科目： 291006
知能類： K1.01 [2.7/2.7]
序號： B104

Which one of the following describes the process for placing a steam (shell) and water (tube) heat exchanger into service?

A. Water side is valved in before the steam side to ensure adequate venting.
B. Water side is valved in before the steam side to minimize thermal shock.
C. Steam side is valved in before the water side to minimize scale buildup on the heat exchanger tubes.
D. Steam side is valved in before the water side to ensure that the cooldown rate does not exceed 100˚F/hr.

ANSWER: B.

下列何者為運轉蒸汽（殼側）與水（管側）導入熱交換器的正確步驟？

A. 先導入水，再導入蒸汽，以確保充分的排氣。
B. 先導入水，再導入蒸汽，將熱震 (thermal shock) 降至最低。
C. 先導入蒸汽，再導入水，將熱交換器內的水垢囤積降至最低。
D. 先導入蒸汽，再導入水，以確保冷卻率不超過100˚F/hr。

答案：B.

科目： 291006
知能類： K1.02 [2.6/2.6]
序號： B36

Why is proper venting of a shell-and-tube heat exchanger important?
A. An air bubble reduces the heat transfer coefficient of the heat exchanger.
B. An air bubble causes pressure transients within the tubes as heat load changes.
C. An air bubble will cause thermal shock as it moves through the heat exchanger.
D. An air bubble will cause corrosion in the heat exchanger.
ANSWER: A.

對殼-管熱交換器而言，正確的排氣為何很重要？
A. 氣泡會減低熱交換器的熱傳導係數。
B. 當熱負載改變時，氣泡能引起管內的壓力暫態。
C. 當氣泡通過熱交換器時，會引起熱震。
D. 氣泡會使熱交換器內部腐蝕。
答案：A.

科目： 291006
知能類： K1.02 [2.6/2.6]
序號： B531

A liquid-to-liquid heat exchanger containing trapped air on the shell side will be less efficient because the air...
A. causes more turbulent fluid flow.
B. increases the differential temperature across the tubes.
C. reduces the fluid contact with the heat transfer surface.
D. causes pressure oscillations.
ANSWER: C.

在殼側含有空氣的液體對液體熱交換器效率較差，因為空氣會____
A. 引起較多的流體擾流 (turbulent) 。
B. 增加整個管子的溫差。
C. 減少流體與熱傳面的接觸。
D. 引起壓力震盪。
答案：C.

科目： 291006
知能類： K1.02 [2.6/2.6]
序號： B932

Reduced heat transfer performance in a heat exchanger will result from...
A. tube wall thinning.
B. turbulent flow in the tubes.
C. increased .T between fluids.
D. gas collection in the shell.
ANSWER: D.

熱交換器的熱傳導功能會因____而降低。
A. 管壁變薄
B. 管內的擾流
C. 流體間的溫差增加
D. 殼側內的氣體累積
答案：D.

科目： 291006
知能類： K1.03 [2.4/2.6]
序號： B330

Given the formula, $Q_{core} = \dot{m}_{core}(h_{out} - h_{in})$, which one of the following causes the initial change in heat transfer rate from the core during a minor (3%) steamline break?
A. h_{out} decreases
B. h_{out} increases
C. $\dot{m}_{core}$ decreases
D. $\dot{m}m_{core}$ increases
ANSWER: D.

給予公式：$Q_{core} = \dot{m}_{core}(h_{out} - h_{in})$，下列何者會在蒸汽管路小破口（3%）時，引起爐心熱傳導率的初始改變？
A. h_{out} 降低
B. h_{out} 增加
C. $\dot{m}_{core}$ 降低
D. $\dot{m}_{core}$ 增加
答案：D.

科目： 291006
知能類： K1.03 [2.4/2.6]
序號： B631 (P2032)

The rate of heat transfer between two liquids in a heat exchanger will be increased if the: (Assume single-phase conditions and a constant specific heat for each liquid.)
A. flow rate of the colder liquid is decreased by 10%.
B. flow rate of the hotter liquid is increased by 10%.
C. inlet temperature of both liquids is decreased by 20˚F.
D. inlet temperature of both liquids is increased by 20˚F.
ANSWER: B.

下列何者會提高熱交換器中兩種液體間的熱傳導率？
（假設在單相狀態，兩種液體的比熱固定。）
A. 較冷液體的流量降低10％。
B. 較熱液體的流量增加10％。
C. 兩種液體的進口溫度都降低20˚F。
D. 兩種液體的進口溫度都升高20˚F。
答案：B.

科目： 291006
知能類： K1.03 [2.4/2.6]
序號： B832 (P1632)

The rate of heat transfer between two liquids in a heat exchanger will be decreased if the: (Assume single-phase conditions and a constant specific heat capacity.)
A. temperature of both liquids is decreased by 20˚F.
B. temperature of both liquids is increased by 20˚F.
C. flow rate of the colder liquid is decreased by 10%.
D. flow rate of the hotter liquid is increased by 10%.
ANSWER: C.

下列何者會降低熱交換器中兩種液體間的熱傳導率？
（假設在單相狀態，比熱容固定。）
A. 兩種液體的溫度都降低20˚F。
B. 兩種液體的溫度都升高20˚F。
C. 較冷液體的流量降低10%。
D. 較熱液體的流量增加10%。
答案：C.

科目： 291006
知能類： K1.03 [2.4/2.6]
序號： B1432 (P1432)

The rate of heat transfer between two liquids in a heat exchanger will be increased if the: (Assume single-phase conditions and a constant specific heat.)
A. temperature of the hotter liquid is decreased by 20˚F.
B. temperature of the colder liquid is increased by 20˚F.
C. flow rates of both liquids are decreased by 10%.
D. flow rates of both liquids are increased by 10%.
ANSWER: D.

下列何者會提高熱交換器中兩種液體間的熱傳導率？
（假設在單相狀態，比熱固定。）
A. 較熱液體的溫度降低20˚F。
B. 較冷液體的溫度升高20˚F。
C. 兩種液體的流量都降低10％。
D. 兩種液體的流量都增加10％。
答案：D.

科目： 291006
知能類： K1.03 [2.4/2.6]
序號： B1732 (P1732)

Which one of the following will reduce the rate of heat transfer between two liquids in a heat exchanger? (Assume single-phase conditions and a constant specific heat for both liquids.)
A. The inlet temperatures of both liquids are decreased by 20˚F.
B. The inlet temperatures of both liquids are increased by 20˚F.
C. The inlet temperature of the hotter liquid is increased by 20˚F.
D. The inlet temperature of the colder liquid is increased by 20˚F.
ANSWER: D.

下列何者會降低熱交換器中兩種液體間的熱傳導率？
（假設在單相狀態，兩種液體比熱固定。）
A. 兩種液體的進口溫度都降低20˚F。
B. 兩種液體的進口溫度都升高20˚F。
C. 較熱液體的進口溫度升高20˚F。
D. 較冷液體的進口溫度升高20˚F。
答案：D.

科目： 291006
知能類： K1.03 [2.4/2.6]
序號： B2531 (P2632)

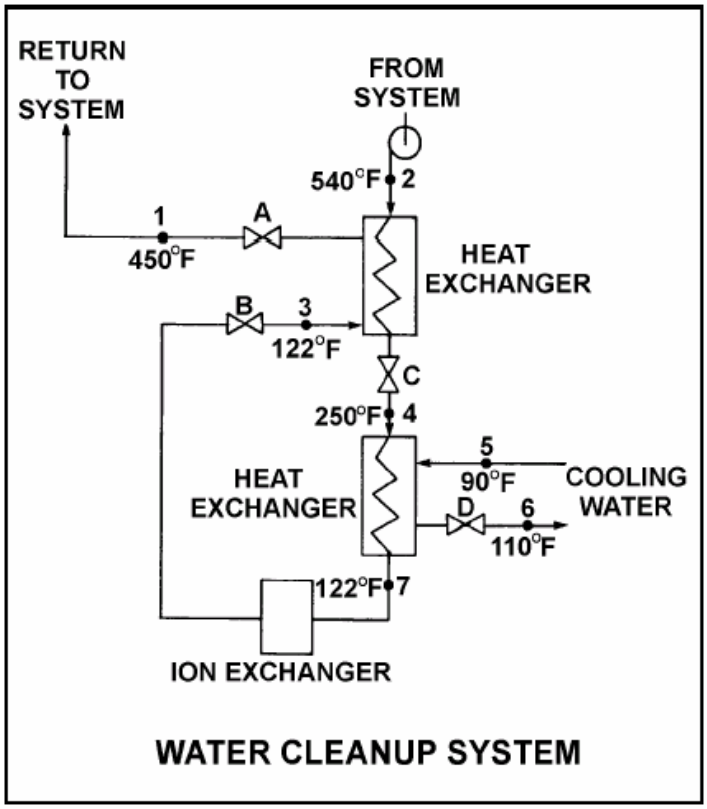
The rate of heat transfer between two liquids in a heat exchanger will be decreased if the: (Assume single-phase conditions and a constant specific heat for both liquids.)
A. inlet temperature of the hotter liquid is increased by 20˚F.
B. inlet temperature of the colder liquid is decreased by 20˚F.
C. flow rates of both liquids are decreased by 10%.
D. flow rates of both liquids are increased by 10%.
ANSWER: C.

下列何者會降低熱交換器中兩種液體間的熱傳導率？
（假設在單相狀態，兩種液體比熱固定。）
A. 較熱液體的進口溫度增加20˚F。
B. 較冷液體的進口溫度降低20˚F。
C. 兩種液體的流量都降低10%。
D. 兩種液體的流量都提高10%。
答案：C.

科目： 291006
知能類： K1.03 [2.4/2.6]
序號： B3631 (P3632)

Refer to the drawing of an operating water cleanup system (see figure below).
If cooling water flow rate is 1.0 x 10^6 lbm/hr, what is the approximate water flow rate in the cleanup system?
A. 1.6 x 10^5 lbm/hr
B. 3.2 x 10^5 lbm/hr
C. 1.6 x 10^6lbm/hr
D. 3.2 x 10^6 lbm/hr
ANSWER: A.

運轉中的水淨化系統（見下圖）。
如果冷卻水的流量為1.0 x 10^6 lbm/hr，此淨化系統的流量大約為多少？
A. 1.6 x 10^5 lbm/hr
B. 3.2 x 10^5 lbm/hr
C. 1.6 x 10^6 lbm/hr
D. 3.2 x 10^6 lbm/hr
答案：A.



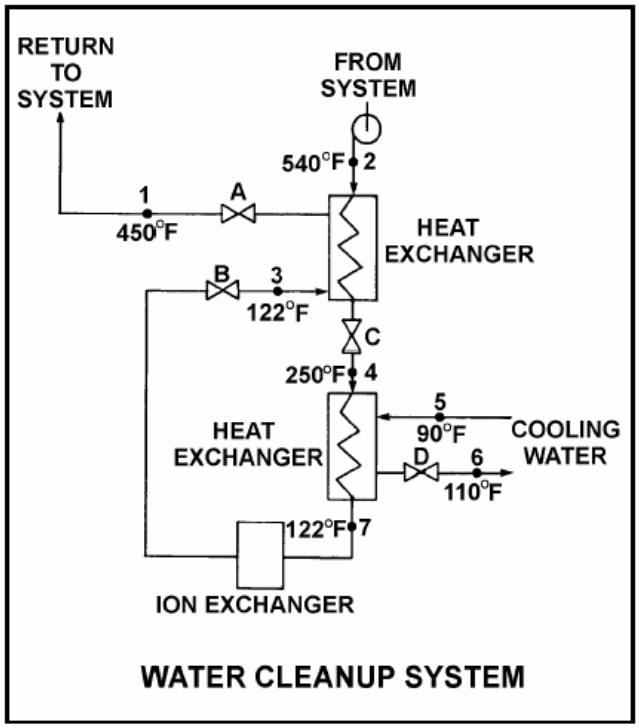
科目： 291006
知能類： K1.04 [2.8/2.8]
序號： B632 (P3232)

Refer to the drawing of an operating water cleanup system (see figure below). Valves A, B, and D are fully open and valve C is 20% open.
If valve C is opened to 50%, how will the temperatures at points 3 and 6 be affected?
Point 3 Point 6
A. Decrease Decrease
B. Decrease Increase
C. Increase Decrease
D. Increase Increase
ANSWER: D.

運轉中的水淨化系統（見下圖）。A, B, D閥完全打開，C閥打開20%開度。
若將C閥打開到50%開度，位置3和位置6的溫度會受到什麼影響？

	位置3	位置6
A.	降低	降低
B.	降低	升高
C.	升高	降低
D.	升高	升高

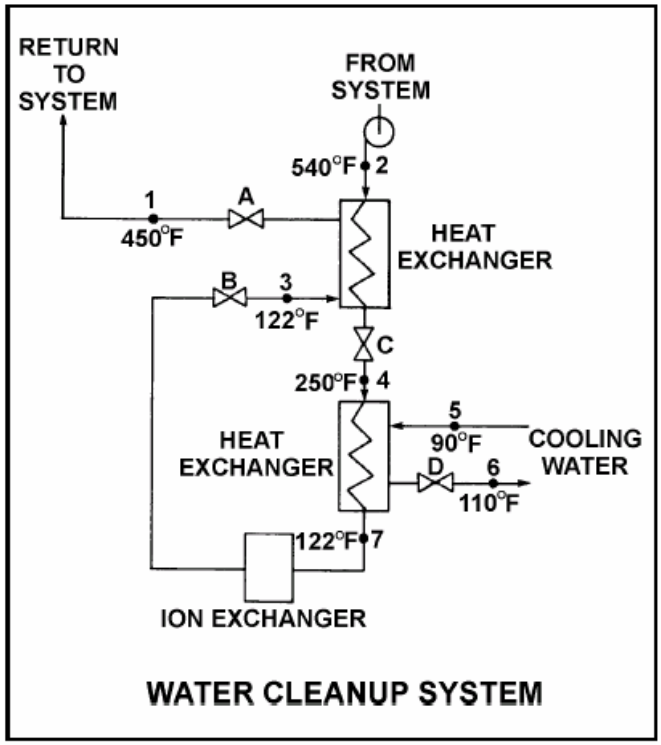
答案：D.



