

科目： 293005

知能類： K1.03 [2.6/2.7]

序號： 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.

主汽機內，受到最嚴重的葉片沖蝕的地方是____壓汽機的____級。

A. 高；最後

B. 低；最後

C. 高；最初

D. 低；最初

答案： B.

科目： 293005

知能類： K1.03 [2.6/2.7]

序號： 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 blading has increased.

ANSWER: A.

如果供給汽機的蒸汽內的濕度含量降低，蒸汽循環效能將會增加，因為_____。

- A. 供給汽機的蒸汽焓增加
- B. 通過汽機的蒸汽流量增加
- C. 汽機抽汽的再熱能力增加
- D. 汽機葉片的運轉溫度升高

答案： A.

科目： 293005

知能類： K1.03 [2.6/2.7]

序號： 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.

蒸汽電廠的主汽機由一個高壓（HP）汽機和數個低壓（LP）汽機所構成。該汽機最有可能遭受到與應力有關的轉子葉片損壞是在____汽機的____級。

A. HP；進口

B. LP；進口

C. HP；出口

D. LP；出口

答案： D.

科目： 293005

知能類： K1.03 [2.6/2.7]

序號： 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.

如果供給主汽機的蒸汽內含濕度增加，（假設蒸汽壓力、冷凝器壓力、以及控制閥的開度都不變）汽機的功將會_____。

- A. 減少，因為供給汽機的蒸汽焓降低
- B. 減少，因為含水氣的蒸汽導致汽機內較多的風損(windage losses)
- C. 增加，因為供給汽機的蒸汽焓提高
- D. 增加，因為含水氣的蒸汽導致汽機內較少的風損(windage losses)

答案： A.

科目： 293005

知能類： K1.05 [2.7/2.8]

序號： 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.

在90%額定功率下，將高壓飼水加熱器的抽汽隔離，會有什麼影響？

- A. 爐心進口次冷度維持不變，而汽渦輪發電機MWe輸出降低。
- B. 爐心進口次冷度和反應爐功率(MWt)降低。
- C. 反應爐功率(MWt)和汽渦輪發電機MWe輸出保持不變。
- D. 爐心進口次冷度提高，汽渦輪發電機MWe輸出提高。

答案： D.

科目： 293005

知能類： K1.05 [2.7/2.8]

序號： 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.

在典型蒸汽循環內運用飼水加熱器的直接好處為加熱器可提高_____。

- A. 循環效率
- B. 汽機效率
- C. 汽機輸出功率
- D. 飼水泵的淨正吸水頭

答案： A.

科目： 293005

知能類： K1.05 [2.7/2.8]

序號： 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.

在使用氣水分離再熱器的沸水式反應爐蒸汽循環中，以下何者為最有可能發生過熱蒸汽的地方？

- A. 高壓汽機的出口
- B. 低壓汽機的進口
- C. 高壓汽機的進口
- D. 低壓汽機的出口

答案： B.

科目： 293005

知能類： K1.05 [2.7/2.8]

序號： B978

A nuclear plant is operating at steady-state 85% power when the extraction steam to a highpressure 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.

當核能電廠運轉在85%功率時，發生高壓飼水加熱器的抽汽隔離，主渦輪發電機輸出(MWe)一開始會受到何種影響？（假設運轉員沒有動作，反應爐保護設備也沒有啟動。）

- A. MWe提高，因為電廠效能提高。
- B. MWe降低，因為電廠效能降低。
- C. MWe提高，因為通過汽機的總蒸汽流量增加。
- D. MWe降低，因為通過汽機的總蒸汽流量降低。

答案： C.

科目： 293005

知能類： K1.05 [2.7/2.8]

序號： B1278

A reactor plant was initially operating normally at 90% 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 was stabilized. 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.

