Refer to the drawing of a steam-jet air ejector (see figure below) in normal operation with supersonic steam velocities.

At which of the following locations is the lowest pressure experienced?

A. 1

- **B**. 2
- C. 3
- D. 4

ANSWER: B.

參考以超音速蒸汽速度正常運轉的蒸汽抽氣器圖(見下圖)。

在下列哪一個位置會有最低壓力?

- A. 1
- **B**. 2
- C. 3
- D. 4
- 答案: B.



Refer to the drawing of a steam-jet air ejector (see figure below) in normal operation with supersonic steam velocities.

Steam flowing from D to E undergoes a pressure _____ and a velocity _____.

A. decrease; decrease

B. decrease; increase

C. increase; increase

D. increase; decrease

ANSWER: D.

參考以超音速蒸汽速度正常運轉的蒸汽抽氣器圖(見下圖)。

蒸汽從D流到E會造成壓力___、速度___的現象。

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

答案: D.



Refer to the drawing of a steam-jet air ejector (see figure below) in normal operation.

The section of the air ejector that converts steam pressure into kinetic energy is called the...

A. diffuser.

B. nozzle.

C. intercondenser.

D. riser.

ANSWER: B.

參考正常運轉的蒸汽抽氣器(STAE)圖(見下圖)。

空氣噴射器中,將蒸汽壓力轉換稱動能的部分稱為____。

- A. 擴散器
- B. 噴嘴
- C. 中間凝結器(intercondenser)
- D. 升流管(riser)

答案: B.



The steam inlet nozzles used in steam jet air ejectors convert the ______ of the steam into

A. kinetic energy; pressureB. enthalpy; kinetic energyC. kinetic energy; velocityD. enthalpy; pressureANSWER: B.

_.

在蒸汽抽氣器的蒸汽進口噴嘴會將蒸汽的____轉換成___。

A. 動能; 壓力

- B. 焓; 動能
- C. 動能;速度
- D. 焓; 壓力
- 答案: B.

Steam entering an air ejector reaches sonic velocity in the throat of a convergent-divergent nozzle. Upon entering the divergent section of the nozzle, steam velocity will ______

and steam pressure will _____.

A. increase; increase

B. increase; decrease

C. decrease; increase

D. decrease; decrease

ANSWER: B.

進入空氣噴射器的蒸汽會在漸縮—漸擴噴嘴的喉部內達到音速。當進入噴嘴的漸擴區時,蒸 汽速度會____,蒸汽壓力會____。

- A. 加快;增加
- B. 加快;降低
- C. 減慢;增加
- D. 減慢;降低
- 答案: B.

Refer to the drawing of a steam-jet air ejector (see figure below) in normal operation with supersonic steam velocities.

Steam flowing from 1 to 2 undergoes a pressure _____ and a velocity _____.

A. increase; decrease

B. increase; increase

C. decrease; decrease

D. decrease; increase

ANSWER: D.

參考以超音速蒸汽速度正常運轉的蒸汽抽氣器圖(見下圖)。

蒸汽從1流到2會產生壓力___、速度___的現象。

A. 增加;降低

- B. 增加;增加
- C. 降低;降低
- D. 降低; 增加

答案: D.



Refer to the drawing of a steam-jet air ejector (see figure below) in normal operation with supersonic steam velocities.

Steam flowing from C to D undergoes a pressure _____ and a velocity _____.

A. decrease; decrease

B. decrease; increase

C. increase; increase

D. increase; decrease

ANSWER: D.

參考以超音速蒸汽速度正常運轉的蒸汽抽氣器圖(見下圖)。

蒸汽從C流到D會產生壓力___、速度___的現象。

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

答案: D.



科目: 293004 知能類: K1.05 [2.7/2.7]

序號: B276

During jet pump operation, high pressure and low velocity fluid flow is supplied through a

______ where the pressure drops and the velocity increases, creating a low pressure area in the ______ section.

A. nozzle; throat

B. nozzle; diffuser

C. diffuser; throat

D. diffuser; nozzle

ANSWER: A.