科目： 291006
知能類： K1.04 [2.8/2.8]
序號： B1031 (P1032)

Refer to the drawing of an operating water cleanup system (see figure below).
Valves A, B, and C are fully open. Valve D is 20% open. All temperatures are as shown. Valve D is then quickly opened to 100%.
The temperature at point...
A. 3 will increase.
B. 4 will decrease.
C. 5 will decrease.
D. 7 will increase.
ANSWER: B.

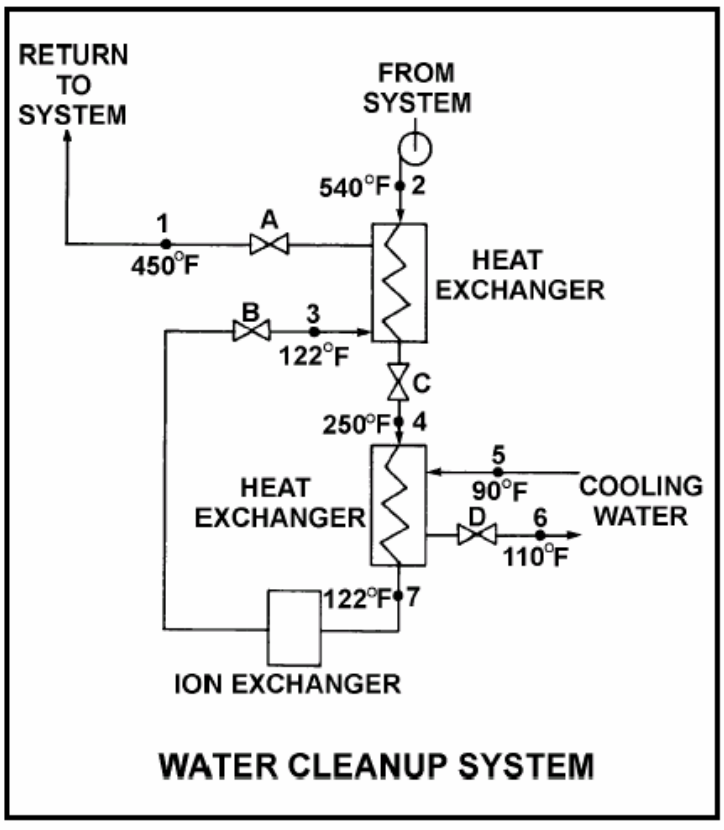
運轉中的水淨化系統圖（見下圖）。
A, B, C閥都是完全打開的，D閥打開20%開度，溫度均如圖所示。若將D閥快速打開至100%開度，則
A. 位置3的溫度會升高。
B. 位置4的溫度會降低。
C. 位置5的溫度會降低。
D. 位置7的溫度會升高。
答案：B.



科目： 291006
知能類： K1.04 [2.8/2.8]
序號： B1834 (P732)

Refer to the drawing of an operating water cleanup system (see figure below).
Valves A, B, and C are fully open. Valve D is 80% open. All temperatures are as shown. If valve D is then throttled to 50%, the temperature at point...
A. 3 will decrease.
B. 4 will increase.
C. 5 will increase.
D. 6 will decrease.

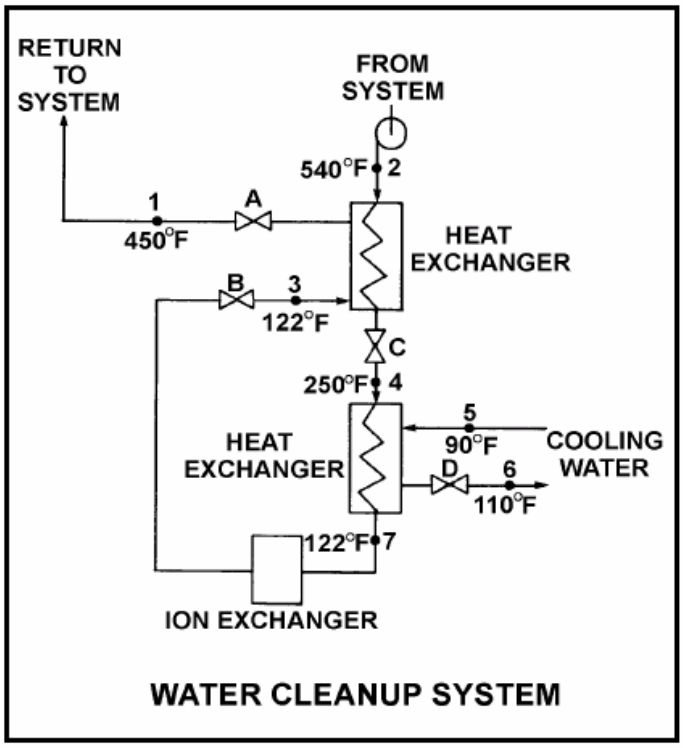
運轉中的水淨化系統圖（見下圖）。
A, B, C閥都是完全打開的，D閥打開80%開度，溫度均如圖所示。如果將D閥關至50%開度，則
A. 位置3的溫度會降低。
B. 位置4的溫度會升高。
C. 位置5的溫度會升高。
D. 位置6的溫度會降低。
答案：B.



科目： 291006
知能類： K1.04 [2.8/2.8]
序號： B1930 (P3332)

Refer to the drawing of an operating water cleanup system. All valves are identical and are initially 50% open (see figure below).
To raise the temperature at point 7, the operator should adjust valve _____ in the close direction.
A. A
B. B
C. C
D. D
ANSWER: D.

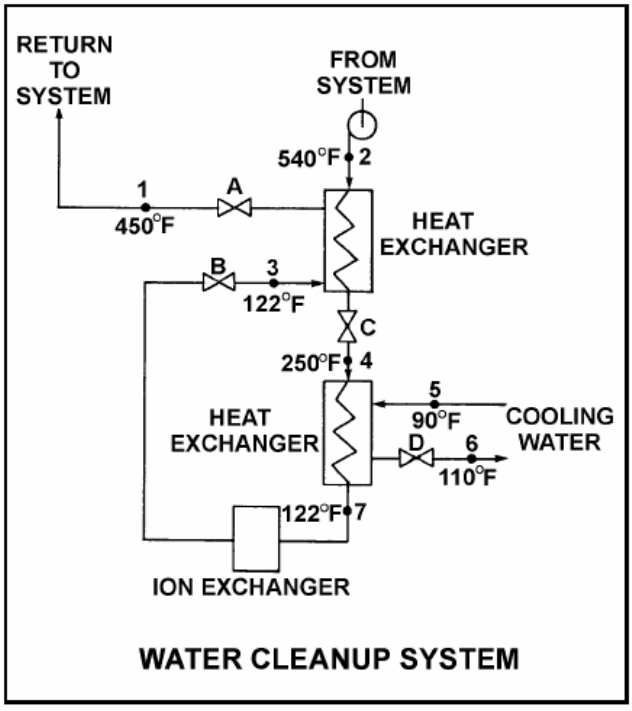
運轉中的水淨化系統圖，所有的閥都相同，且打開50%開度（見下圖）。
欲將位置7的溫度升高，運轉員應將閥__向關的方向調轉。
A. A
B. B
C. C
D. D
答案：D.



科目： 291006
知能類： K1.04 [2.8/2.8]
序號： B2431 (P2433)

Refer to the drawing of an operating water cleanup system (see figure below).
All valves are identical and are initially 50% open. To raise the temperature at point 1, the operator can adjust valve _____ in the _____ direction.
A. A; shut
B. B; open
C. C; shut
D. D; open
ANSWER: B

運轉中的水淨化系統圖（見下圖）。
所有的閥均在開始時打開50%開度。欲將位置1的溫度提高，運轉員應將閥__向__的方向調轉。
A. A；關
B. B；開
C. C；關
D. D；開
答案：B.



科目： 291006
知能類： K1.07 [2.7/2.8]
序號： B31

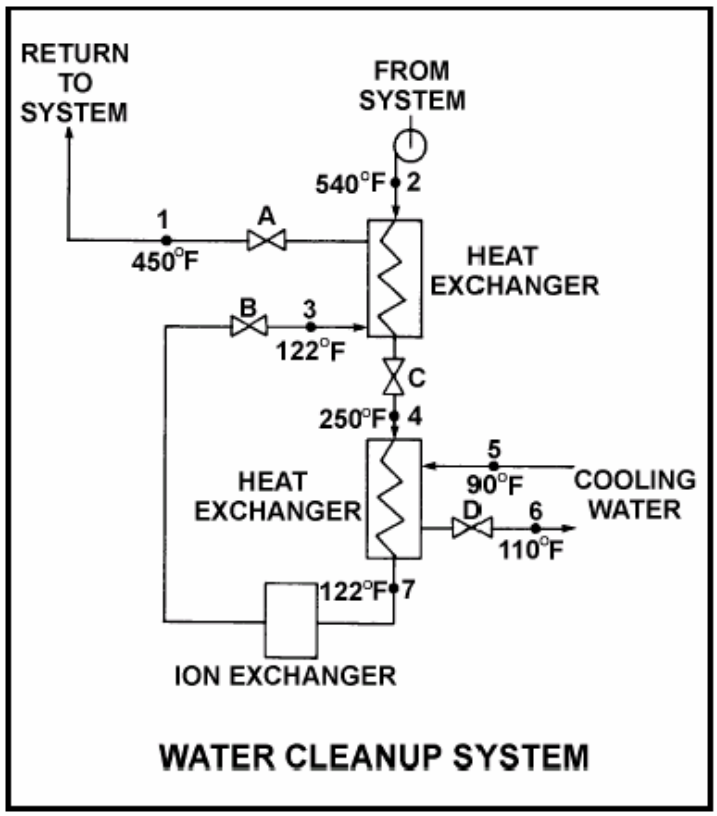
Decreasing the temperature of a cooled system using a shell-and-tube heat exchanger is normally accomplished by...
A. increasing the cooling system flow.
B. increasing the cooled system flow.
C. decreasing the cooling system flow.
D. decreasing the cooled system flow.
ANSWER: A.

利用殼—管熱交換器來降低被冷卻(cooled)系統的溫度時，正常而言應該要____
A. 增加冷卻(cooling)系統流量。
B. 增加被冷卻(cooled)系統流量。
C. 減少冷卻(cooling)系統流量。
D. 減少被冷卻(cooled)系統流量。
答案：A.

科目： 291006
知能類： K1.07 [2.9/3.0]
序號： B101

Refer to the drawing of an operating water cleanup system (see figure below).
All valves are identical and are initially 50% open. The temperature at point 3 is exceeding operating limits. To lower the temperature at point 3, the operator should adjust valve _____ in the open direction.
A. A
B. B
C. C
D. D
ANSWER: D.

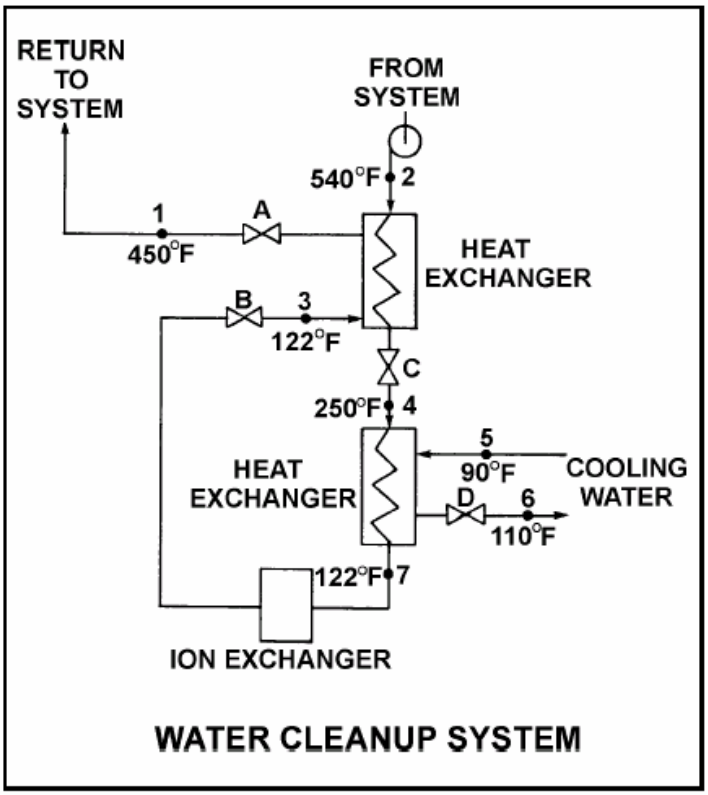
運轉中的水淨化系統圖（見下圖）。
所有的閥均在開始時打開50%開度。位置3的溫度超過運轉限制，為了降低位置3的溫度，運轉員應將閥__向開的方向調轉。
A. A
B. B
C. C
D. D
答案：D.