核能電廠正以90%功率正常運轉，發生輸送到數個飼水加熱器的加熱蒸汽（由主汽機抽出）自動隔離，暫態後反應爐功率重返90%且電廠也達到穩定時，與主發電機的初始MWe相比，現在的MWe_____。

- A. 比較低；因為蒸汽循環較無效率
- B. 比較低，因為從主汽機抽取的蒸汽較少
- C. 比較高，因為蒸汽循環較無效率
- D. 比較高，因為從主汽機抽取的蒸汽較少

答案： A.

科目： 293005

知能類： K1.05 [2.7/2.8]

序號： B1378

A plant is operating at 80% 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 feed water heater
- B. Decreasing circulating water flow rate
- C. Decreasing circulating water temperature
- D. Decreasing main condenser vacuum (increasing pressure)

ANSWER: B.

核能發電廠運轉於80%功率，其冷凝水次冷度為10°F。下列何者在開始時會提高電廠的熱力效能(thermodynamic efficiency)? (假設主冷凝器的真空度沒有改變，除非特別聲明。)

- A. 隔離飼水加熱器的加熱蒸汽
- B. 降低循環水的流量
- C. 降低循環水的溫度
- D. 降低主冷凝器的真空度 (增加壓力)

答案： B.

科目： 293005

知能類： K1.05 [2.7/2.8]

序號： B1679 (P1980)

What is the long-term effect of isolating extraction steam to a high-pressure feed water heater while at 85% of rated power? (Assume a constant turbine load.)

- A. Reactor power (MWt) increases and overall plant efficiency increases.
- B. Reactor power (MWt) increases and overall plant efficiency decreases.
- C. Reactor power (MWt) decreases and overall plant efficiency increases.
- D. Reactor power (MWt) decreases and overall plant efficiency decreases.

ANSWER: B.

當在85%功率運轉時，隔離高壓飼水加熱器的抽汽，會有什麼長期的影響？（假設汽機的負載固定）

- A. 反應爐功率(MWt)增加，整體的電廠效能提高。
- B. 反應爐功率(MWt)增加，整體的電廠效能降低。
- C. 反應爐功率(MWt)降低，整體的電廠效能提高。
- D. 反應爐功率(MWt)降低，整體的電廠效能降低。

答案： B.

科目： 293005

知能類： K1.05 [2.7/2.8]

序號： B1879 (P1878)

A reactor plant is operating at 85% reactor 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 is causing the turbine to operate at a higher speed.
- B. lower because decreased steam flow is causing the turbine to operate at a lower speed.
- C. higher because plant efficiency has increased.
- D. lower because plant efficiency has decreased.

ANSWER: D.

當進入高壓飼水加熱器的抽汽被隔離時，核能電廠正運轉於85%功率。在暫態發生後，運轉員將反應爐功率回復到85%，並使電廠穩定。與暫態前的狀況比較，現在的汽輪發電機輸出(MWe)_____。

- A. 比較高，因為蒸汽流量的增加導致汽機運轉在較快的轉速
- B. 比較低，因為蒸汽流量的增加導致汽機運轉在較慢的轉速
- C. 比較高，因為電廠效能提高
- D. 比較低，因為電廠效能降低

答案： D.

科目： 293005

知能類： K1.05 [2.7/2.8]

序號： 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

如果進入低壓汽機的進口蒸汽過熱度降低時，低壓汽機輸出的功會____，低壓汽機排汽的水分含量會_____。

- A. 增加；增加
- B. 增加；降低
- C. 減少；增加
- D. 減少；降低

答案： C

科目： 293005

知能類： K1.05 [2.7/2.8]

序號： 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.

若給定下列條件：

- 60%乾度的飽和蒸汽—水混合物正流經汽水分離器的進口。
- 汽水分離器的除水效率為100%。

則有多少水分能被氣水分離器從50 lbm的蒸汽—水混合物中分離出來？

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

答案： B.

科目： 293005

知能類： K1.05 [2.7/2.8]

序號： 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. A moisture separator/reheater supplies turbine Y with superheated steam at 250 psia and 500EF. Which one of the following lists the percentage of moisture in 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.

