

TOPIC: 293005
KNOWLEDGE: K1.03 [2.6/2.7]
QID: B678

The location in a main turbine that experiences the greatest amount of blade erosion is in the _____ stage of the _____ pressure turbine.

- A. last; high
- B. last; low
- C. first; high
- D. first; low

ANSWER: B.

TOPIC: 293005
KNOWLEDGE: K1.03 [2.6/2.7]
QID: B1978 (P2678)

If the moisture content of the steam supplied to a turbine decreases, steam cycle efficiency will increase because the...

- A. enthalpy of the steam being supplied to the turbine has increased.
- B. mass flow rate of the steam through the turbine has increased.
- C. reheat capacity of the turbine extraction steam has increased.
- D. the operating temperature of the turbine blades has increased.

ANSWER: A.

TOPIC: 293005
KNOWLEDGE: K1.03 [2.6/2.7]
QID: B2678

A steam plant main turbine consists of a high-pressure (HP) unit and several low-pressure (LP) units. The main turbine is most likely to experience stress-related failures of the rotor blades in the _____ stages of the _____ unit(s).

- A. inlet; HP
- B. inlet; LP
- C. outlet; HP
- D. outlet; LP

ANSWER: D.

TOPIC: 293005
KNOWLEDGE: K1.03 [2.6/2.7]
QID: B2978 (P2278)

If the moisture content of the steam supplied to a main turbine increases, (assume no change in steam pressure, condenser pressure, or control valve position) turbine work will...

- A. decrease, because the enthalpy of the steam being supplied to the turbine has decreased.
- B. decrease, because moist steam results in more windage losses in the turbine.
- C. increase, because the enthalpy of the steam being supplied to the turbine has increased.
- D. increase, because moist steam results in less windage losses in the turbine.

ANSWER: A.

TOPIC: 293005
KNOWLEDGE: K1.05 [2.7/2.8]
QID: B129

What is the effect of isolating extraction steam to a high-pressure feed water heater while at 90% of rated power?

- A. The core inlet subcooling remains the same while the turbine generator MWe output decreases.
- B. The core inlet subcooling and the reactor power (MWt) decrease.
- C. The reactor power (MWt) and the turbine generator MWe output remain the same.
- D. The core inlet subcooling increases and the turbine generator MWe output increases.

ANSWER: D.

TOPIC: 293005
KNOWLEDGE: K1.05 [2.7/2.8]
QID: B140

A direct advantage of using feed water heaters in a typical steam cycle is that heaters increase...

- A. cycle efficiency.
- B. turbine efficiency.
- C. turbine kW output.
- D. feed water pump net positive suction head.

ANSWER: A.

TOPIC: 293005
KNOWLEDGE: K1.05 [2.7/2.8]
QID: B278

Which one of the following is the most probable location for superheated steam in a boiling water reactor steam cycle that uses moisture separator reheaters?

- A. The outlet of the high pressure turbine
- B. The inlet of the low pressure turbines
- C. The inlet of the high pressure turbine
- D. The outlet of the low pressure turbines

ANSWER: B.

TOPIC: 293005
KNOWLEDGE: K1.05 [2.7/2.8]
QID: B978

A nuclear power plant is operating steady-state at 85% of rated power when the extraction steam to a high-pressure feedwater heater is isolated. Which one of the following describes the initial effect on main turbine-generator output (MWe)? (Assume no operator action and no reactor protection actuation.)

- A. MWe increases because plant efficiency increases.
- B. MWe decreases because plant efficiency decreases.
- C. MWe increases because the total steam flow rate through the turbine increases.
- D. MWe decreases because the total steam flow rate through the turbine decreases.

ANSWER: C.

TOPIC: 293005
KNOWLEDGE: K1.05 [2.7/2.8]
QID: B1278

A nuclear power plant was initially operating normally at 90% reactor power when heating steam (extracted from the main turbine) was automatically isolated to several feedwater heaters. Reactor power was returned to 90% and the plant is currently stable.