科目： 291006
知能類： K1.07 [2.7/2.8]
序號： B231 (P104)

Refer to the drawing of an operating water cleanup system (see figure below).
All valves are identical and are initially 50% open. To lower the temperature at point 7, the operator should adjust valve _____ in the open direction.
A. A
B. B
C. C
D. D
ANSWER: D.

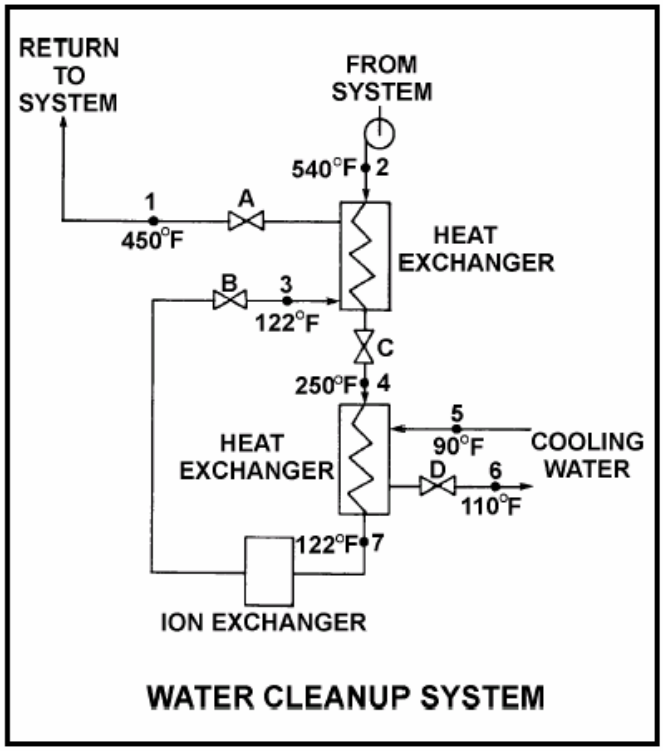
運轉中的水淨化系統圖（見下圖）。
所有的閥均在開始時打開50%開度。為了降低位置7的溫度，運轉員應將閥__向開的方向調轉。
A. A
B. B
C. C
D. D
答案：D.



科目： 291006
知能類： K1.07 [2.7/2.8]
序號： B1231 (P1231)

Refer to the drawing of an operating water cleanup system (see figure below).
All valves are identical and are initially 50% open. To lower the temperature at point 4, the operator should adjust valve _____ in the _____ direction.
A. A; open
B. B; shut
C. C; open
D. D; shut
ANSWER: B.

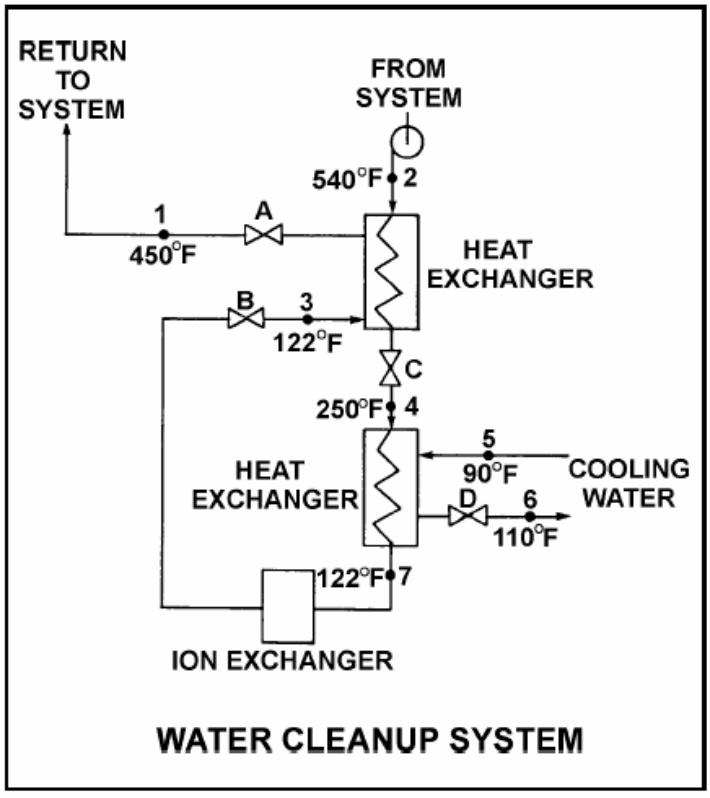
運轉中的水淨化系統圖（見下圖）。
所有的閥均在開始時打開50%開度。為了降低位置4的溫度，運轉員應將閥__向開的方向調轉。
A. A; 開
B. B; 關
C. C; 開
D. D; 關
答案：B.



科目： 291006
知能類： K1.07 [2.7/2.8]
序號： B2732 (P2732)

Refer to the drawing of an operating water cleanup system (see figure below).
All valves are identical and are initially 50% open. To raise the temperature at point 4, the operator can adjust valve _____ in the _____ direction.
A. A; shut
B. B; shut
C. C; open
D. D; open
ANSWER: C.

運轉中的水淨化系統圖（見下圖）。
所有的閥均在開始時打開50%開度。為了提高位置4的溫度，運轉員應將閥__向__的方向調轉。
A. A; 關
B. B; 關
C. C; 開
D. D; 開
答案：C.



科目： 291006
知能類： K1.07 [2.6/2.8]
序號： B3832 (P3833)

A main turbine-generator was operating at 80% load with the following initial steady-state cooling water and lube oil temperatures for the main turbine lube oil heat exchanger:
$T_{oil\ in}$ = 174˚F
$T_{oil\ out}$ = 114˚F
$T_{water\ in}$ = 85˚F
$T_{water\ out}$ = 115˚F
Six months later, the following current steady-state heat exchanger temperatures are observed:
$T_{oil\ in}$ = 177˚F
$T_{oil\ out}$ = 111˚F
$T_{water\ in}$ = 85˚F
$T_{water\ out}$ = 115˚F
Assume that the total heat exchanger heat transfer coefficient and the cooling water flow rate do not change, and that the specific heat values for the cooling water and lube oil do not change.
Also, assume that the lube oil system is a closed system.
Which one of the following could be responsible for the differences between the initial and current steady-state heat exchanger temperatures?
A. The current main turbine-generator load is lower than the initial load.
B. The current main turbine-generator load is higher than the initial load.
C. The current main turbine lube oil flow rate is less than the initial flow rate.
D. The current main turbine lube oil flow rate is greater than the initial flow rate.
ANSWER: C.

一主汽輪發電機運轉至80%負載，潤滑油熱交換器冷卻水和潤滑油溫度的起始穩定狀態如下列。
$T_{oil\ in}$ = 174˚F
$T_{oil\ out}$ = 114˚F
$T_{water\ in}$ = 85˚F
$T_{water\ out}$ = 115˚F

六個月後，觀察到熱交換器的目前穩態溫度如下列：

$T_{oil\ in}$ = 177˚F
$T_{oil\ out}$ = 111˚F
$T_{water\ in}$ = 85˚F
$T_{water\ out}$ = 115˚F

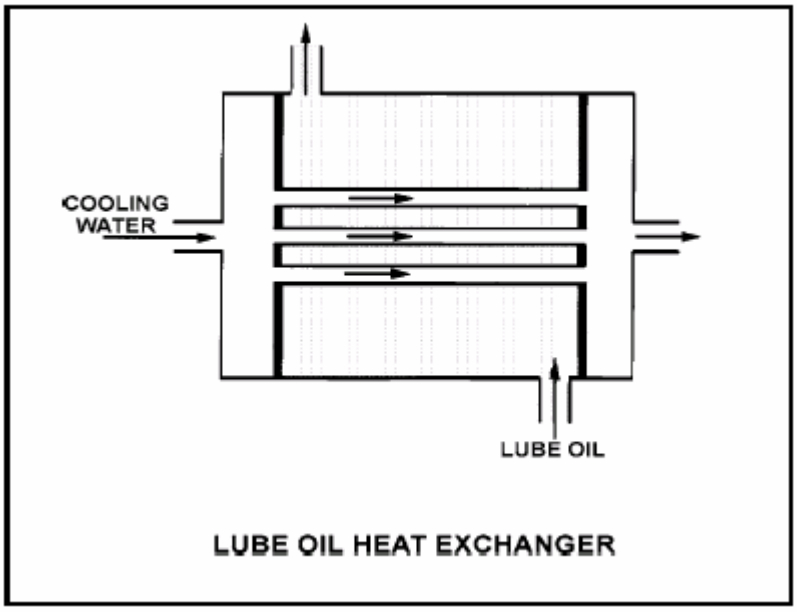
假設熱交換器總熱傳導係數和冷卻水流量都沒有改變，冷卻水和潤滑油的比熱也沒有改變。再假設潤滑油系統為封閉系統。
下列何者可能為導致熱交換器起始和目前穩態溫度不同的原因？

A. 主汽輪發電機目前的負載比起始負載低。
B. 主汽輪發電機目前的負載比起始負載高。
C. 主汽機目前的潤滑油流量比起始流量小。
D. 主汽機目前的潤滑油流量比起始流量大。
答案：C.

科目： 291006
知能類： K1.08 [2.9/3.0]
序號： B331 (P534)

Refer to the drawing of an operating lube oil heat exchanger (see figure below).
Increasing the oil flow rate through the heat exchanger will cause the oil outlet temperature to _____ and the cooling water outlet temperature to _____.
A. increase; increase
B. increase; decrease
C. decrease; increase
D. decrease; decrease
ANSWER: A.

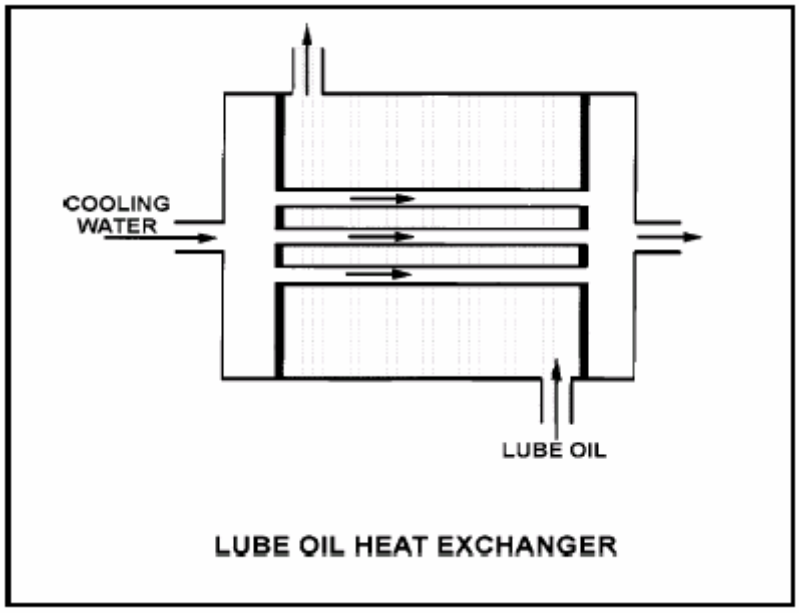
運轉中潤滑油熱交換器圖（見下圖）。
加大熱交換器中潤滑油的流量會導致油的出口溫度____，冷卻水的出口溫度____。
A. 升高；升高
B. 升高；降低
C. 降低；升高
D. 降低；降低
答案：A.



科目： 291006
知能類： K1.08 [2.9/3.0]
序號： B431 (P632)

Refer to the drawing of an operating lube oil heat exchanger (see figure below).
Assuming the inlet oil and inlet cooling water temperatures are constant, decreasing the oil flow rate through the heat exchanger will cause the oil outlet temperature to _____ and the cooling water outlet temperature to _____. (Assume cooling water flow rate remains the same.)
A. increase, increase
B. increase, decrease
C. decrease, increase
D. decrease, decrease
ANSWER: D.

運轉中潤滑油熱交換器圖（見下圖）。
假設潤滑油和冷卻水的進口溫度不變，冷卻水流量也不變。減低熱交換器中潤滑油的流量會導致潤滑油的出口溫度____，冷卻水的出口溫度____。
A. 升高；升高
B. 升高；降低
C. 降低；升高
D. 降低；降低
答案：D.



科目： 291006
知能類： K1.08 [2.9/3.0]
序號： B834 (P2034)

Refer to the drawing of an operating lube oil heat exchanger (see figure below).
Given the following existing conditions:
Qoil = 9.9 x 105 Btu/hr
Cp-oil = 1.1 Btu/lbm-˚F
Cp-water = 1.0 Btu/lbm-˚F
moil = 1.8 x 104 lbm/hr
mwater = 1.65 x 104 lbm/hr
Toil in = 170˚F
Toil out = 120˚F
Twater out = 110˚F
Twater in = ?Which one of the following is the cooling water inlet temperature ($T_{water\ in}$) in this heat exchanger?
A. 45˚F
B. 50˚F
C. 55˚F
D. 60˚F
ANSWER: B.