噴射泵運轉時,高壓低速流體是經由____提供的,在此壓力下降,速度加快,在____部位產 生低壓區。 A. 噴嘴;喉 B. 噴嘴;擴散器

- C. 擴散器; 喉
- D. 擴散器; 噴嘴
- 答案: A.

科目: 293004 知能類: K1.05 [2.7/2.7] 序號: B1076 The <u>lowest</u> pressure in a liquid jet pump exists in the... A. throat. B. diffuser. C. rams head. D. impeller eye.

ANSWER: A.

液體噴射泵的最低壓力存在於____。

A. 喉部

B. 擴散器

C. 活塞頭(rams head)

D. 推進孔(impeller eye)

答案: A.

科目: 293004 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.

運轉在26 inch Hg真空的冷凝器中的冷凝水溫度為100°F,則冷凝水的過冷度約為多少? A. 2°F B. 19°F C. 26°F D. 53°F 答案: C. 科目: 293004 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 inch Hg真空下運轉,冷凝水出口溫度為92°F。則冷凝水次冷度(condensate depression)約幾度?

- A. $6^{\circ}F$
- B. 10°F
- C. 13°F
- D. 17°F
- 答案: B.

科目: 293004 知能類: K1.12 [2.9/3.1] 序號: B77

Condensate depression (subcooling) is increased by increasing...

A. main turbine load.

B. the circulating water temperature.

C. circulating water flow through the condenser.

D. air leakage into the condenser.

ANSWER: C.

冷凝水次冷度(Condensate depression)會因增加___而增加。

A. 主汽機負載

- B. 循環水溫度
- C. 流經冷凝器的循環水流量
- D. 滲入冷凝器的空氣

科目: 293004 知能類: K1.12 [2.9/3.1] 序號: B277 (P477)

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.

主冷凝器壓力為1.0 psia。在冷凝器冷卻過程中,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. 過冷液體
- D. 過熱蒸汽
- 答案: C.

科目: 293004 知能類: K1.12 [2.9/3.1] 序號: B78 (P2276)

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.

核能發電廠的熱力循環效能可藉由____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(由29 inch降至25 inch)

D. 减少冷凝水次冷度(condensate depression)

答案: D.

科目: 293004 知能類: K1.12[2.9/3.1] 序號: B200

Which one of the following effects will an <u>increase</u> in main condenser vacuum (lower absolute pressure) have on a plant? (Assume reactor power, main steam flow, and condenser circulating water flow rate are unchanged.)

A. Increase in condensate temperature

- B. Increase in the amount of noncondensable gas in the condenser
- C. Increase in main turbine efficiency
- D. Increase in condensate subcooling

ANSWER: C.

主冷凝器之真空度增加對電廠會有何影響(較低的絕對壓力)?(假設反應爐功率、主蒸汽 流量、以及冷凝器循環水流量均不變。)

- A. 提高冷凝水温度
- B. 增加冷凝器中不凝結氣體量
- C. 提高主汽機的效能
- D. 增加冷凝水的次冷度
- 答案: C.

科目: 293004 知能類: K1.12 [2.9/3.1] 序號: B1876 (P876)

Which one of the following is the approximate 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.

運轉於26 inch Hg真空的冷凝器中,冷凝水溫度為100°F,則下列何者為冷凝水的次冷度約略值?

- A. 2°F
- B. 19°F
- C. $26^{\circ}F$
- D. 53°F
- 答案: C.

科目: 293004 知能類: K1.12 [2.9/3.1] 序號: B2077 (P2476)

A 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.

電廠運轉於90%的功率。主冷凝器壓力為1.69 psia,熱井的冷凝水溫為120°F。 如果流經主冷凝器的冷卻水流量降低5%,會產生下列何種影響?

A. 整體蒸汽循環效能會提高,因為汽機輸出的功增加

B. 整體蒸汽循環效能會提高,因為冷凝水次冷度(condensate depression)會減少

C. 整體蒸汽循環效能會降低,因為汽機輸出的功減少

D. 整體蒸汽循環效能會降低,因為冷凝水次冷度(condensate depression)會增加 答案: C.

科目: 293004 知能類: K1.12 [2.9/3.1] 序號: B2176 (P1176)

A plant is operating at 80% power with $5^{\circ}F$ of condensate depression in the main condenser. If the condensate depression increases to $10^{\circ}F$, 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.

