科目： 193004
知能類：K1.11 [2.4/2.5]
序號： P74 (B2277)

Condensate depression is the process of...

A. removing condensate from turbine exhaust steam.

B. spraying condensate into turbine exhaust steam.

C. heating turbine exhaust steam above its saturation temperature.

D. cooling turbine exhaust steam below its saturation temperature.

ANSWER: D.

冷凝水壓抑(condensate depression)是_____的過程。

A. 從汽機排出的蒸汽移除冷凝水。

B. 於汽機排出的蒸汽灑進冷凝水。

C. 將汽機排出的蒸汽，加熱至飽和溫度以上。

D. 將汽機排出的蒸汽，冷卻至飽和溫度以下。

答案：D.

科目： 193004
知能類：K1.11 [2.4/2.5]
序號： P274

Excessive heat removal from the low pressure turbine exhaust steam in the main condenser will result in...

A. thermal shock.

B. loss of condenser vacuum.

C. condensate depression.

D. fluid compression.

ANSWER: C.

在主冷凝器移除低壓汽機排汽的過剩熱量，將導致……

A. 熱震

B. 冷凝器真空度損失

C. 冷凝水壓抑(condensate depression)

D. 流體壓縮

答案：C.

科目： 193004
知能類：K1.11 [2.4/2.5]
序號： P477 (B277)

Main condenser pressure is 1.0 psia. During the cooling process in the condenser, the temperature of the low pressure turbine exhaust decreases to 100°F, at which time it is a...

A. saturated liquid.

B. saturated vapor.

C. subcooled liquid.

D. superheated vapor.

ANSWER: C.

主冷凝器的壓力為1.0 psia。冷凝器進行冷卻過程中，低壓汽機的排氣溫度降至100˚F，此時為_____。

A. 飽和液體

B. 飽和蒸汽

C. 次冷液體

D. 過熱蒸汽

答案：C.

科目： 193004
知能類：K1.11 [2.4/2.5]
序號： P576 (B2676)

Which one of the following explains why condensate subcooling is necessary in a nuclear power plant steam cycle?

A. To provide a better condenser vacuum

B. To maximize overall secondary efficiency

C. To provide net positive suction head for the condensate pumps

D. To minimize turbine blade and condenser tube erosion by entrained moisture

ANSWER: C.

下列何者說明了在核能電廠蒸汽循環中，冷凝水次冷度(condensate subcooling)實為必要？

A. 提供更好的冷凝器真空度。

B. 提昇二次側整體效能至最大。

C. 提供冷凝水泵淨正吸水頭。

D. 將汽機葉片和冷凝器管路所受的夾帶水份沖蝕降至最小。

答案：C.

科目： 193004
知能類：K1.11 [2.4/2.5]
序號： P876 (B1976)

Which one of the following is the approximate amount of condensate subcooling in a condenser operating at 26 inches Hg vacuum with a condensate temperature of 100°F?

A. 2°F

B. 19°F

C. 26°F

D. 53°F

ANSWER: C.

已知冷凝器以26吋汞柱(inch Hg)真空運轉，其冷凝水溫度為100˚F，則冷凝水次冷度約為多少？

A. 2˚F

B. 19˚F

C. 26˚F

D. 53˚F

答案：C.

科目： 193004
知能類：K1.11 [2.4/2.5]
序號： P1076

Which one of the following is an advantage of condensate depression in the main condenser?

A. Increased secondary cycle efficiency

B. Increased feedwater temperature entering the steam generators

C. Increased net positive suction head available to condensate pumps

D. Increased inventory in the main condenser hotwell

ANSWER: C.

下列何者為主冷凝器具備冷凝水壓抑(condensate depression)的優點？

A. 增加二次側循環效能。

B. 提高進入蒸汽產生器的飼水溫度。

C. 增加冷凝水泵可用的淨正吸水頭。

D. 增加主冷凝器熱井內的水存量。

答案：C.

科目： 193004
知能類：K1.11 [2.4/2.5]
序號： P1176 (B2176)

A nuclear power plant is operating at 80% of rated power with 5°F of condensate depression in the main condenser. If the condensate depression increases to 10°F, plant efficiency will _____ and the probability of condensate pump cavitation will _____.

A. increase; increase

B. increase; decrease

C. decrease; increase

D. decrease; decrease

ANSWER: D.

核能電廠以80%額定功率運轉，主冷凝器的冷凝水壓抑(condensate depression)為5˚F。如果冷凝水壓抑增至10˚F，電廠效能將_____，冷凝水泵產生孔蝕的可能性將_____。

A. 增加；增加

B. 增加；降低

C. 降低；增加

D. 降低；降低

答案：D.

科目： 193004
知能類：K1.11 [2.4/2.5]
序號： P1376

Which one of the following is the condensate depression in a condenser operating at 2.0 psia with a condensate temperature of 115°F?

A. 9°F

B. 11°F

C. 13°F

D. 15°F

ANSWER: B.

已知冷凝器以 2.0 psia 運轉，其冷凝水溫度為 115°F，請問冷凝水壓抑(condensate depression)為多少？

A. 9°F

B. 11°F

C. 13°F

D. 15°F

答案：B.

科目： 193004
知能類：K1.11 [2.4/2.5]
序號： P1576 (B2976)

What is the approximate condensate depression in a condenser operating at 28 inches Hg vacuum with a condensate temperature of 100°F?