運轉中的潤滑油熱交換器圖（見下圖）。
給予現有的狀態如下列：

Q_{oil} = 9.9 x 10^5 Btu/hr
$C_{p\text{-}oil}$ = 1.1 Btu/lbm-˚F
$C_{p\text{-}water}$ = 1.0 Btu/lbm-˚F
m_{oil} = 1.8 x 10^4 lbm/hr
m_{water} = 1.65 x 10^4 lbm/hr
$T_{oil\ in}$ = 170˚F
$T_{oil\ out}$ = 120˚F
$T_{water\ out}$ = 110˚F
$T_{water\ in}$ = ?

下列何者為熱交換器中冷卻水的進口溫度($T_{water\ in}$)？
A. 45˚F
B. 50˚F
C. 55˚F
D. 60˚F
答案：B.

科目： 291006
知能類： K1.08 [2.9/3.0]
序號： B934 (P3132)

Refer to the drawing of a lube oil heat exchanger (see figure below).
The heat exchanger is operating with the following parameters:

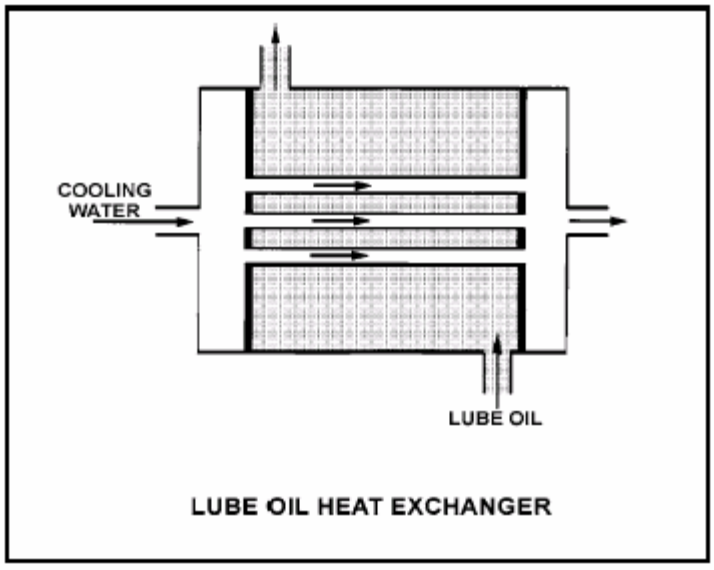
$\dot{Q}$oil = 1.0 x 107 Btu/hr

Toil in = 170˚F
Toil out = 134˚F
Twater in = 85˚F
Twater out = 112˚F
Cp-oil = 1.1 Btu/lbm-˚F
Cp-water = 1.0 Btu/lbm-˚F
mwater = ?Which one of the following is the mass flow rate of the cooling water?
A. 4.5 x 10^5 lbm/hr
B. 3.7 x 10^5 lbm/hr
C. 2.5 x 10^5 lbm/hr
D. 1.2 x 10^5 lbm/hr
ANSWER: B.

參考潤滑油熱交換器圖（見下圖）。
熱交換器以下列參數運轉：

$\dot{Q}_{oil}$ = 1.0 x 10^7 Btu/hr

$T_{oil\ in}$ = 170˚F
$T_{oil\ out}$ = 134˚F
$T_{water\ in}$ = 85˚F
$T_{water\ out}$ = 112˚F
$C_{p\text{-}oil}$ = 1.1 Btu/lbm-˚F
$C_{p\text{-}water}$ = 1.0 Btu/lbm-˚F
m_{water} = ?



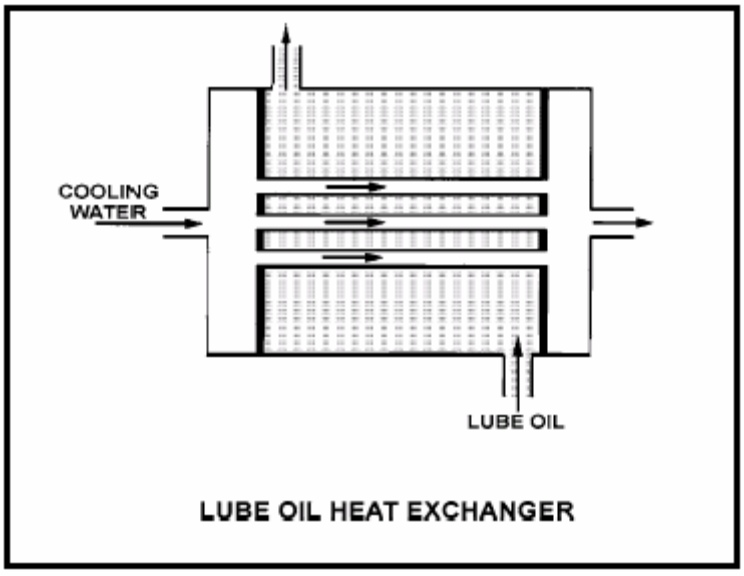
下列何者為冷卻水的流量？
A. 4.5 x 10^5 lbm/hr
B. 3.7 x 10^5 lbm/hr
C. 2.5 x 10^5 lbm/hr
D. 1.2 x 10^5 lbm/hr
答案：B.

科目： 291006
知能類： K1.08 [2.9/3.0]
序號： B1033

Refer to the drawing of an operating lube oil heat exchanger (see figure below).
Given the following existing conditions:
Cp-oil = 1.1 Btu/lbm-˚F
Cp-water = 1.0 Btu/lbm-˚F
$\dot{m}$oil = 1.8 x 104 lbm/hr
$\dot{m}$water = 1.65 x 104 lbm/hr
Toil in = 115˚F
Toil out = 90˚F
Twater out = 110˚F
Twater in = ?
Which one of the following is the cooling water inlet temperature ($T_{water\ in}$) for this heat exchanger?
A. 50˚F
B. 60˚F
C. 75˚F
D. 80˚F
ANSWER: D.

運轉中的潤滑油熱交換器圖（見下圖）。
給定下列現有的狀態：

$C_{p\text{-}oil}$ = 1.1 Btu/lbm-˚F
$C_{p\text{-}water}$ = 1.0 Btu/lbm-˚F
$\dot{m}_{oil}$ = 1.8 x 10^4 lbm/hr
$\dot{m}_{water}$ = 1.65 x 10^4 lbm/hr
$T_{oil\ in}$ = 115˚F
$T_{oil\ out}$ = 90˚F
$T_{water\ out}$ = 110˚F
$T_{water\ in}$ = ?

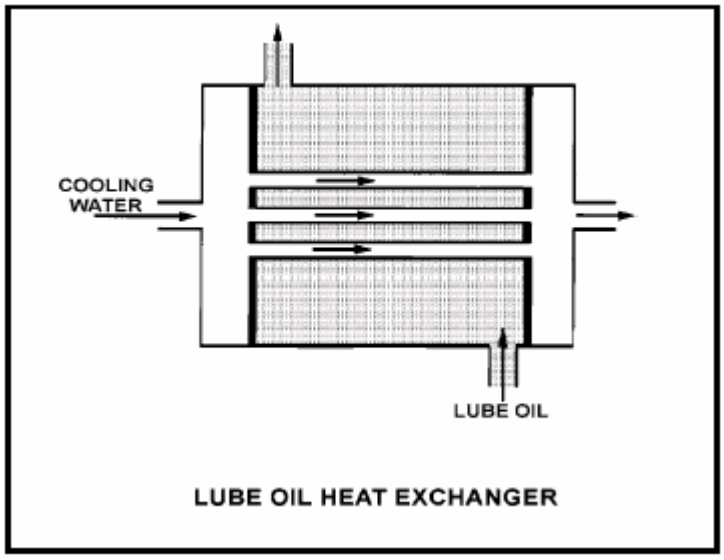


下列何者為熱交換器的冷卻水進口溫度($T_{water\ in}$)？
A. 50˚F
B. 60˚F
C. 75˚F
D. 80˚F
答案：D.

科目： 291006
知能類： K1.08 [2.9/3.0]
序號： B1331

Refer to the drawing of an operating lube oil heat exchanger (see figure below).
Given the following existing conditions:
$\dot{m}$oil = 1.8 x 104 lbm/hr
$\dot{m}$water = 3.3 x 104 lbm/hr
Cp-oil = 1.1 Btu/lbm-˚F
Cp-water = 1.0 Btu/lbm-˚F
Tcw-in = 90˚F
Tcw-out = 120˚F
Toil-in = 170˚F
Toil-out = ?
Which one of the following is the temperature of the oil exiting the heat exchanger ($T_{oil\text{-}out}$)?
A. 110˚F
B. 120˚F
C. 130˚F
D. 140˚F
ANSWER: B.

運轉中的潤滑油熱交換器（見下圖）。
給予現有的狀態如下列：
$\dot{m}_{oil}$ = 1.8 x 10^4 lbm/hr
$\dot{m}_{water}$ = 3.3 x 10^4 lbm/hr
$C_{p\text{-}oil}$ = 1.1 Btu/lbm-˚F
$C_{p\text{-}water}$ = 1.0 Btu/lbm-˚F
$T_{cw\text{-}in}$ = 90˚F
$T_{cw\text{-}out}$ = 120˚F
$T_{oil\text{-}in}$ = 170˚F
$T_{oil\text{-}out}$ = ?

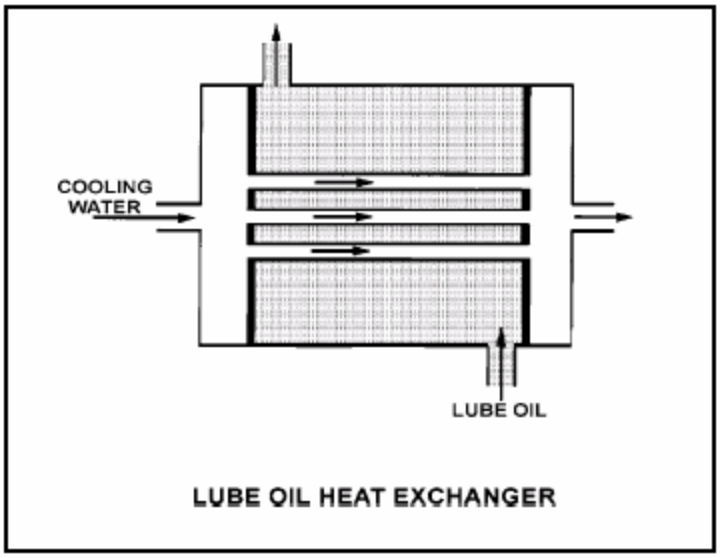


下列何者為熱交換器的潤滑油出口溫度($T_{oil\text{-}out}$)？
A. 110˚F
B. 120˚F
C. 130˚F
D. 140˚F
答案：B.

科目： 291006
知能類： K1.08 [2.9/3.0]
序號： B1435 (P2232)

Refer to the drawing of an operating lube oil heat exchanger (see figure below).
Given the following existing conditions:
$\dot{m}_{oil}$ = 1.8 x 10^4 lbm/hr
$\dot{m}_{water}$ = 3.3 x 10^4 lbm/hr
$C_{p\text{-}oil}$ = 1.1 Btu/lbm-˚F
$C_{p\text{-}water}$ = 1.0 Btu/lbm-˚F
$T_{cw\text{-}in}$ = 90˚F
$T_{cw\text{-}out}$ = 120˚F
$T_{oil\text{-}in}$ = 170˚F
$T_{oil\text{-}out}$ = ?
What is the approximate temperature of the oil exiting the heat exchanger ($T_{oil\text{-}out}$)?
A. 110˚F
B. 120˚F
C. 130˚F
D. 140˚F
ANSWER: B.

運轉中的潤滑油熱交換器圖（見下圖）。
給定下列現有的狀態：
$\dot{m}_{oil}$ = 1.8 x 10^4 lbm/hr
$\dot{m}_{water}$ = 3.3 x 10^4 lbm/hr
$C_{p\text{-}oil}$ = 1.1 Btu/lbm-˚F
$C_{p\text{-}water}$ = 1.0 Btu/lbm-˚F
$T_{cw\text{-}in}$ = 90˚F
$T_{cw\text{-}out}$ = 120˚F
$T_{oil\text{-}in}$ = 170˚F
$T_{oil\text{-}out}$ = ?

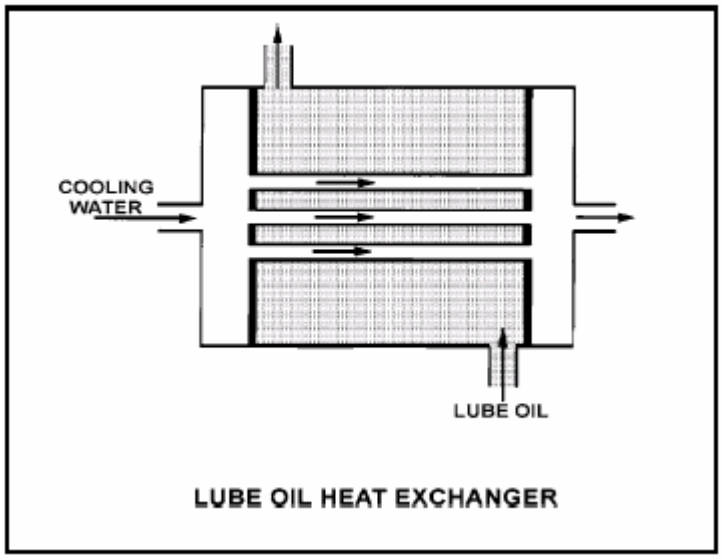


熱交換器中潤滑油的出口溫度($T_{oil\text{-}out}$)大約為多少？
A. 110˚F
B. 120˚F
C. 130˚F
D. 140˚F
答案：B.