Compared to the initial main generator MW load, the current main generator MW load is...

- A. lower, because the steam cycle is less efficient.
- B. lower, because less steam is being extracted from the main turbine.
- C. higher, because the steam cycle is less efficient.
- D. higher, because less steam is being extracted from the main turbine.

ANSWER: A.

TOPIC: 293005
KNOWLEDGE: K1.05 [2.7/2.8]
QID: B1378

A nuclear power plant is operating at 80% of rated power with 10°F of condensate subcooling. Which one of the following initially will increase plant thermodynamic efficiency? (Assume main condenser vacuum does not change unless otherwise stated.)

- A. Isolating heating steam to a feedwater heater.
- B. Decreasing main condenser cooling water flow rate.
- C. Decreasing main condenser cooling water temperature.
- D. Decreasing main condenser vacuum (increasing pressure).

ANSWER: B.

TOPIC: 293005
KNOWLEDGE: K1.05 [2.7/2.8]
QID: B1679 (P1980)

A nuclear power plant is initially operating at 85% reactor power when extraction steam to a high-pressure feedwater heater is isolated. Main generator load is returned to its initial value. When the plant stabilizes, reactor power will be _____ than 85% and overall plant thermal efficiency will be _____.

- A. greater; lower
- B. greater; higher
- C. less; lower
- D. less; higher

ANSWER: A.

TOPIC: 293005
KNOWLEDGE: K1.05 [2.7/2.8]
QID: B1879 (P1878)

A nuclear power plant is operating at 85% of rated thermal power when the extraction steam to a high-pressure feedwater heater is isolated. After the transient, the operator returns reactor power to 85% and stabilizes the plant. Compared to conditions just prior to the transient, current main turbine generator output (MWe) is...

- A. higher because increased steam flow causes the turbine generator to pick up load.
- B. lower because decreased steam flow causes the turbine generator to reject load.
- C. higher because plant efficiency has increased.
- D. lower because plant efficiency has decreased.

ANSWER: D.

TOPIC: 293005
KNOWLEDGE: K1.05 [2.7/2.8]
QID: B2178 (P2178)

If superheating of the inlet steam to the low pressure turbines is reduced, low pressure turbine work output will _____ and low pressure turbine exhaust steam moisture content will _____.

- A. increase; increase
- B. increase; decrease
- C. decrease; increase
- D. decrease; decrease

ANSWER: C.

TOPIC: 293005
KNOWLEDGE: K1.05 [2.7/2.8]
QID: B3378 (P3375)

Given the following:

- A saturated steam-water mixture with an inlet quality of 60% is flowing through a moisture separator.
- The moisture separator is 100% efficient for removing moisture.

How much moisture will be removed by the moisture separator from 50 lbm of the steam-water mixture?

- A. 10 lbm
- B. 20 lbm
- C. 30 lbm
- D. 40 lbm

ANSWER: B.

TOPIC: 293005
KNOWLEDGE: K1.05 [2.7/2.8]
QID: B3578 (P378)

Steam turbines X and Y are identical 100% efficient turbines that exhaust to a condenser at 1.0 psia. Saturated steam at 250 psia enters turbine X. Superheated steam at 250 psia and 500°F enters turbine Y.

Which one of the following lists the percentage of moisture at the exhaust of turbines X and Y?

	<u>Turbine X</u>	<u>Turbine Y</u>
A.	24.5%	20.5%
B.	26.3%	13.0%
C.	24.5%	13.0%
D.	26.3%	20.5%

ANSWER: A.

TOPIC: 293005
KNOWLEDGE: K1.05 [2.7/2.8]
QID: B3778 (P3774)

Given the following:

- A saturated steam-water mixture with an inlet quality of 40% is flowing through a moisture separator.
- The moisture separator is 100% efficient for removing water.

How much water will be removed by the moisture separator from 50 lbm of the steam-water mixture?

- A. 10 lbm
- B. 20 lbm
- C. 30 lbm
- D. 40 lbm

ANSWER: C.