汽機 X 和 Y 為相同的 100% 效率的汽機，它們均排汽至壓力為 1.0 psia 的冷凝器中。250 psia 的飽和蒸汽進入汽機 X。汽水分離/再熱器以 250 psia 及 500°F 的過熱蒸汽供應汽機 Y。

下列何者為汽機 X 和 Y 排汽中的水分百分比？

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

答案： A.

科目： 293005

知能類： K1.05 [2.7/2.8]

序號： 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.

給予下列條件：

- 40%乾度的飽和蒸汽—水混和物正流經汽水分離器的進口。
- 汽水分離器的除水效率為100%。

有多少水能被汽水分離器從50 lbm的蒸汽—水混合物中分離出來？

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

答案： C.

科目/題號：293005/1 (2016新增)

知能類：K1.03 [2.6/2.7]

序號：B7240 (P7241)

A nuclear power plant has a thermal power rating of 3,200 MW. When the plant operates at 100 percent power, the main generator produces 1,200 MW at a 0.95 power factor. Plant modifications are planned that will upgrade the feedwater heaters and moisture separator/reheaters without changing the plant's thermal power rating. If the plant modifications improve plant thermal efficiency by 2 percent, what will be the resulting main generator electrical output at 100 percent reactor power with the same power factor?

A. 1,204 MW

B. 1,224 MW

C. 1,244 MW

D. 1,264 MW

ANSWER: D.

一額定熱功率 3,200MW的核能電廠。當其以100%的功率運轉，主發電機以0.95的功率因數發電量 1,200MW。若電廠計劃在不改變額定熱功率下，進行變更以提升飼水加熱器和汽水分離器/再熱器，使熱效率提高了 2%，則在相同功率因數下反應器以100%的功率運轉時，主發電機的輸出將會是多少？

A. 1,204 MW

B. 1,224 MW

C. 1,244 MW

D. 1,264 MW

答案： D

科目/題號：293005/2 (2016 新增)

知能類：K1.05 [2.7/2.8]

序號：B7440

A nuclear power plant was initially operating at steady-state 85 percent reactor power when the extraction steam to a high pressure feedwater heater was isolated. With the feedwater heater still isolated, the operators stabilized the plant at 85 percent reactor power. Compared to the initial main generator output (MW), the current main generator output (MW) is...

- A. lower, because the steam cycle thermal efficiency is lower.
- B. lower, because the steam mass flow rate through the main turbine is lower.
- C. higher, because the steam cycle thermal efficiency is higher.
- D. higher, because the steam mass flow rate through the main turbine is higher.

ANSWER: A.

核能電廠最初穩定運轉在反應爐功率85%，此時將抽汽至高壓飼水加熱器之蒸汽隔離，運轉員穩定反應爐功率在85%，則相較於初始主發電機之輸出(MW)，目前主發電機輸出(MW)將會如何？

- A.降低，因為蒸汽循環的熱效率降低
- B.降低，因為通過主汽機的蒸汽質量流量率降低
- C.升高，因為蒸汽循環的熱效率提高
- D.升高，因為通過主汽機的蒸汽質量流量率提高

答案： A

科目/題號：293005/3 (2016 新增)

知能類：K1.05

序號：B7610

Given the following:

- A saturated steam-water mixture with an inlet quality of 70 percent is flowing through a moisture separator.
- The moisture separator is 100 percent efficient for removing moisture.

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

- A. 15 lbm
- B. 30 lbm
- C. 35 lbm
- D. 50 lbm

ANSWER: A.

已知如下：

- 飽和蒸汽-水混合物以乾度70%流經一個汽水分離器
- 汽水分離器去除水份濕氣的效率是100%

該汽水分離器將可從50lbm的蒸汽-水混合物中，移除多少水份？

- A. 15 lbm
- B. 30 lbm
- C. 35 lbm
- D. 50 lbm

答案： A