科目： 291006
知能類： K1.08 [2.9/3.0]
序號： B1531 (P1533)

Refer to the drawing of an operating lube oil heat exchanger (see figure below).
Given the following existing conditions:
$\dot{m}_{oil}$ = 1.8 x 10^4 lbm/hr
$\dot{m}_{water}$ = 3.3 x 10^4 lbm/hr
Cp-oil = 1.1 Btu/lbm-˚F
Cp-water = 1.0 Btu/lbm-˚F
Tcw-in = 90˚F
Tcw-out = 120˚F
Toil-in = 170˚F
Toil-out = ?
What is the approximate temperature of the oil exiting the heat exchanger ($T_{oil-out}$)?
A. 110˚F
B. 120˚F
C. 130˚F
D. 140˚F
ANSWER: B.

運轉中的潤滑油熱交換器圖（見下圖）。
給定下列現有的狀態：
$\dot{m}_{oil}$ = 1.8 x 10^4 lbm/hr
$\dot{m}_{water}$ = 3.3 x 10^4 lbm/hr
$C_{p\text{-}oil}$ = 1.1 Btu/lbm-˚F
$C_{p\text{-}water}$ = 1.0 Btu/lbm-˚F
$T_{cw\text{-}in}$ = 90˚F
$T_{cw\text{-}out}$ = 120˚F
$T_{oil\text{-}in}$ = 170˚F
$T_{oil\text{-}out}$ = ?



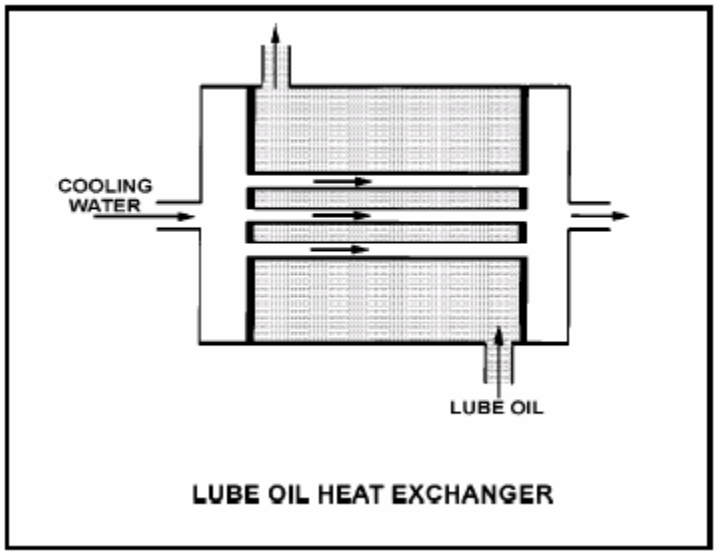
熱交換器中潤滑油的出口溫度
($T_{oil-out}$)大約為多少？
A. 110˚F
B. 120˚F
C. 130˚F
D. 140˚F
答案：B.

科目： 291006
知能類： K1.08 [2.9/3.0]
序號： B1631 (P1634)

Refer to the drawing of an operating lube oil heat exchanger (see figure below).
Given the following information, which one of the following is the temperature of the oil exiting the heat exchanger ($T_{oil-out}$)?
$\dot{m}_{oil}$ = 2.0 x 10^4lbm/hr
$\dot{m}_{water}$ = 3.0 x 10^4 lbm/hr
Cp-oil = 1.1 Btu/lbm-˚F
Cp-water = 1.0 Btu/lbm-˚F
Tcw-in = 92˚F
Tcw-out = 125˚F
Toil-in = 180˚F
Toil-out = ?
A. 126˚F
B. 135˚F
C. 147˚F
D. 150˚F
ANSWER: B.

運轉中的潤滑油熱交換器圖（見下圖）。
給予下列資料，下列何者為該熱交換器中潤滑油出口溫度($T_{oil-out}$)？

$\dot{m}_{oil}$ = 2.0 x 10^4 lbm/hr
$\dot{m}_{water}$ = 3.0 x 10^4 lbm/hr
C_{p-oil} = 1.1 Btu/lbm-˚F
$C_{p-water}$ = 1.0 Btu/lbm-˚F
T_{cw-in} = 92˚F
T_{cw-out} = 125˚F
T_{oil-in} = 180˚F
$T_{oil-out}$ = ?



A. 126˚F
B. 135˚F
C. 147˚F
D. 150˚F

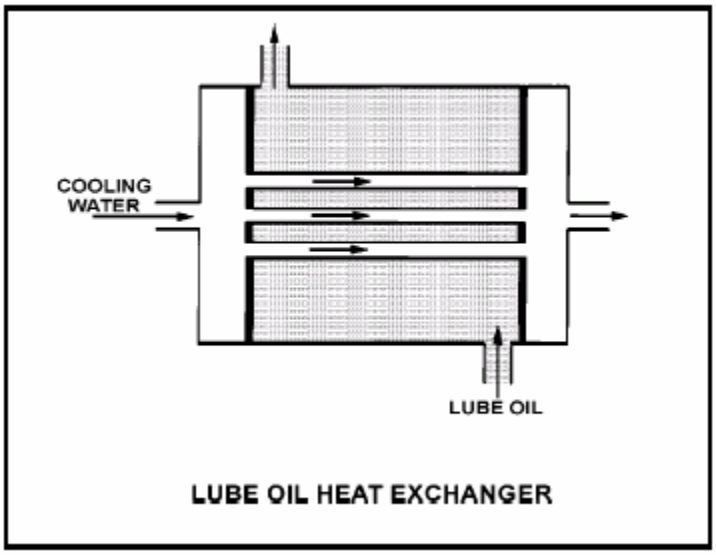
答案：B.

科目： 291006
知能類： K1.08 [2.9/3.0]
序號： B1933 (P1934)

Refer to the drawing of an operating lube oil heat exchanger (see figure below).
Given the following information, which one of the following is the temperature of the oil exiting the heat exchanger ($T_{oil-out}$)?
$\dot{m}_{oil}$ = 1.5 x 10^4 lbm/hr
$\dot{m}_{water}$ = 2.5 x 10^4 lbm/hr
Cp-oil = 1.1 Btu/lbm-˚F
Cp-water = 1.0 Btu/lbm-˚F
Tcw-in = 92˚F
Tcw-out = 125˚F
Toil-in = 160˚F
Toil-out = ?
A. 110˚F
B. 127˚F
C. 135˚F
D. 147˚F
ANSWER: A.

運轉中的潤滑油熱交換器圖（見下圖）。
給定下列資料，下列何者為該熱交換器中潤滑油出口溫度($T_{oil-out}$)？

$\dot{m}_{oil}$ = 1.5 x 10^4 lbm/hr
$\dot{m}_{water}$ = 2.5 x 10^4 lbm/hr
C_{p-oil} = 1.1 Btu/lbm-˚F
$C_{p-water}$ = 1.0 Btu/lbm-˚F
T_{cw-in} = 92˚F
T_{cw-out} = 125˚F
T_{oil-in} = 160˚F
$T_{oil-out}$ = ?



A. 110˚F
B. 127˚F
C. 135˚F
D. 147˚F
答案：A.

科目： 291006
知能類： K1.08 [2.9/3.0]
序號： B2132 (P2133)

Refer to the drawing of a lube oil heat exchanger (see figure below).
The lube oil heat exchanger is in service with the following inlet temperatures:
Lube oil inlet temperature: 120˚F
Cooling water inlet temperature: 60˚F
Assuming cooling water flow rate is greater than lube oil flow rate, which one of the following sets of heat exchanger outlet temperatures is possible? (Neglect any difference between fluidspecific heats.)

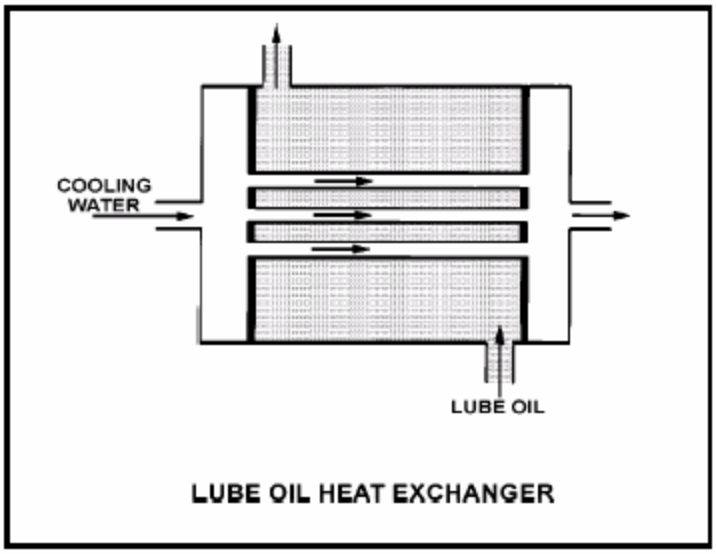
	Lube Oil Outlet Temp	Cooling Water Outlet Temp
A.	100˚F	100˚F
B.	90˚F	90˚F
C.	80˚F	80˚F
D.	80˚F	100˚F

ANSWER: C.

參考潤滑油熱交換器圖（見下圖）。
該潤滑油熱交換器以下列進口溫度運轉：
潤滑油進口溫度：120˚F
冷卻水進口溫度：60˚F
假設冷卻水流量大於潤滑油流量，下列何者為可能的熱交換器出口溫度？（忽略流體間的比熱差）

	潤滑油出口溫度	冷卻水出口溫度
A.	100˚F	100˚F
B.	90˚F	90˚F
C.	80˚F	80˚F
D.	80˚F	100˚F

答案：C.



科目： 291006
知能類： K1.08 [2.9/3.0]
序號： B2233 (P2434)

Refer to the drawing of a lube oil heat exchanger (see figure below).
The lube oil heat exchanger is in service with the following inlet temperatures:
Lube oil inlet temperature: 130˚F
Cooling water inlet temperature: 70˚F
Assuming cooling water flow rate is greater than lube oil flow rate, which one of the following sets of heat exchanger outlet temperatures is possible? (Assume both fluids have the same c_p.)

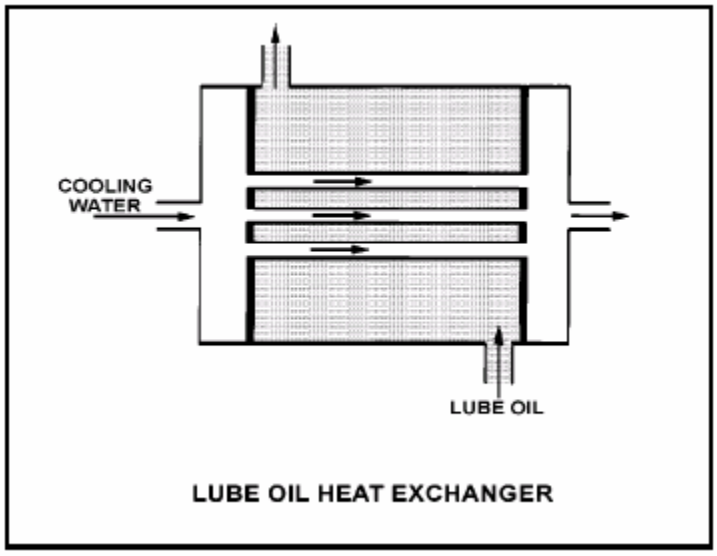
Lube Oil Outlet Temp	Cooling Water Outlet Temp
A.90˚F	100˚F
B.90˚F	110˚F
C.100˚F	100˚F
D.100˚F	110˚F

ANSWER: A.

參考潤滑油熱交換器圖（見下圖）。
該潤滑油熱交換器以下列進口溫度運轉：
潤滑油進口溫度：130˚F
冷卻水進口溫度：70˚F
假設冷卻水流量大於潤滑油流量，下列何者為可能的熱交換器出口溫度？（假設兩種流體具有相同的c_p。）

	潤滑油出口溫度	冷卻水出口溫度
A.	90˚F	100˚F
B.	90˚F	110˚F
C.	100˚F	100˚F
D.	100˚F	110˚F

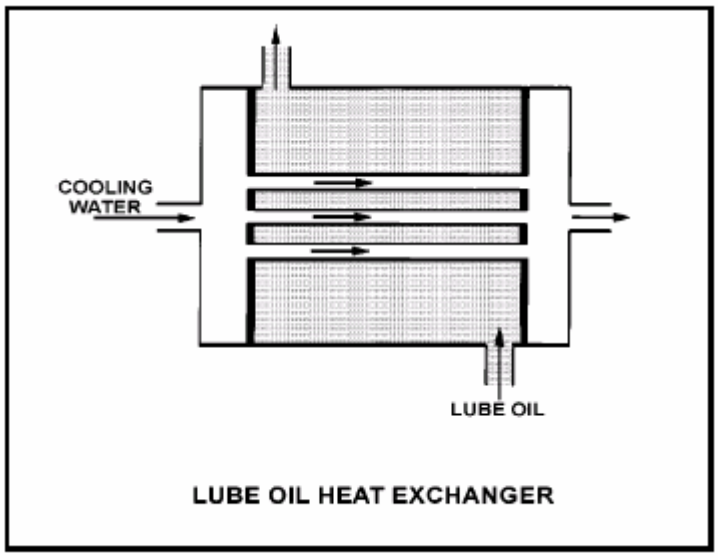
答案：A.