核能發電廠運轉在80%功率,主冷凝器的冷凝水次冷度(condensate depression)為5°F。如果冷凝水次冷度增加到10°F,電廠效能將會____,冷凝水泵產生孔蝕的可能性會____。

- A. 提高;提高
- B. 提高;降低
- C. 降低;提高
- D. 降低;降低
- 答案: D.

科目: 293004 知能類: K1.12 [2.9/3.1] 序號: 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.

冷凝水次冷度(condensate depression)是____的過程。

A. 從汽機排出的蒸汽中移除冷凝水

B. 在汽機排出的蒸汽中灑進冷凝水

C. 將汽機排出的蒸汽加熱到高於它的飽和溫度

D. 將汽機排出的蒸汽冷卻到低於它的飽和溫度

答案: D.

科目: 293004 知能類: K1.12 [2.9/3.1] 序號: B2576 (P2576)

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

A. increase; increase

B. increase; decrease

C. decrease; increase

D. decrease; decrease

ANSWER: A.

電廠運轉於80%功率,主冷凝器中的冷凝水次冷度(condensate depression)為5°F。如果冷凝水 次冷度降至2°F,電廠的熱效能會____,冷凝水泵產生孔蝕的機率會____。

- A. 提高;提高
- B. 提高;降低
- C. 降低;提高
- D. 降低;降低
- 答案: A.

科目: 293004 知能類: K1.12 [2.9/3.1] 序號: B2676 (P576)

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

A. To provide a better condenser vacuum

B. To maximize overall steam cycle thermal 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.

下列何者說明了為何在電廠蒸汽循環中冷凝水的次冷度是必要的?

A. 提供更好的冷凝器真空度

B. 將整體的蒸汽循環熱效能提昇至最大

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水汽沖蝕降至最小

科目: 293004 知能類: K1.12 [2.9/3.1] 序號: B2775 (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 incondenser 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.

壓力28 inch Hg 真空的主冷凝器在熱井中收集的冷凝水溫度為90°F。下列何者可以改進蒸汽 循環效能?

- A. 將主冷凝器冷卻水流量降低5%,冷凝器真空不變。
- B. 將冷凝器冷卻水進口溫度降低10°F,冷凝器真空不變。
- C. 主冷凝器真空因不凝結氣體累積而降至27 inch Hg。
- D. 流經汽機的蒸汽流量降低10%,冷凝器真空不變。

答案: A.

科目: 293004 知能類: K1.12 [2.9/3.1] 序號: B2976 (P1576)

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.

運轉於28 inch Hg真空的冷凝器中的冷凝水溫度為100°F,則冷凝水次冷度(condensate depression)大約為多少?
A. 小於 2°F
B. 3°F 到 5°F
C. 6°F 到 8°F
D. 9°F 到 11°F
答案: A.

科目: 293004 知能類: K1.12 [2.9/3.1] 序號: B3877 (P3876)

Main turbine exhaust enters a main condenser and condenses at 126°F. The condensate is cooled to 100°F 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. Increase condenser cooling water flow rate by 5%.

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

C. Increase main condenser hotwell level by 5%.

D. Decrease main condenser hotwell level by 5%.

ANSWER: B.

進入主冷凝器的主汽機排氣冷凝於126°F。冷凝水在進入主冷凝器熱井前冷卻到100°F。假設 主冷凝器真空度不變,下列何者會改進蒸汽循環的熱效率?

A. 冷凝器冷卻水流量增加5%。

B. 冷凝器冷卻水流量降低5%。

C. 主冷凝器熱井水位提高5%。

D. 主冷凝器熱井水位降低5%。

答案: B.

A plant is operating at 100% power when the only in-service steam jet air ejector is inadvertently isolated from the main condenser. The operator verifies circulating water system parameters have not changed. If no operator action is taken over the next 60 minutes, condenser vacuum will...