A. Less than 2°F

B. 3°F to 5°F

C. 6°F to 8°F

D. 9°F to 11°F

ANSWER: A.

已知冷凝器以28吋汞柱真空運轉，其冷凝水溫度為100˚F，則冷凝水壓抑(condensate depression)約為多少？

A. 小於2˚F

B. 3˚F至5˚F

C. 6˚F至8˚F

D. 9˚F至11˚F

答案：A.

科目： 193004
知能類：K1.11 [2.4/2.5]
序號： P1977

Condensate is collecting in a main condenser hotwell at 90°F with a condenser pressure of 28 inches Hg vacuum. Which one of the following will improve steam cycle efficiency?

A. Main condenser cooling water flow rate decreases by 5% with no change in condenser vacuum.

B. Main condenser cooling water inlet temperature decreases by 10°F with no change in condenser vacuum.

C. Main condenser vacuum decreases to 27 inches Hg due to buildup of noncondensible gases.

D. Steam flow through the turbine decreases by 10% with no change in condenser vacuum.

ANSWER: A.

從 90°F 的主冷凝器熱井收集冷凝水，該冷凝器的壓力為 28 吋汞柱真空。下列何者將改善蒸汽循環效能？

A. 主冷凝器的冷卻水流量減少 5%，冷凝器真空度維持不變。

B. 主冷凝器的冷卻水進口溫度降低 10°F，冷凝器真空度維持不變。

C. 由於累積不凝結氣體，主冷凝器真空度降至 27 吋汞柱。

D. 通過汽機的蒸汽流減少 10%，冷凝器真空度維持不變。

答案：A.

科目： 193004
知能類：K1.11 [2.4/2.5]
序號： P2276 (B78)

The thermodynamic cycle efficiency of a nuclear power plant can be increased by...

A. decreasing power from 100% to 25%.

B. removing a high-pressure feed water heater from service.

C. lowering condenser vacuum from 29 inches to 25 inches.

D. decreasing the amount of condensate depression (subcooling).

ANSWER: D.

核能電廠的熱功效率，能藉由_____而提高。

A. 降低功率(由100%降至25%)

B. 移除運轉中的高壓飼水加熱器

C. 降低冷凝器真空度(從29吋降至25吋)

D. 減少冷凝水壓抑(condensate depression)

答案：D.

科目： 193004
知能類：K1.11 [2.4/2.5]
序號： P2476 (B2077)

A nuclear power plant is operating at 90% of rated power. Main condenser pressure is 1.69 psia and hotwell condensate temperature is 120°F.

Which one of the following describes the effect of a 5% decrease in cooling water flow rate through the main condenser?

A. Overall steam cycle efficiency will increase because the work output of the turbine will increase.

B. Overall steam cycle efficiency will increase because condensate depression will decrease.

C. Overall steam cycle efficiency will decrease because the work output of the turbine will decrease.

D. Overall steam cycle efficiency will decrease because condensate depression will increase.

ANSWER: C.

核能電廠以90%額定功率運轉。主冷凝器壓力為1.69 psia，熱井冷凝水溫為120˚F。

流經主冷凝器的冷卻水流量減少5%時，會產生下列何種影響？

A. 整體蒸汽循環效能將提高，因為汽機輸出的功增加。

B. 整體蒸汽循環效能將提高，因為冷凝水壓抑(condensate depression)減少。

C. 整體蒸汽循環效能將降低，因為汽機輸出的功減少。

D. 整體蒸汽循環效能將降低，因為冷凝水壓抑(condensate depression)增加。

答案：C.

科目： 193004
知能類：K1.11 [2.4/2.5]
序號： P2576 (B2576)

A nuclear power plant is operating at 80% of rated power with 5°F of condensate depression in the main condenser. If the condensate depression decreases to 2°F, steam cycle efficiency will _____ and the probability of condensate pump cavitation will _____.

A. decrease; decrease

B. decrease; increase

C. increase; decrease

D. increase; increase

ANSWER: D.

核能電廠以80%額定功率運轉，主冷凝器的冷凝水壓抑(condensate depression)為5˚F。如果冷凝水壓抑降至2˚F，蒸汽循環效能將_____，冷凝水泵產生孔蝕的可能性將_____。

A. 降低；降低

B. 降低；增加

C. 增加；降低

D. 增加；增加

答案：D.

科目： 193004
知能類：K1.11 [2.4/2.5]
序號： P2976

What is the approximate condensate depression in a condenser operating at 27 inches Hg vacuum with a condensate temperature of 100°F?

A. 2°F

B. 4°F

C. 8°F

D. 16°F

ANSWER: D.

一部冷凝器於 27 吋汞柱真空運轉，其冷凝水溫為 100°F，請問冷凝水壓抑(condensate depression)約為多少？

A. 2°F

B. 4°F

C. 8°F

D. 16°F

答案：D.

科目： 193004
知能類：K1.11 [2.4/2.5]
序號： P3576 (B1484)

A main condenser is operating at 28 inches of Hg vacuum with a condensate outlet temperature of 92°F. Which one of the following is the approximate amount of condensate depression?

A. 6°F

B. 10°F

C. 13°F

D. 17°F

ANSWER: B.