科目： 291006
知能類： K1.08 [2.9/3.0]
序號： B2534 (P2532)

Refer to the drawing of an operating lube oil heat exchanger (see figure below).
Given the following information, which one of the following is the temperature of the cooling water exiting the heat exchanger ($T_{cw\text{-}out}$)?
$\dot{m}_{oil}$ = 1.5 x 10^4 lbm/hr
$\dot{m}_{water}$ = 2.5 x 10^4 lbm/hr
Cp-oil = 1.1 Btu/lbm-˚F
Cp-water = 1.0 Btu/lbm-˚F
Tcw-in = 92˚F
Tcw-out = ?
Toil-in = 160˚F
Toil-out = 110˚F
A. 110˚F
B. 115˚F
C. 120˚F
D. 125˚F
ANSWER: D.

運轉中的潤滑油熱交換器圖（見下圖）。
給定下列資料，下列何者為該熱交換器的冷卻水出口溫度($T_{cw\text{-}out}$)？
$\dot{m}_{oil}$ = 1.5 x 10^4 lbm/hr
$\dot{m}_{water}$ = 2.5 x 10^4 lbm/hr
$C_{p\text{-}oil}$ = 1.1 Btu/lbm-˚F
$C_{p\text{-}water}$ = 1.0 Btu/lbm-˚F
$T_{cw\text{-}in}$ = 92˚F
$T_{cw\text{-}out}$ = ?
$T_{oil\text{-}in}$ = 160˚F
$T_{oil\text{-}out}$ = 110˚F



A. 110˚F
B. 115˚F
C. 120˚F
D. 125˚F
答案：D.

科目： 291006
知能類： K1.08 [2.9/3.0]
序號： B2632 (P2633)

Refer to the drawing of a lube oil heat exchanger (see figure below).
The lube oil heat exchanger is in service with the following inlet temperatures:
Lube oil inlet temperature: 110˚F
Cooling water inlet temperature: 75˚F
Assuming cooling water flow rate is greater than lube oil flow rate, which one of the following sets of heat exchanger outlet temperatures is possible? (Neglect any difference between fluid specific heats.)

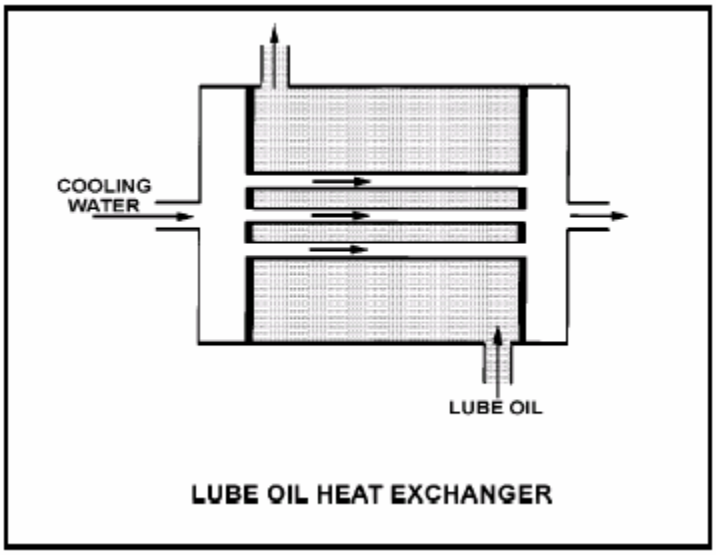
	Lube Oil Outlet Temp	Cooling Water Outlet Temp
A.	100˚F	100˚F
B.	100˚F	90˚F
C.	90˚F	100˚F
D.	90˚F	90˚F

ANSWER: D.

參考潤滑油熱交換器圖（見下圖）。
該潤滑油熱交換器以下列進口溫度運轉：
潤滑油進口溫度：110˚F
冷卻水進口溫度：75˚F
假設冷卻水流量大於潤滑油流量，下列何者為可能的熱交換器出口溫度？（忽略流體間的比熱差異）

	潤滑油 出口溫度	冷卻水 出口溫度
A.	100˚F	100˚F
B.	100˚F	90˚F
C.	90˚F	100˚F
D.	90˚F	90˚F

答案：D.



科目： 291006
知能類： K1.08 [2.9/3.0]
序號： B2733 (P2733)

Refer to the drawing of a lube oil heat exchanger (see figure below).
The lube oil heat exchanger is in service with the following inlet temperatures:
Lube oil inlet temperature: 130˚F
Cooling water inlet temperature: 70˚F
Assuming cooling water flow rate is greater than lube oil flow rate, which one of the following pairs of heat exchanger outlet temperatures is not possible? (Assume both fluids have the same specific heat.)

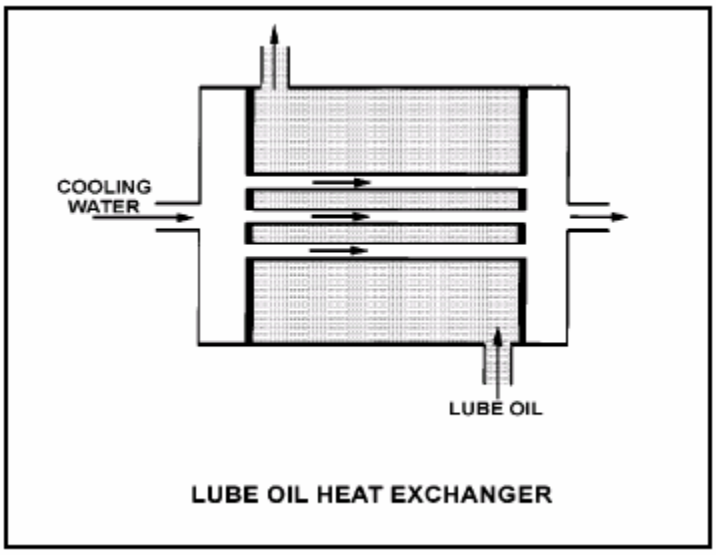
	Lube Oil Outlet Temp	Cooling Water Outlet Temp
A.	90EF	86˚F
B.	100EF	85˚F
C.	110EF	84˚F
D.	120EF	83˚F

ANSWER: D.

參考潤滑油熱交換器圖（見下圖）。
該潤滑油熱交換器以下列進口溫度運轉：
潤滑油進口溫度：130˚F
冷卻水進口溫度：70˚F
假設冷卻水流量大於潤滑油流量，下列何者不可能是該熱交換器的出口溫度？（假設兩種流體有相同的比熱）

	潤滑油出口溫度	冷卻水出口溫度
A.	90˚F	86˚F
B.	100˚F	85˚F
C.	110˚F	84˚F
D.	120˚F	83˚F

答案：D.



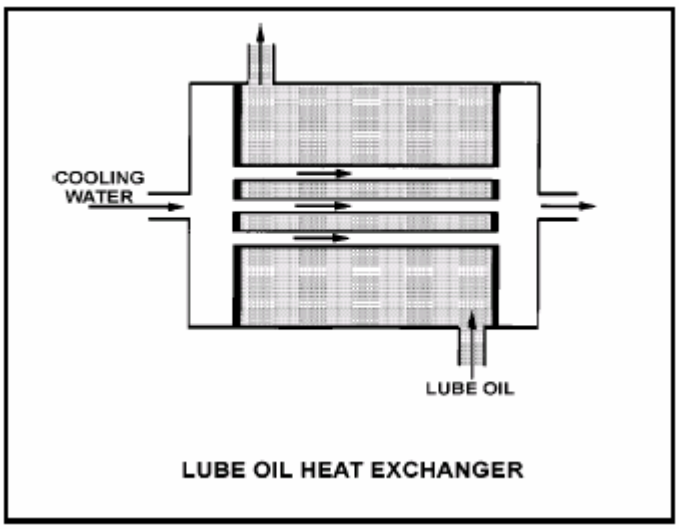
科目： 291006
知能類： K1.08 [2.9/3.0]
序號： B2832

Refer to the drawing of an operating lube oil heat exchanger (see figure below).
Given the following initial parameters:
Cooling water inlet temperature ($T_{cw\text{-}in}$) = 75E˚F
Cooling water outlet temperature ($T_{cw\text{-}out}$) = 105˚F
Oil inlet temperature ($T_{oil\text{-}in}$) = 140˚F
Oil outlet temperature ($T_{oil\text{-}out}$) = 100˚F
Air introduction to the heat exchanger results in some of the heat exchanger tubes becoming uncovered. As a result, $T_{cw\text{-}out}$ decreases to 99˚F. Assuming mass flow rate and c_p of both fluids remain the same, which one of the following will be the approximate temperature of the oil exiting the heat exchanger ($T_{oil\text{-}out}$)?
A. 99˚F
B. 108˚F
C. 116˚F
D. 122˚F
ANSWER: B.

運轉中的潤滑油熱交換器圖（見下圖）。
給予下列起始參數：
冷卻水進口溫度($T_{cw\text{-}in}$) = 75˚F
冷卻水出口溫度($T_{cw\text{-}out}$) = 105˚F
潤滑油進口溫度($T_{oil\text{-}in}$) = 140˚F
潤滑油出口溫度($T_{oil\text{-}out}$) = 100˚F
由於空氣進入該熱交換器，以致於有一些熱交換器水管未被水覆蓋，也因此讓$T_{cw\text{-}out}$降低到99˚F。假設兩種流體的流量以及c_p 都沒有改變，下列何者為該熱交換器潤滑油的大約出口溫度($T_{oil\text{-}out}$)？

A. 99˚F
B. 108˚F
C. 116˚F
D. 122˚F

答案：B.



科目： 291006
知能類： K1.08 [2.9/3.0]
序號： B2933 (P2934)

Refer to the drawing of a lube oil heat exchanger (see figure below).
The lube oil heat exchanger is in service with the following inlet temperatures:
Lube oil inlet temperature: 130˚F
Cooling water inlet temperature: 70˚F
Assuming the cooling water flow rate exceeds the lube oil flow rate, which one of the following pairs of heat exchanger outlet temperatures is possible? (Assume both fluids have the same specific heat.)

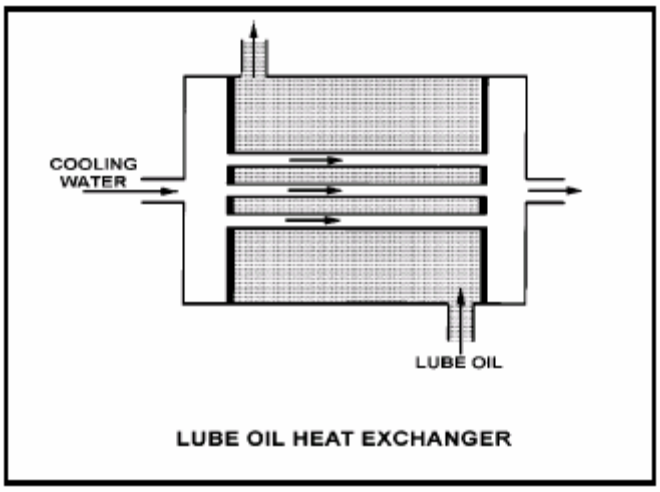
	Lube Oil Outlet Temp	Cooling Water Outlet Temp
A.	100EF	90˚F
B.	100EF	100˚F
C.	110EF	90˚F
D.	110EF	100˚F

ANSWER: A.

參考潤滑油熱交換器圖（見下圖）。
該潤滑油熱交換器以下列進口溫度運轉：
潤滑油進口溫度：130˚F
冷卻水進口溫度：70˚F
假設冷卻水流量大於潤滑油流量，下列何者可能是該熱交換器的出口溫度？（假設兩種流體有相同的比熱）

	潤滑油 出口溫度	冷卻水 出口溫度
A.	100˚F	90˚F
B.	100˚F	100˚F
C.	110˚F	90˚F
D.	110˚F	100˚F

答案：A.



科目： 291006
知能類： K1.08 [2.9/3.0]
序號： B3032 (P3081)

The volumetric flow rate of cooling water entering a heat exchanger is 500 gpm.
Given the following:
Cooling water pressure entering and leaving the heat exchanger is 10 psig.
Cooling water inlet temperature is 90°F.
Cooling water outlet temperature is 160°F.
Heat exchanger inlet and outlet piping have the same diameter.
What is the approximate volumetric flow rate of the cooling water exiting the heat exchanger?
A. 496 gpm
B. 500 gpm
C. 504 gpm
D. 509 gpm
ANSWER: D.