A. slowly increase (lower absolute pressure).

B. slowly decrease and stabilize at a slightly lower vacuum (higher absolute pressure).

C. slowly and continuously decrease (higher absolute pressure) towards atmospheric pressure.

D. remain essentially the same (constant absolute pressure).

ANSWER: C.

當唯一使用中的蒸汽抽氣器因故被隔離時,電廠正運轉於100%功率。運轉員確認循環水系統 參數都沒改變,如果運轉員在接下來的60分鐘內都沒有採取行動,冷凝器真空將會____。

A. 慢慢升高(絕對壓力降低)

B. 慢慢降低, 並在略低的真空穩定(絕對壓力升高)

C. 緩慢而持續的向大氣壓力降低(絕對壓力升高)

D. 大致保持不變(絕對壓力不變)

Which one of the following explains why condensation of the steam entering a main condenser creates a vacuum?

- A. The entropy of the steam increases.
- B. The entropy of the steam decreases.
- C. The specific volume of the steam increases.
- D. The specific volume of the steam decreases.

ANSWER: D.

下列何者可以解釋為何當進入主冷凝器的蒸汽冷凝時會產生真空?

A. 蒸汽的熵增加

- B. 蒸汽的熵减少
- C. 蒸汽的比容增加
- D. 蒸汽的比容降低
- 答案: D.

A power plant is operating at 90% of rated power. Which one of the following describes the effect of increasing circulating water flow rate through the main condenser?

A. The saturation temperature in the main condenser decreases.

B. The enthalpy of the condensate leaving the main condenser increases.

C. The temperature of the circulating water leaving the main condenser increases.

D. The total rate of heat transfer from the turbine exhaust steam to the circulating water decreases. ANSWER: A.

核能電廠正運轉於90%的功率。如果流經主冷凝器的循環水流量增加,會產生下列何種影響?

A. 主冷凝器的飽和溫度降低。

B. 離開主冷凝器的冷凝水的焓升高。

C. 離開主冷凝器的循環水的溫度升高。

D. 由汽機排汽傳到循環水的總熱傳率降低。

答案: A.

A plant is operating at 100% power. Which one of the following describes how and why main condenser pressure changes when condenser cooling water flow rate significantly decreases?

A. Decreases because main condenser saturation temperature increases

B. Decreases because main condenser condensate subcooling decreases

C. Increases because main condenser saturation temperature increases

D. Increases because main condenser condensate subcooling decreases

ANSWER: C.

電廠正運轉於100%的功率。當冷凝器冷卻水流量明顯降低時,主冷凝器的壓力會如何改變及 原因為何?

A. 降低,因為主冷凝器的飽和溫度升高

B. 降低,因為主冷凝器的冷凝水次冷度降低

C. 升高,因為主冷凝器飽和溫度升高

D. 升高,因為主冷凝器冷凝水次冷度降低

A plant is operating at 100% power. Which one of the following describes how and why main condenser <u>pressure</u> changes when condenser cooling water flow rate increases significantly?

A. Decreases because main condenser saturation (shell) temperature decreases

B. Decreases because main condenser condensate subcooling increases

C. Increases because main condenser saturation (shell) temperature decreases

D. Increases because main condenser condensate subcooling increases

ANSWER: A.

電廠正運轉於100%的功率。當冷凝器冷卻水流量明顯增加時,主冷凝器的<u>壓力會</u>如何改變及 原因為何? A. 降低,因為主冷凝器(殼側)的飽和溫度降低 B. 降低,因為主冷凝器冷凝水次冷度升高 C. 升高,因為主冷凝器(殼側)的飽和溫度降低 D. 升高,因為主冷凝器冷凝水次冷度升高 答案: A.

During normal plant operation at full power, the operating pressure in the main condenser is directly affected by the: (Assume each parameter remains within its normal operating range.)

A. amount of condensate subcooling.

B. level of the condensate in the hotwell.

C. temperature of the circulating water.

D. quality of the steam entering the high pressure turbine.

ANSWER: C.

電廠以全功率正常運轉時,主冷凝器的運轉壓力會直接受到___的影響。(假設每個參數都 在正常運作範圍內。)

A. 冷凝水次冷度

B. 熱井中冷凝水水位

C. 循環水溫度

D. 進入高壓汽機的蒸汽乾度

Which one of the following is a primary function performed by a main condenser?