主冷凝器在28吋汞柱真空下運轉，冷凝水出口溫度為92˚F，則冷凝水壓抑(condensate depression)約為幾度？

A. 6˚F

B. 10˚F

C. 13˚F

D. 17˚F

答案：B.

科目： 193004
知能類：K1.11 [2.4/2.5]
序號： P3876 (B3877)

Main turbine exhaust enters a main condenser and condenses at 126°F. The condensate is cooled to 100EF before entering the main condenser hotwell. Assuming main condenser vacuum does not change, which one of the following would improve the thermodynamic efficiency of the steam cycle?

A. Decrease main condenser hotwell level by 5%.

B. Increase main condenser hotwell level by 5%.

C. Decrease condenser cooling water flow rate by 5%.

D. Increase condenser cooling water flow rate by 5%.

ANSWER: C.

進入主冷凝器的主汽機排氣於126˚F凝結。冷凝水進入主冷凝器熱井前，先冷卻至100˚F。假設主冷凝器真空度不變，下列何者會改善蒸汽循環的熱功效率？

A. 主冷凝器熱井水位降低5%。

B. 主冷凝器熱井水位增加5%。

C. 冷凝器冷卻水流量降低5%。

D. 冷凝器冷卻水流量增加5%。

答案：C.

科目： 193004
知能類：K1.15 [2.8/2.8]
序號： P76 (N/A)

A nuclear power plant is maintained at 2,000 psia with a pressurizer temperature of 636°F. A pressurizer relief safety valve is leaking to a collection tank which is being held at 10 psig.

Which one of the following is the approximate temperature of the fluid downstream of the relief valve?

A. 280°F

B. 240°F

C. 190°F

D. 170°F

ANSWER: B.

核能電廠的壓力維持在 2,000 psia，調壓槽溫度為 636°F。調壓槽的釋壓安全閥，洩漏至維持在 10 psig 的收集槽。請問釋壓閥下游流體溫度約為多少？

A. 280°F

B. 240°F

C. 190°F

D. 170°F

答案：B.

科目： 193004
知能類：K1.15 [2.8/2.8]
序號： P148 (N/A)

A pressurizer power-operated relief valve is stuck partially open with the fluid being discharged into a pressurizer relief tank. The pressurizer pressure is 2200 psia and the relief tank pressure is 5 psig.

Which one of the following is the condition of the fluid downstream of the relief valve?

A. Superheated steam

B. Subcooled liquid

C. Dry saturated steam

D. Wet vapor

ANSWER: D.

調壓槽的動力釋壓閥卡於部分開啟位置，導致流體洩漏至調壓槽的釋壓槽(relief tank)。調壓槽壓力為 2200 psia，釋壓槽壓力為 5 psig。

下列何者為釋壓閥下游流體的狀態？

A. 過熱蒸汽

B. 次冷液體

C. 乾飽和蒸汽

D. 濕蒸汽

答案：D.

科目： 193004
知能類：K1.15 [2.8/2.8]
序號： P150 (N/A)

As steam goes through a throttling process in the main steam header to atmospheric leak, in which of the following parameters will there be an increase?

A. Enthalpy

B. Pressure

C. Specific volume

D. Temperature

ANSWER: C.

蒸汽由主蒸汽集管(steam header)經過節流過程外洩至大氣之中，下列哪項參數將增加？

A. 焓

B. 壓力

C. 比容

D. 溫度

答案：C.

科目： 193004
知能類：K1.15 [2.8/2.8]
序號： P276 (N/A)

A reactor coolant system is being maintained at 1000 psia. A pressurizer safety/relief valve is slowly discharging to a collection tank, which is maintained at 5 psig.

Assuming 100% quality steam in the pressurizer vapor space, what is the approximate enthalpy of the fluid entering the tank?

A. 1,210 Btu/lbm

B. 1,193 Btu/lbm

C. 1,178 Btu/lbm

D. 1,156 Btu/lbm

ANSWER: B.

反應器冷卻水系統的壓力維持在 1000 psia。調壓槽的安全/釋壓閥慢慢排放至收集槽，該槽壓力維持在 5 psig。

假設調壓槽蒸汽空間的蒸汽乾度為 100%，進入收集槽內的流體焓值約為多少？

A. 1,210 Btu/lbm

B. 1,193 Btu/lbm

C. 1,178 Btu/lbm

D. 1,156 Btu/lbm

答案：B.

科目： 193004
知能類：K1.15 [2.8/2.8]
序號： P377 (N/A)

What is the approximate temperature and phase of the fluid downstream of the pressurizer relief valve if it sticks partially open with 2,200 psia in the pressurizer and a 50 psia backpressure?

A. 281°F, saturated

B. 281°F, superheated

C. 332°F, saturated

D. 332°F, superheated

ANSWER: A.

已知調壓槽壓力為 2,200 psia，背壓為 50 psia，如果釋壓閥卡於部分開啟處，其下游流體溫度約為多少？處於何種狀態？

A. 281°F，飽和狀態

B. 281°F，過熱狀態

C. 332°F，飽和狀態

D. 332°F，過熱狀態

答案：A.