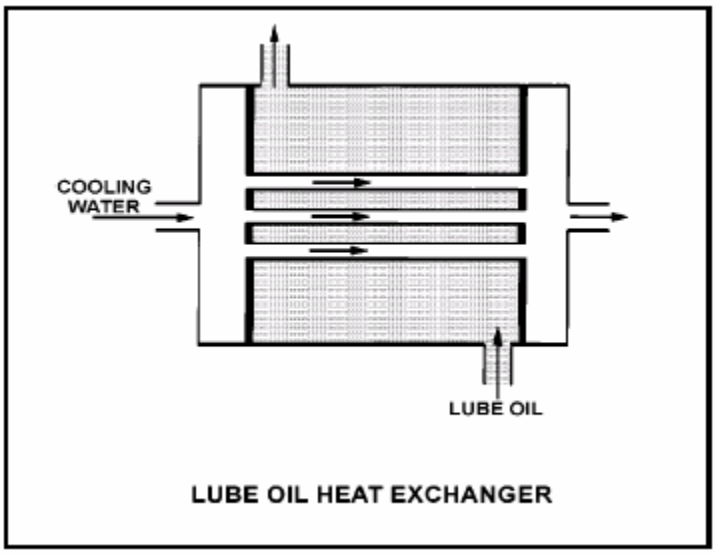
流進熱交換器的冷卻水容積流量為500gpm。
給定下列條件：
流進和流出熱交換器的冷卻水壓為10psig。
冷卻水的進口溫度為90 F。
冷卻水的出口溫度為160˚F。
熱交換器的進口、出口管路直徑相同。
流出熱交換器的冷卻水容積流量大約為多少？

A. 496 gpm
B. 500 gpm
C. 504 gpm
D. 509 gpm
答案：D.

科目： 291006
知能類： K1.08 [2.9/3.0]
序號： B3431

Refer to the drawing of a lube oil heat exchanger (see figure below).
The heat exchanger is operating with the following parameters:
$C_{p\text{-}oil}$ = 1.1 Btu/lbm-˚F
$C_{p\text{-}water}$ = 1.0 Btu/lbm-˚F
$T_{oil\ in}$ = 174˚F
$T_{oil\ out}$ = 114˚F
$T_{water\ in}$ = 85˚F
$T_{water\ out}$ = 121˚F
$\dot{m}_{oil}$ = 4.0 x 10_4 lbm/hr
$\dot{m}_{water}$ = ?
What is the mass flow rate of the cooling water?
A. 8.0 x 10_4 lbm/hr
B. 7.3 x 10_4 lbm/hr
C. 2.6 x 10_4 lbm/hr
D. 2.2 x 10_4 lbm/hr
ANSWER: B.

參考潤滑油熱交換器圖（見下圖）。
該熱交換器以下列的參數運轉：
$C_{p\text{-}oil}$ = 1.1 Btu/lbm-˚F
$C_{p\text{-}water}$ = 1.0 Btu/lbm-˚F
$T_{oil\ in}$ = 174˚F
$T_{oil\ out}$ = 114˚F
$T_{water\ in}$ = 85˚F
$T_{water\ out}$ = 121˚F
$\dot{m}_{oil}$ = 4.0 x 10^4 lbm/hr
$\dot{m}_{water}$ = ?



冷卻水的流量為何？

A. 8.0 x 10^4 lbm/hr
B. 7.3 x 10^4 lbm/hr
C. 2.6 x 10^4 lbm/hr
D. 2.2 x 10^4 lbm/hr
答案：B.

科目： 291006
知能類： K1.08 [2.9/3.0]
序號： B3732 (P3732)

Refer to the drawing of a lube oil heat exchanger (see figure below).
The lube oil heat exchanger is in service with the following inlet temperatures:
Lube oil inlet temperature: 130˚F
Cooling water inlet temperature: 70˚F
Assume that cooling water mass flow rate is less than lube oil mass flow rate, and that both fluids have the same specific heat. Which one of the following pairs of heat exchanger outlet temperatures is not possible?

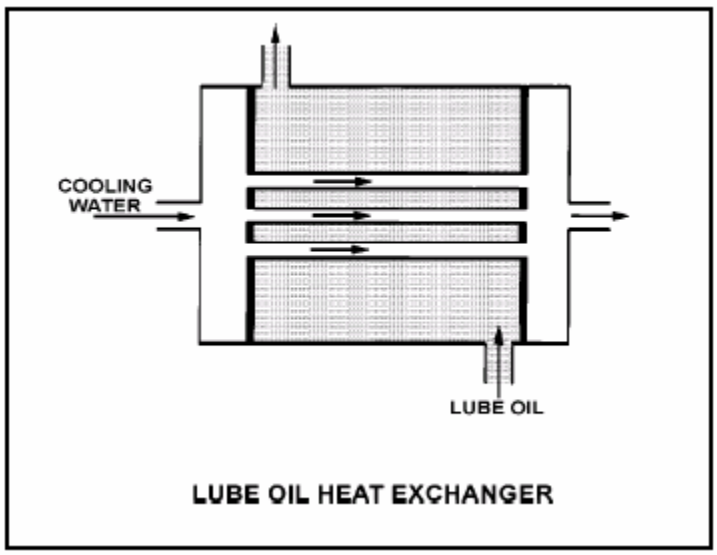
	Lube Oil Outlet Temp	Cooling Water Outlet Temp
A.	100EF	105˚F
B.	105EF	105˚F
C.	110EF	90˚F
D.	115EF	90˚F

ANSWER: C.

參考潤滑油熱交換器圖（見下圖）。
該潤滑油熱交換器以下列進口溫度運轉：
潤滑油進口溫度：130˚F
冷卻水進口溫度：70˚F
假設冷卻水流量小於潤滑油流量，兩種流體有相同的比熱，下列何者不可能是該熱交換器的出口溫度？

	潤滑油出口溫度	冷卻水出口溫度
A.	100˚F	105˚F
B.	105˚F	105˚F
C.	110˚F	90˚F
D.	115˚F	90˚F

答案：C.



科目： 291006
知能類： K1.08 [2.9/3.0]
序號： B3733 (P3783)

A condensate pump is taking suction on a main condenser hotwell, containing water at 100˚F, and discharging the water at a volumetric flow rate of 100,000 gpm to the main feedwater system. The main feedwater system heats the water to 400EF before it enters the reactor vessel.
Assume there is no leakage, and no bypass or recirculation flow paths are in use.
What is the approximate volumetric flow rate of the feedwater entering the reactor vessel?
A. 100,000 gpm
B. 105,000 gpm
C. 109,000 gpm
D. 116,000 gpm
ANSWER: D.

冷凝水泵由主冷凝器熱井中抽水，水溫為100˚F，以100,000 gpm的容積流量將水注入到主飼水系統。主飼水系統將水加熱到400˚F再送入反應爐內。
假設沒有漏水，也沒有使用旁通或再循環路徑。
流進反應爐槽的飼水容積流量大約為何？
A. 100,000 gpm
B. 105,000 gpm
C. 109,000 gpm
D. 116,000 gpm
答案：D.

TOPIC: 291006
KNOWLEDGE: K1.08 [2.9/3.0]
QID: B4018 (P4016)

Refer to the drawing of an operating lube oil heat exchanger (see figure below).

Given the following initial parameters:

Cooling water inlet temperature ($T_{cw\text{-}in}$) = 75°F
Cooling water outlet temperature ($T_{cw\text{-}out}$) = 95°F
Oil inlet temperature ($T_{oil\text{-}in}$) = 150°F
Oil outlet temperature ($T_{oil\text{-}out}$) = 120°F

Air introduction to the heat exchanger results in some of the heat exchanger tubes becoming uncovered. As a result, $T_{cw\text{-}out}$ decreases to 91°F. Assume the inlet temperatures, mass flow rates, and specific heats of both fluids remain the same.

Which one of the following will be the new approximate temperature of the oil exiting the heat exchanger ($T_{oil\text{-}out}$)?

A. 126°F

B. 130°F

C. 134°F

D. 138°F

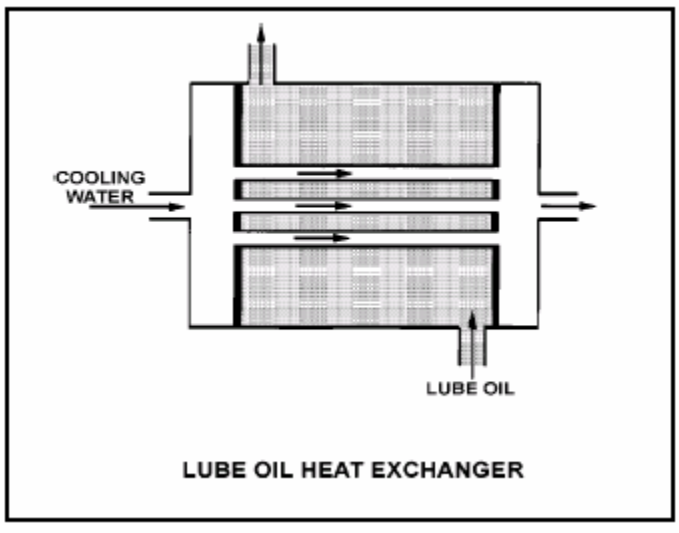
運轉中的潤滑油熱交換器（見下圖）。
給定下列的起始參數：

冷卻水進口溫度 ($T_{cw\text{-}in}$) = 75˚F
冷卻水出口溫度 ($T_{cw\text{-}out}$) = 95˚F
潤滑油進口溫度 ($T_{oil\text{-}in}$) = 150˚F
潤滑油出口溫度 ($T_{oil\text{-}out}$) = 120˚F

空氣進入熱交換器導致有些熱交換管未被水覆蓋。結果$T_{cw\text{-}out}$降低到91˚F。假設進口溫度，流量以及兩種流體的比熱維持不變。下列何者為潤滑油流出熱交換器時的大約溫度($T_{oil\text{-}out}$)？

A. 126˚F
B. 130˚F
C. 134˚F
D. 138˚F

答案：A.



LUBE OIL HEAT EXCHANGER

科目： 291006
知能類： K1.09 [2.7/2.8]
序號： B232

A reactor is shut down with a reactor coolant temperature of 400˚F and all control rods fully inserted. What is the major adverse consequence resulting from rapidly reducing the reactor coolant temperature to 250˚F?
A. Excessive stress in the ceramic fuel pellets of the reactor core
B. Excessive stress on the reactor vessel wall
C. Uncontrolled reactor criticality
D. Loss of core inlet subcooling
ANSWER: B.

一反應器停機，其冷卻水的溫度為400˚F，且所有控制棒全入。下列何者為將反應器冷卻水迅速降溫至250˚F時會導致主要的負面後果？
A. 反應器爐心的陶瓷燃料丸會有過高的應力
B. 反應爐槽壁會有過高的應力
C. 反應器臨界值失控
D. 喪失爐心進口冷卻水的次冷度
答案：B.

科目： 291006
知能類： K1.09 [2.7/2.8]
序號： B633

Steam has been admitted to a condenser for 25 minutes with no cooling water during a condenser startup. Initiating full cooling water flow rate at this time will...
A. reduce the stress on the condenser shell by rapidly cooling the shell.
B. reduce the stress on the condenser tubes by rapidly cooling the tubes.
C. induce large thermal stresses on the condenser shell.
D. induce large thermal stresses on the junctions between the condenser tubes and the tubesheet.
ANSWER: D

在冷凝器啟動時，蒸汽在無冷卻水狀況下進入冷凝器25分鐘，此時以全流量加入冷卻水將會__
__
A. 因快速冷卻冷凝器殼而降低殼的應力。
B. 因快速冷卻冷凝器管子而降低管子的應力。
C. 在冷凝器殼造成大量的熱應力。
D. 在冷凝器管和管板間的接頭上造成大量的熱應力。
答案：D.

科目： 291006
知能類： K1.10 [2.8/2.8]
序號： B32

A plant is operating at full power with 2˚F of condensate subcooling. Which one of the following changes will decrease subcooling of the condensate entering the main condenser hot well? (Assume condensate temperature does not change.)
A. Decreased circulating water flow rate
B. Increased gas buildup in the main condenser
C. Decreased main condenser hotwell level
D. Decreased main turbine steam flow
ANSWER: D.

電廠以2˚F的冷凝水次冷度全功率運轉。下列何種改變將會降低進入主冷凝器熱井的冷凝水次冷度？（假設冷凝水溫度不變。）
A. 降低循環水流量
B. 增加主冷凝器中的氣體囤積
C. 降低主冷凝器熱井的水位
D. 降低主汽機的蒸汽流量
答案：D.

科目： 291006
知能類： K1.10 [2.8/2.8]
序號： B111 (P1834)

During normal reactor operation, a main condenser develops an air leak which decreases vacuum at a rate of 1 inch Hg/min. Which one of the following would increase because of this condition?
A. Extraction steam flow rate
B. Condenser hotwell temperature
C. Low pressure turbine exhaust steam moisture content
D. Steam cycle efficiency
ANSWER: B.

反應爐正常運轉時，有一主冷凝器發生漏氣現象，導致真空度以每分鐘1英吋汞柱的速度降低。下列何者會因此狀況而增加（或提高）？
A. 主冷凝器抽汽的流量
B. 冷凝器熱井溫度
C. 低壓汽機排汽的含水率
D. 蒸汽循環效率
答案：B.

科目： 291006
知能類： K1.10 [2.8/2.8]
序號： B733

Which one of the following changes will result in increased subcooling of the condensate water in the condenser hot well?
A. Decrease circulating water flow.
B. Increase circulating water temperature.
C. Decrease the main turbine generator MW load.
D. Isolate one bay of the condenser circulating water system.
ANSWER: C.