A. Deaerate turbine exhaust condensate

B. Remove ions from main condensate

C. Filter out impurities from main condensate

D. Provide net positive suction head for feed water pumps

ANSWER: A.

下列何者為主冷凝器的主要功能? A. 汽機排汽中冷凝水的除氣 B. 除去主冷凝水中的離子 C. 從主冷凝水中過濾雜質 D. 提供飼水泵淨正吸水頭 答案: A.

A plant is operating normally at 80% power. Which one of the following will result in the most rapid initial loss of condenser vacuum?

A. All air ejectors are isolated from the main condenser.

B. All feed and condensate pumps are stopped.

C. All condenser cooling water flow is stopped.

D. All condenser hotwell makeup water flow is stopped.

ANSWER: C.

電廠以80%的功率正常運轉。下列何者會最先導致冷凝器真空度的喪失?

A. 將所有的抽汽器與主冷凝器隔離。

B. 停止所有的飼水與冷凝水泵。

C. 停止所有的冷凝器冷卻水流。

D. 停止所有冷凝器熱井的補充水流。

科目: 293004 知能類: K1.14 [2.6/2.7] 序號: B3077 (P3078)

Which one of the following will be caused by a <u>decrease</u> in main condenser vacuum (higher absolute pressure) on a plant operating at full power? (Assume main steam flow rate and condenser circulating water flow rate are unchanged.)

A. Decrease in the condensate temperature

B. Decrease in the ideal steam cycle efficiency

C. Decrease in the condensate pump required NPSH

D. Decrease in the mass of noncondensable gas in the condenser

ANSWER: B.

當電廠以全功率運轉時,下列何者會在主冷凝器真空度<u>降低</u>時發生(絕對壓力升高)?(假 設主蒸汽的流量與冷凝器循環水流量都不變)

A. 冷凝水溫度降低

B. 理想蒸汽循環效能降低

C. 冷凝水泵所需的淨正吸水頭降低

D. 冷凝器中的不凝結氣體質量減少

答案: B.

科目: 293004 知能類: K1.14 [2.6/2.7] 序號: B3777 (P3734)

A nuclear power plant is operating near rated power with the following initial conditions:

Main steam pressure: 900 psia

Main steam quality: 100%, saturated vapor

Main condenser pressure: 1.0 psia

Air leakage into the main condenser results in the main condenser pressure increasing and stabilizing at 2.0 psia. Assume that all main steam parameters (e.g., pressure, quality, and mass flow rate) remain the same and that the main turbine efficiency remains at 100%.

Which one of the following is the approximate percent by which the main generator output will decrease as a result of the main condenser pressure increase?

A. 5.0%

B. 6.3%

C. 7.5%

D. 8.8%

ANSWER: C.

核能電廠以近乎額定功率運作,起始狀況如下:

主蒸汽壓力:900 psia

主蒸汽乾度:100%, 飽和蒸氣

主冷凝器壓力:1.0 psia

滲入主冷凝器的空氣使主冷凝器壓力升高,在2.0 psia時達到平衡。假設所有的主蒸汽參數 (如:壓力、乾度、質量流量)不變,主汽機效能保持100%。

下列何者為主發電機因主冷凝器壓力增加而輸出減少的百分比?

A. 5.0%

B. 6.3%

C. 7.5%

D. 8.8%

科目/題號: 293004/1 (2016新增) 知能類: K1.13 [2.5/2.6] 序號: B7609 (P7609)

A main condenser is operating at 1.0 psia. If 20,000 ft³ of dry saturated steam is condensed to saturated water in the condenser, what will be the approximate volume of the saturated water? A. 1 ft³ B. 10 ft³ C. 100 ft³ D. 1,000 ft³ ANSWER: A.

一座主冷凝器以1.0 psia運轉。如果在冷凝器中將20,000ft³飽和乾蒸汽冷凝成飽 和水,則飽和水的體積大約為多少? A. 1 ft³ B. 10 ft³ C. 100 ft³ D. 1,000 ft³

答案: A