科目： 193004
知能類：K1.15 [2.8/2.8]
序號： P677 (N/A)

An operator is involved in a routine nuclear power plant shutdown with a steam bubble (100% quality) in the pressurizer. Pressurizer pressure is 415 psig and pressurizer pressure and level are slowly decreasing. The operator suspects a pressurizer power-operated relief valve (PORV) is partially open but the position indicating lights are not working.

Which one of the following will be the approximate PORV tailpipe temperature if the PORV is partially open? (Assume downstream pressure is atmospheric and no heat is lost from the tailpipe.)

A. 212°F

B. 280°F

C. 330°F

D. 450°F

ANSWER: C.

一運轉員參與核能電廠例行停機作業，該電廠的調壓槽出現汽泡(蒸汽乾度為 100%)。調壓槽壓力為 415 psig，其壓力與水位正緩慢降低。運轉員懷疑調壓槽動力釋壓閥(PORV)可能部分開啟，位置指示燈卻故障。

如果 PORV 部分開啟，PORV 尾管溫度約為多少？(假設下游壓力為大氣壓力，尾管未損失任何熱量)

A. 212°F

B. 280°F

C. 330°F

D. 450°F

答案：C.

科目： 193004
知能類：K1.15 [2.8/2.8]
序號： P877 (N/A)

A nuclear reactor is operating at 100% power. As steam escapes via a main steam header-to-atmosphere leak, which of the following parameters will increase in the leaking steam?

A. Enthalpy

B. Pressure

C. Specific volume

D. Temperature

ANSWER: C.

一部核子反應器以 100%功率運轉。蒸汽從主蒸汽集管的裂縫外洩至大氣之中時，該洩漏蒸汽的哪項參數將增加？

A. 焓

B. 壓力

C. 比容

D. 溫度

答案：C.

科目： 193004
知能類：K1.15 [2.8/2.8]
序號： P1277 (N/A)

A heatup and pressurization of the reactor coolant system (RCS) is in progress following a maintenance shutdown. RCS pressure is 800 psia with a steam bubble in the pressurizer. Pressurizer power-operated relief valve (PORV) tailpipe temperature has been steadily rising. Assume 97.5% saturated steam in the pressurizer vapor space, PORV downstream pressure is 30 psia, and PORV leakage is an ideal throttling process.

Which one of the following is the approximate PORV tailpipe temperature if a PORV is leaking by?

A. 264°F

B. 284°F

C. 302°F

D. 322°F

ANSWER: B.

反應器冷卻水系統(RCS)於停機維修後開始升溫加壓。RCS 壓力為 800 psig，調壓槽內有汽泡。調壓槽的動力釋壓閥(PORV)尾管溫度穩定上升。假設調壓槽蒸汽空間所裝的飽和蒸汽乾度為 97.5%，PORV 下游壓力為 30 psia，PORV 洩漏為理想的節流過程。

如果經由 PORV 洩漏，PORV 尾管溫度約為多少？

A. 264°F

B. 284°F

C. 302°F

D. 322°F

答案：B.

科目： 193004
知能類：K1.15 [2.8/2.8]
序號： P1477 (N/A)

A nuclear power plant is operating at 100% power with steam generator pressure at 900 psia. A steam generator safety valve is leaking 100% saturated steam to atmosphere.

Which one of the following is the approximate temperature of the escaping steam once it reaches atmospheric pressure?

A. 532°F

B. 370°F

C. 308°F

D. 212°F

ANSWER: C.

核能電廠以 100%功率運轉，蒸汽產生器的壓力為 900 psia。蒸汽產生器的安全閥正洩漏 100%飽和蒸汽至大氣中。

一旦外逸蒸汽到達大氣壓力時，其溫度約為多少？

A. 532°F

B. 370°F

C. 308°F

D. 212°F

答案：C.

科目： 193004
知能類：K1.15 [2.8/2.8]
序號： P1577 (N/A)

A heatup and pressurization of the reactor coolant system (RCS) is in progress following a maintenance shutdown. RCS pressure is 800 psia with a steam bubble in the pressurizer. Pressurizer power-operated relief valve (PORV) tailpipe temperature has been steadily rising. The pressurizer vapor space contains 96.0% quality saturated steam and PORV downstream pressure is 20 psia.

Assuming PORV leakage is an ideal throttling process, which one of the following will be the approximate PORV tailpipe temperature if a PORV is leaking by?

A. 228°F

B. 260°F

C. 284°F

D. 320°F

ANSWER: B.

反應器冷卻水系統(RCS)於停機維修後開始升溫加壓。RCS 壓力為 800 psig，調壓槽內有汽泡。調壓槽的動力釋壓閥(PORV)尾管溫度穩定上升。調壓槽蒸汽空間所裝的飽和蒸汽乾度為 96.0%，PORV 下游壓力為 20 psia。

假設 PORV 洩漏為理想的節流過程，若經由 PORV 洩漏，PORV 尾管溫度約為多少？

A. 228°F

B. 260°F

C. 284°F

D. 320°F

答案：B.

科目： 193004
知能類：K1.15 [2.8/2.8]
序號： P1677 (N/A)

A nuclear reactor plant is being maintained at 2,220 psig. A pressurizer safety/relief valve is leaking saturated steam (100% quality) to a collection tank which is being held at 20 psig.

Neglecting heat losses to ambient, which one of the following is the approximate temperature of the fluid downstream of the relief valve?

