*

- high critical temperature
- high saturation pressure at ambient temperature
- high enthalpy of vaporization
- easily available

No, the answer is incorrect.
Score: 0

Accepted Answers:
high saturation pressure at ambient temperature

7) A steam power plant operating on a simple Rankine cycle has boiler and condenser pressures of 3 MPa and 10 kPa respectively. If the steam leaves the boiler as saturated vapor, then the thermal efficiency of the plant (correct to 1 decimal place) is _____ %.

Hint

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 31.5,33.1

1 point

8) An ideal Rankine cycle with a boiler pressure of 3 MPa has maximum and minimum cycle temperatures of 450°C and 45°C respectively. If a Carnot cycle is also allowed to operate within the same temperature limits, then the ratio of the thermal efficiencies of the mentioned Rankine cycle and Carnot cycle (correct to 2 decimal places) is _____.

Hint

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 0.61,0.63

1 point

9) A power plant produces 25 kg/s of steam at 3 MPa, 600°C in the boiler. Reheating is done at 500 kPa till the steam temperature rises to 400°C, and subsequently the steam is expanded in the low-pressure turbine. If the condenser temperature is 45°C, then the net work output from this cycle (correct to 1 decimal place) is _____ MW.

Hint

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 34.5,35.1

1 point

10) In a steam power station, saturated vapor at 5 MPa leaves the boiler and then is superheated to 600°C in an external superheater. During the expansion through the turbine, some amount of steam is extracted at the pressure of 0.4 MPa, and is supplied to an open feedwater heater. The condition at the exit to the feedwater heater is of saturated liquid at the concerned pressure. If the condenser pressure is 7.5 kPa and net power output from the cycle is 1 MW, then the amount of heat added to the steam in the external superheater (correct to 1 decimal place) is _____ kW.

Hint

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 660,685

1 point