A. 162°F

B. 228°F

C. 259°F

D. 320°F

ANSWER: C.

核能電廠的壓力維持在 2,220 psig。飽和蒸汽(乾度為 100%)從調壓槽的安全/釋壓閥，洩漏至壓力為 20 psig 的收集槽。

如果忽略流失至環境中的熱量，釋壓閥下游流體溫度約為多少？

A. 162°F

B. 228°F

C. 259°F

D. 320°F

答案：C.

科目： 193004
知能類：K1.15 [2.8/2.8]
序號： P1777 (N/A)

Which one of the following is essentially a constant-enthalpy process?

A. Throttling of main steam through main turbine steam inlet valves

B. Condensation of turbine exhaust in a main condenser

C. Expansion of main steam through the stages of an ideal turbine

D. Steam flowing through an ideal convergent nozzle

ANSWER: A.

下列何者基本上屬於等焓過程？

A. 節流通過主汽機進汽閥的蒸汽。

B. 汽機排氣在主冷凝器凝結。

C. 蒸汽歷經理想汽機階段而膨脹。

D. 蒸汽流過理想的漸縮噴嘴。

答案：A.

科目： 193004
知能類：K1.15 [2.8/2.8]
序號： P2077 (B2075)

A nuclear power plant is operating at 50% of rated power. Main steam at a main turbine steam inlet valve has the following properties:

Pressure: 900 psia
Quality: 98%

The main turbine steam chest pressure is 400 psia. Which one of the following is the approximate quality of the steam in the steam chest?

A. 97%

B. 98%

C. 99%

D. 100%

ANSWER: A.

核能電廠以 50%額定功率運轉。主汽機進汽閥的蒸汽性質如下：

壓力： 900 psia
蒸汽乾度： 98%

主汽機汽櫃壓力為 400 psia，汽櫃內的蒸汽乾度約為多少？

A. 97%

B. 98%

C. 99%

D. 100%

答案：A.

科目： 193004
知能類：K1.15 [2.8/2.8]
序號： P2377

A heatup and pressurization of the reactor coolant system (RCS) is in progress following a maintenance shutdown. RCS pressure is 800 psia with a steam bubble in the pressurizer.

Pressurizer power-operated relief valve (PORV) tailpipe temperature has been steadily rising. The pressurizer vapor space contains 96.0% quality saturated steam and PORV downstream pressure is 20 psia.

Assuming PORV leakage is an ideal throttling process, which one of the following will be the approximate PORV tailpipe temperature and phase of escaping fluid if a PORV is leaking by?

A. 254°F, saturated

B. 254°F, superheated

C. 228°F, saturated

D. 228°F, superheated

ANSWER: B.

反應器冷卻水系統(RCS)於停機維修後開始升溫加壓。RCS 壓力為 800 psig，調壓槽內有汽泡。調壓槽的動力釋壓閥(PORV)尾管溫度穩定上升。調壓槽蒸汽空間所裝的飽和蒸汽乾度為 96.0%，PORV 下游壓力為 20 psia。

假設 PORV 洩漏為理想的節流過程，若經由 PORV 洩漏，PORV 尾管溫度約為多少？外逸流體為何種狀態？

A. 254°F，飽和狀態

B. 254°F，過熱狀態

C. 228°F，飽和狀態

D. 228°F，過熱狀態

答案：B.

科目： 193004
知能類：K1.15 [2.8/2.8]
序號： P2876

Refer to the drawing of two 1,000 ft^3 pressure vessels with relief protection (see figure below).

Both vessels are in saturated conditions at 281°F and approximately 35 psig. Vessel A is completely filled with saturated water. Vessel B contains one-half saturated steam (100% quality) volume and one-half saturated water (0% quality) volume. Both vessels are protected by identical relief valves.

If both relief valves begin to leak at a rate of 0.1% of design flow, the higher temperature fluid will initially be leaving the relief valve of vessel _____. And, if 100 lbm of fluid is released through both relief valves, the larger pressure decrease will occur in vessel _____.

A. A; A

B. A; B

C. B; A

D. B; B

ANSWER: D.

請參照下圖中，兩個具釋壓保護機制的 1,000 ft^3 壓力槽。

兩個壓力槽均處於飽和狀態，溫度為 281°F，壓力約為 35 psig。壓力槽 A 裝滿飽和水，壓力槽 B 則是一半飽和蒸汽(乾度為 100%)、一半飽和水(乾度為 0%)。兩個壓力槽均以相同釋壓閥做為保護。

如果兩個釋壓閥開始以 0.1%的設計流量洩漏，溫度較高的流體，首先離開壓力槽_____的釋壓閥；而且，若從兩個釋壓閥釋出 100 lbm 的流體，壓力槽_____的壓降較大。

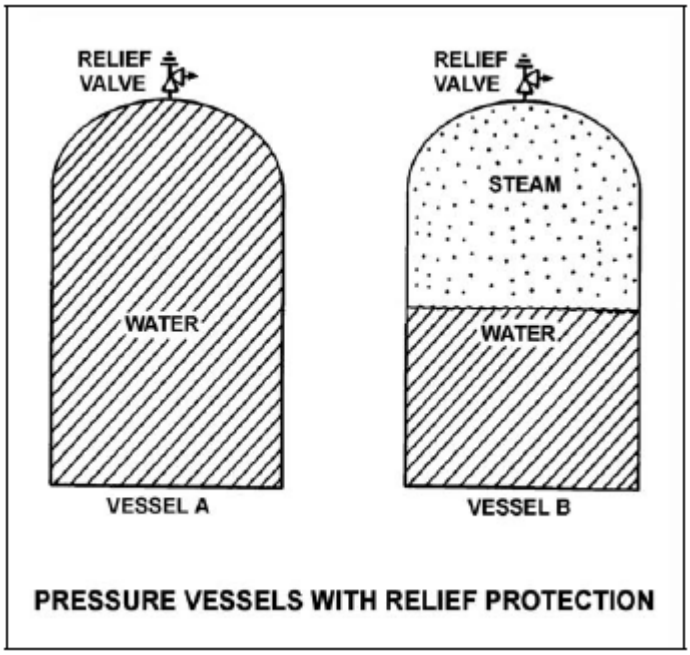
A. A；A

B. A；B

C. B；A

D. B；B

答案：D.



PRESSURE VESSELS WITH RELIEF PROTECTION

科目： 193004
知能類：K1.15 [2.8/2.8]
序號： P3077 (B3074)

A nuclear power plant is operating at 100% rated power. Steam is escaping to atmosphere through a flange leak in a steam supply line to the low pressure section of the main turbine.

Given:

- Steam line pressure is 300 psia.
- Steam line temperature is 440°F.

What is the approximate temperature of the steam as it reaches atmospheric pressure?

A. 212°F

B. 268°F

C. 322°F

D. 358°F

ANSWER: D.

核能電廠以 100%額定功率運轉。蒸汽從低壓汽機的供氣管路凸緣縫隙，外逸至大氣之中。

已知下列條件：

- 蒸汽管路壓力為 300 psia。
- 蒸汽管路溫度為 440°F。

蒸汽洩漏至到達大氣壓力時，其溫度約為多少？

A. 212°F

B. 268°F

C. 322°F

D. 358°F

答案：D.

科目： 193004
知能類：K1.15 [2.8/2.8]
序號： P3277

A nuclear power plant is operating at 100% rated power. Steam is escaping to atmosphere through a flange leak in a steam supply line to the low pressure section of the main turbine.

Given:

- Steam line pressure is 280 psia.
- Steam line temperature is 450°F.

What is the approximate temperature of the steam as it reaches atmospheric pressure?

A. 212°F

B. 268°F

C. 322°F

D. 378°F

ANSWER: D.

核能電廠以 100%額定功率運轉。蒸汽從低壓汽機供氣管路的凸緣縫隙，外逸至大氣之中。

已知下列條件：

- 蒸汽管路壓力為 280 psia。
- 蒸汽管路溫度為 450°F。

蒸汽洩漏至到達大氣壓力時，其溫度約為多少？

A. 212°F

B. 268°F

C. 322°F

D. 378°F

答案：D.

科目： 193004
知能類：K1.15 [2.8/2.8]
序號： P3477

A pressurizer safety valve is leaking by, allowing the 100% quality steam in the pressurizer to flow to the pressurizer relief tank (PRT). The reactor has been shut down, and a plant cooldown and depressurization are in progress. PRT pressure is being maintained constant at 20 psig.

Which one of the following describes how safety valve tailpipe temperature will be affected as pressurizer pressure slowly decreases from 1500 psia to 500 psia? (Assume there is no ambient heat loss from the tailpipe.)

A. Increases, because the entropy of the pressurizer steam will be increasing.

B. Increases, because the enthalpy of the pressurizer steam will be increasing.

C. Decreases, because the mass flow rate of the leaking steam will be decreasing.

D. Decreases, because the temperature of the pressurizer steam will be decreasing.

ANSWER: B.

調壓槽的安全閥洩漏，讓槽內 100%乾度的蒸汽，流至該槽的釋壓槽(PRT)。反應器已經停機，電廠進行冷卻減壓。PRT 壓力維持在 20 psig。

隨著調壓槽壓力從 1500 psia 緩慢降至 500 psia 時，安全閥尾管溫度將受到何種影響？(假設尾管沒有熱散失)

A. 升高，因為調壓槽蒸汽的熵將增加。

B. 升高，因為調壓槽蒸汽的焓將增加。

C. 降低，因為洩漏蒸汽的流量將減少。

D. 降低，因為調壓槽的蒸汽溫度將下降。

答案：B.

科目： 193004
知能類：K1.15 [2.8/2.8]
序號： P3577 (B3575)

Saturated steam (100% quality) at 1000 psia is being supplied to the inlet of a partially-open steam throttle valve on a main turbine. Pressure in the steam chest downstream of the throttle valve is 150 psia. Assume a typical throttling process with no heat gain or loss to/from the steam.

When compared to the conditions at the inlet to the throttle valve, which one of the following describes the conditions in the steam chest for specific enthalpy and entropy?

	Steam Chest Specific Enthalpy	Steam Chest Specific Entropy
A.	About the same	About the same
B.	About the same	Significantly higher
C.	Significantly lower	About the same
D.	Significantly lower	Significantly higher

ANSWER: B.

1000 psia 的飽和蒸汽(乾度為 100%)經由部分開啟的蒸汽節流閥進入主汽機。節流閥下游汽櫃壓力為 150 psia。假設標準節流過程的蒸汽沒有任何熱損益。

相較於節流閥進口的蒸汽狀況，下列何者描述了汽櫃內蒸汽的比焓與比熵？

	汽櫃比焓	汽櫃比熵
A.	約為相同	約為相同
B.	約為相同	顯然較高
C.	顯然較低	約為相同
D.	顯然較低	顯然較高

答案：B.

科目： 193004
知能類：K1.15 [2.8/2.8]
序號： P3677 (B3675)

A nuclear power plant is shutdown and steam is escaping to atmosphere through a leak in a main steam line. If main steam line pressure is 300 psia, what is the approximate temperature of the steam as it reaches atmospheric pressure? (Assume the steam in the main steam line has a quality of 100%.)

A. 212°F

B. 268°F

C. 322°F

D. 358°F

ANSWER: C.

核能電廠停機，蒸汽從主蒸汽管路的裂縫隙外洩至大氣中。如果主蒸汽管路壓力為 300 psia，蒸汽洩漏至到達大氣壓力時，其溫度約為多少？(假設主蒸汽管路內的蒸汽乾度為 100%)

A. 212°F

B. 268°F

C. 322°F

D. 358°F

答案：C.

科目： 193004
知能類：K1.15 [2.8/2.8]
序號： P4040

A heatup and pressurization of a reactor coolant system (RCS) is in progress following a maintenance shutdown. RCS pressure is 1,000 psia with a steam bubble in the pressurizer. Pressurizer power-operated relief valve (PORV) tailpipe temperature has been steadily rising. The pressurizer vapor space contains 100.0% quality saturated steam and PORV downstream pressure is 40 psia.

Assuming PORV leakage is an ideal throttling process, which one of the following will be the approximate PORV tailpipe temperature and phase of escaping fluid if a PORV is leaking by?

A. 267°F, saturated

B. 267°F, superheated

C. 312°F, saturated

D. 312°F, superheated

ANSWER: D.

反應器冷卻水系統(RCS)於停機維修後開始升溫加壓。RCS 壓力為 1,000 psig，調壓槽內有汽泡。調壓槽的動力釋壓閥(PORV)尾管溫度穩定上升。調壓槽蒸汽空間所裝的飽和蒸汽乾度為 100.0%，PORV 下游壓力為 40 psia。

假設 PORV 洩漏為理想的節流過程，若經由 PORV 洩漏，PORV 尾管溫度約為多少？外逸流體為何種狀態？

A. 267°F，飽和狀態

B. 267°F，過熱狀態

C. 312°F，飽和狀態

D. 312°F，過熱狀態

答案：D.

科目/題號：193004/1 (2016新增)
知能類：K1.15 [2.8/2.8]
序號：P5340 (B5338)

A nuclear power plant is operating with the following main steam parameters at the main turbine steam inlet valves:

Pressure = 900 psia
Quality = 99 percent

The main turbine steam chest pressure is 300 psia. Assuming an ideal throttling process, what is the quality of the steam in the steam chest?
A. 100 percent
B. 98 percent
C. 88 percent
D. 87 percent
ANSWER: B.

一座核電廠運轉中，主汽機進汽閥處的主蒸汽參數如下：

壓力= 900 psia
乾度= 99%

主汽機汽櫃壓力為 300 psia。假設其為一個理想的節流流程，則汽櫃的蒸汽乾度為多少？
A. 100%
B. 98%
C. 88%
D. 87%

答案： B

科目/題號：193004/2 (2016新增)
知能類：K1.15 [2.8/2.8]
序號：P5640

A pressurizer safety valve is leaking by, allowing 100 percent quality steam from the pressurizer to enter the discharge pipe, which remains at a constant pressure of 30 psig. Initial safety valve discharge pipe temperature is elevated but stable. Assume no heat loss from the safety valve discharge pipe.
Upon discovery of the leak, the reactor is shut down and a plant cooldown and depressurization are commenced. Throughout the cooldown and depressurization, dry saturated steam continues to leak through the pressurizer safety valve.
As pressurizer pressure decreases from 2,000 psig to 1,800 psig, the safety valve discharge pipe temperature will...
A. decrease, because the entropy of the safety valve discharge will decrease during the pressurizer pressure decrease.
B. decrease, because the enthalpy of the safety valve discharge will decrease during the pressurizer pressure decrease.
C. increase, because the safety valve discharge will become more superheated during the pressurizer pressure decrease.
D. remain the same, because the safety valve discharge will remain a saturated steam-water mixture at 30 psig.
ANSWER: D.

一調壓槽的安全閥洩漏中，使100%乾度蒸汽從調壓槽進入30 psig恆壓的排放管。初始安全閥排放管溫度雖升高但穩定。假設安全閥排放管沒有熱損失，反應器從發現洩漏就被迫停機，並啟動冷卻和降壓，但整個冷卻和降壓過程中，乾飽和蒸汽持續洩漏。
調壓槽壓力由2,000 psig下降到1,800 psig，安全閥排放管的溫度將…？
A.降低，因為安全閥排放蒸汽的熵在調壓槽壓力降低時會隨之減小
B.降低，因為安全閥排放蒸汽的熱焓在調壓槽壓力降低時會隨之減小
C.升高，因為安全閥排放蒸汽將於調壓槽壓力降低時變的更過熱
D.保持不變，因為安全閥排放蒸汽將維持飽和汽水混合物在30 psig.

答案：D

科目/題號：193004/3 (2016新增)
知能類：K1.15 [2.8/2.8]
序號：P6540 (B6538)

A nuclear power plant is operating at power. Steam is escaping to atmosphere through a flange leak in a steam line supplying the low pressure section of the main turbine.
Given:
- Steam line pressure is 200 psia.
- Steam line temperature is 400°F.

Assuming no heat transfer to/from the steam, what is the approximate temperature of the steam as it reaches atmospheric pressure?
A. 212°F
B. 284°F
C. 339°F
D. 375°F
ANSWER: C.

一座核電廠正在功率運轉。由主蒸汽管路供給至主汽機的低壓段的蒸汽，經由法蘭洩漏逃逸到大氣中。
已知：
●蒸汽管路壓力為 200 psia
●蒸汽管路溫度為 400°F
假設蒸汽沒有熱傳進出，當蒸汽達到大氣壓時，其溫度大約為多少？
A. 212°F
B. 284°F
C. 339°F
D. 375°F

答案： C

科目/題號：193004/4 (2016新增)
知能類：K1.15 [2.8/2.8]
序號：P7140 (B7138)

A nuclear power plant is operating with the following main steam parameters at the main turbine steam inlet valves:

Pressure = 1,050 psia
Quality = 100 percent

The main turbine steam chest pressure is 400 psia. Assuming an ideal throttling process, which one of the following describes the steam in the steam chest?
A. Saturated, 96 percent quality
B. Saturated, 98 percent quality
C. Saturated, 100 percent quality
D. Superheated
ANSWER: B.

一座核電廠運轉中，在主汽機進汽閥處之主蒸汽參數如下：

壓力= 1050 psia
乾度= 100%

主汽機汽櫃壓力為 400 psia。假設是理想的節流流程，則下列何者描述汽櫃內的蒸汽狀態？
A.飽和，96%蒸汽乾度
B.飽和，98%蒸汽乾度
C.飽和，100%蒸汽乾度
D.過熱蒸汽

答案： B

科目/題號：193004/5 (2016新增)
知能類：K1.15 [2.8/2.8]
序號：P7610

A pressurizer safety valve is leaking by, allowing the dry saturated steam from the pressurizer to enter the discharge pipe, which remains at a constant pressure of 40 psia. Initial safety valve discharge pipe temperature is elevated but stable. Assume no heat loss occurs from the safety valve discharge pipe.
Upon discovery of the leak, the reactor is shut down, and a plant cooldown and depressurization are commenced. Throughout the cooldown and depressurization, dry saturated steam continues to leak through the pressurizer safety valve.
As pressurizer pressure decreases from 1,000 psia to 700 psia, the safety valve discharge pipe temperature will...

A. decrease, because the entropy of the safety valve discharge will decrease during the pressurizer pressure decrease in this range.
B. decrease, because the enthalpy of the safety valve discharge will decrease during the pressurizer pressure decrease in this range.
C. increase, because the safety valve discharge will become more superheated during the pressurizer pressure decrease in this range.
D. remain the same, because the safety valve discharge will remain a saturated steam-water mixture at 40 psia during the pressurizer pressure decrease in this range.

ANSWER: C.

一調壓槽的安全閥洩漏中，使100%乾度蒸汽從調壓槽進入40 psia恆壓的排放管。初始安全閥排放管溫度雖升高但穩定。假設安全閥排放管沒有熱損失，反應器從發現洩漏就被迫停機，並啟動冷卻和降壓，但整個冷卻和降壓過程中，乾飽和蒸汽持續洩漏。
調壓槽壓力由1000 psia下降到700psia時，安全閥排放管的溫度將…？

A.降低，因為調壓槽壓力在上述範圍內降低時，安全閥排放蒸汽的熵會隨之減小
B.降低，因為調壓槽壓力在上述範圍內降低時，安全閥排放蒸汽的熱焓會隨之減小
C.升高，因為調壓槽壓力在上述範圍內降低時，安全閥排放蒸汽將變的更過熱
D.保持不變，因為調壓槽壓力在上述範圍內降低時，安全閥排放蒸汽將維持飽和汽水混合物在40 psia

答案：C

科目/題號：193004/6 (2016新增)
知能類：K1.15 [2.8/2.8]
序號： P7619 (B7619)

A nuclear power plant is operating with the following main steam parameters at a partially open main turbine steam inlet valve:

Pressure = 1,000 psia
Quality = 100 percent

The main turbine steam chest pressure is 50 psia. Which one of the following describes the steam in the steam chest?
A. Saturated, 98 percent quality
B. Saturated, 99 percent quality
C. Saturated, 100 percent quality
D. Superheated
ANSWER: D.

一座運轉核電廠在部分打開主汽機進汽閥之主蒸汽參數如下：

壓力=1,000psia
蒸汽乾度=100%

主汽機汽櫃壓力 50 psia。下列何者描述汽櫃蒸汽狀態？
A.飽和，98%蒸汽乾度
B.飽和，99%蒸汽乾度
C.飽和，100%蒸汽乾度
D.過熱蒸汽

答案： D