下列何項改變將會提高冷凝器熱井中冷凝水的次冷度？
A. 降低循環水流量
B. 提高循環水溫度
C. 降低主汽輪發電機的MW負載
D. 隔離冷凝器循環水系統中的一串熱交換器
答案：C.

科目： 291006
知能類： K1.10 [2.8/2.8]
序號： B1135 (P2480)

The primary reason for slowly opening the discharge valves of large motor-driven centrifugal cooling water pumps after starting the pumps is to minimize the...
A. net positive suction head requirements.
B. potential for a water hammer.
C. motor running current requirements.
D. potential for pump cavitation.
ANSWER: B.

在啟動大型馬達驅動的離心冷卻水泵時，要慢慢打開泵的出口閥，主要原因是要將____減至最低（小）。
A. 淨正吸水頭
B. 水錘的可能性
C. 馬達運轉電流的需求
D. 泵孔蝕的可能性
答案：B.

科目： 291006
知能類： K1.10 [2.8/2.8]
序號： B1232

Assuming that condenser cooling water inlet temperature and flow rate do not change, if condenser vacuum improves, condensate temperature will...
A. increase because condensate subcooling has decreased.
B. increase because condenser saturation pressure has increased.
C. decrease because condensate subcooling has increased.
D. decrease because condenser saturation pressure has decreased.
ANSWER: D.

假設冷凝器冷卻水的進口溫度和流量都不改變，如果冷凝器的真空度改善，冷凝水的溫度將會____
A. 升高，因為冷凝水的次冷度降低。
B. 升高，因為冷凝器的飽和壓力增加。
C. 降低，因為冷凝水的次冷度提高。
D. 降低，因為冷凝器的飽和壓力降低。
答案：D.

科目： 291006
知能類： K1.10 [2.8/2.8]
序號： B2133

During normal plant operation at 100% power, a main condenser develops an air leak that degrades vacuum at a rate of 1 inch Hg/min. Assuming the plant continues to operate at 100% power, condenser hotwell temperature will...
A. increase because condensation of turbine exhaust steam is occurring at a higher temperature.
B. increase because more work is being extracted from the steam by the turbine.
C. decrease because condensation of turbine exhaust steam is occurring at a lower temperature.
D. decrease because less work is being extracted from the steam by the turbine.
ANSWER: A.

核電廠以100％功率正常運轉時，有一主冷凝器發生漏氣現象，導致真空度以每分鐘1英吋汞柱的速率降低。假設該電廠繼續以100％功率運轉，冷凝器熱井的溫度將會____
A. 升高，因為汽機排汽在較高溫度中發生冷凝。
B. 升高，因為汽機從蒸汽中抽取的功(work)較多。
C. 降低，因為汽機排汽在較低溫度中發生冷凝。
D. 降低，因為汽機從蒸汽中抽取的功(work)較少。
答案：A.

科目： 291006
知能類： K1.10 [2.8/2.8]
序號： B2633 (P2634)

A reactor is operating at steady-state 100% power. Assuming that condenser cooling water inlet temperature and flow rate do not change, if condenser vacuum decreases, condensate temperature will...
A. increase because condensate subcooling has decreased.
B. increase because condenser saturation pressure has increased.
C. decrease because condensate subcooling has increased.
D. decrease because condenser saturation pressure has decreased.
ANSWER: B.

核能電廠以100%功率的穩定狀態運轉，假設冷凝器冷卻水的進口溫度和流量都不改變，如果冷凝器的真空度降低，冷凝水的溫度將會____
A. 升高，因為冷凝水的次冷度降低。
B. 升高，因為冷凝器的飽和壓力增加。
C. 降低，因為冷凝水的次冷度提高。
D. 降低，因為冷凝器的飽和壓力降低。
答案：B.

科目： 291006
知能類： K1.10 [2.8/2.8]
序號： B2736 (P3534)

A nuclear plant is operating at steady-state 100% power when air inleakage causes main condenser vacuum to decrease from 28 inches Hg to 27 inches Hg. Assume the steam inlet quality and mass flow rate of steam through the main turbine remain unchanged, and that condenser cooling water inlet temperature and flow rate do not change.
When the plant stabilizes, turbine exhaust quality will be_____ and turbine exhaust temperature will be _____.
A. higher; higher
B. higher; lower
C. lower; higher
D. lower; lower
ANSWER: A.

核能電廠以100％功率的穩定狀態運轉，此時發生空氣漏入現象使得主冷凝器的真空度由28 英吋汞柱降到27英吋汞柱。假設主汽機進口的蒸汽乾度和流量都保持不變，而且冷凝器的冷卻水進口溫度和流量也沒有改變。
當電廠穩定下來時，汽機的排汽乾度將會____，汽機的排汽溫度將會____。
A. 升高，升高
B. 升高，降低
C. 降低，升高
D. 降低，降低
答案：A.

科目： 291006
知能類： K1.11 [2.8/2.8]
序號： B374

A pressure gauge on a condenser reads 27 inches of mercury (Hg) vacuum. What is the absolute pressure corresponding to this vacuum? (Assume an atmospheric pressure of 15 psia.)
A. 1.0 psia
B. 1.5 psia
C. 13.5 psia
D. 14.0 psia
ANSWER: B

冷凝器的壓力表讀數為27 英吋汞柱(Hg)真空。相對於此真空度的絕對壓力為何？（假設一大氣壓為15 psia。）
A. 1.0 psia
B. 1.5 psia
C. 13.5 psia
D. 14.0 psia
答案：B.

科目： 291006
知能類： K1.11 [2.8/2.8]
序號： B434

A steam-driven turbine exhausts to a condenser. As condenser vacuum is increased, the turbine backpressure will _____ and the turbine power output will _____.
A. increase; increase
B. increase; decrease
C. decrease; increase
D. decrease; decrease
ANSWER: C.

蒸汽驅動的汽輪機將蒸汽排入冷凝器，當冷凝器的真空度提高時，汽輪機的背壓將會____，且汽輪機的功率輸出將會____。
A. 升高；升高
B. 升高；降低
C. 降低；升高
D. 降低；降低
答案：C.

科目： 291006
知能類： K1.11 [2.8/2.8]
序號： B835

A pressure gauge on a main condenser reads 2 psiv. What is the approximate absolute pressure in the main condenser?
A. 2 psia
B. 13 psia
C. 15 psia
D. 17 psia
ANSWER: B.

主冷凝器的壓力錶讀數為2 psiv。主冷凝器內的絕對壓力大約為何？
A. 2 psia
B. 13 psia
C. 15 psia
D. 17 psia
答案：B.

科目： 291006
知能類： K1.11 [2.8/2.8]
序號： B1035

A condenser absolute pressure of 4 inches Hg is equivalent to...
A. 11 inches Hg vacuum.
B. 13 inches Hg vacuum.
C. 26 inches Hg vacuum.
D. 28 inches Hg vacuum.
ANSWER: C.

冷凝器的絕對壓力為4英吋汞柱，相當於____的真空度。
A. 11 英吋汞柱
B. 13 英吋汞柱
C. 26 英吋汞柱
D. 28 英吋汞柱
答案：C.

科目： 291006
知能類： K1.11 [2.8/2.8]
序號： B1633

Which one of the following is the approximate condenser vacuum when condenser pressure is 7 inches Hg absolute?
A. 0 inches Hg vacuum
B. 7 inches Hg vacuum
C. 23 inches Hg vacuum
D. 30 inches Hg vacuum
ANSWER: C.

當冷凝器的絕對壓力為7英吋汞柱時，下列何者為該冷凝器的大約真空度？
A. 0 英吋汞柱
B. 7 英吋汞柱
C. 23 英吋汞柱
D. 30 英吋汞柱
答案：C.

科目： 291006
知能類： K1.11 [2.8/2.8]
序號： B2131

Which one of the following is the approximate condenser vacuum (inches Hg vacuum) when condenser pressure is 16 inches Hg absolute?
A. 4 inches Hg vacuum
B. 8 inches Hg vacuum
C. 12 inches Hg vacuum
D. 14 inches Hg vacuum
ANSWER: D.

當冷凝器的絕對壓力為16英吋汞柱時，下列何者為該冷凝器的大約真空度？
A. 4 英吋汞柱
B. 8 英吋汞柱
C. 12 英吋汞柱
D. 14 英吋汞柱
答案：D.

科目： 291006
知能類： K1.12 [2.9/3.0]
序號： B1133

A reactor is shut down at 400 psia during a maintenance outage when all forced decay heat removal is lost. Which one of the following will enhance natural circulation within the reactor vessel?
A. Increasing reactor vessel pressure to 500 psia
B. Increasing reactor vessel water level above the steam separators
C. Decreasing reactor vessel pressure to 300 psia
D. Decreasing reactor vessel water level to just above the top of the core
ANSWER: B.

反應爐在維修停機期間，爐壓為400 psia，所有的強迫衰變熱移除均喪失時。下列何種作法可以加強反應爐槽內的自然循環？
A. 將反應爐槽內的壓力提高到500 psia。
B. 將反應爐槽內的水位加高到超過蒸汽分離器。
C. 將反應爐槽內的壓力降低到300 psia。
D. 將反應爐槽內的水位降至剛好蓋過爐心的頂部。
答案：B.

科目： 291006
知能類： K1.13 [2.7/2.9]
序號： B34

What is the saturation temperature for a boiling water reactor operating at 920 psig?
A. 532.6˚F
B. 533.9˚F
C. 536.5˚F
D. 538.4˚F
ANSWER: C.

以920 psig運轉的沸水式反應器其飽和溫度為何？
A. 532.6˚F
B. 533.9˚F
C. 536.5˚F
D. 538.4˚F
答案：C.

科目： 291006
知能類： K1.13 [2.7/2.9]
序號： B534

Which one of the following is the state of water at 20 psia and 250˚F?
A. Subcooled liquid
B. Saturated liquid
C. Mixture of saturated liquid and vapor
D. Superheated vapor
ANSWER: D.

水在20 psia 和250˚F時的狀態稱為____。
A. 次冷液體
B. 飽和液體
C. 飽和液-汽混和物
D. 過熱蒸汽
答案：D.

科目： 291006
知能類： K1.13 [2.7/2.9]
序號： B1335

Which one of the following describes the state of water at 35 psia and 240˚F?
A. Subcooled liquid
B. Saturated liquid
C. Mixture of saturated liquid and vapor
D. Superheated vapor
ANSWER: A.

水在35 psia 和240˚F時的狀態稱為____。
A. 次冷液體
B. 飽和液體
C. 飽和液-汽混和物
D. 過熱蒸汽
答案：A.

科目： 291006
知能類： K1.13 [2.7/2.9]
序號： B1433

Which one of the following is the state of water at 120 psig and 340˚F?
A. Subcooled liquid
B. Saturated liquid
C. Mixture of saturated liquid and saturated vapor
D. Superheated vapor
ANSWER: A.

水在120 psig和340˚F時的狀態稱為____。
A. 次冷液體
B. 飽和液體
C. 飽和液-汽混和物
D. 過熱蒸汽
答案：A.

科目： 291006
知能類： K1.13 [2.7/2.9]
序號： B1536

Which one of the following describes the state of water at 160 psig and 366˚F?
A. Saturated liquid
B. Subcooled liquid
C. Superheated vapor
D. Mixture of saturated liquid and vapor
ANSWER: B.

水在160 psig和366˚F時的狀態稱為____。
A. 飽和液體
B. 次冷液體
C. 過熱蒸汽
D. 飽和液-汽混和物
答案：B.

科目： 291006
知能類： K1.13 [2.7/2.9]
序號： B2336

Which one of the following describes the state of water at 160 psig and 372˚F?
A. Saturated liquid
B. Subcooled liquid
C. Superheated vapor
D. Mixture of saturated liquid and vapor
ANSWER: C.

水在160 psig和372˚F時的狀態稱為____。
A. 飽和液體
B. 次冷液體
C. 過熱蒸汽
D. 飽和液-汽混和物
答案：C.

科目： 291006
知能類： K1.13 [2.7/2.9]
序號： B2834

Which one of the following describes the state of water at 150 psig and 360˚F
A. Saturated liquid
B. Subcooled liquid
C. Superheated vapor
D. Mixture of saturated liquid and vapor
ANSWER: B.

水在150 psig和360˚F時的狀態稱為____。
A. 飽和液體
B. 次冷液體
C. 過熱蒸汽
D. 飽和液-汽混和物
答案：B.

科目： 291006
知能類： K1.14 [3.1/3.2]
序號： B535

What is the reason for ensuring that a piping system is completely filled and vented prior to initiating system flow?
A. To minimize the system head losses
B. To ensure all noncondensible gases are removed from the piping system to reduce system corrosion
C. To preclude a reduction in the overall system heat transfer coefficient
D. To minimize the potential for water hammer
ANSWER: D.

在系統啟動之前要將管路系統灌滿並排氣的原因為何？
A. 將系統水頭損失降至最低
B. 確保管路系統內所有的不凝結氣體都被移除，以降低系統的腐蝕
C. 避免整體系統熱傳導係數的降低
D. 將產生水錘的可能性降至最低
答案：D.

科目： 291006
知能類： K1.14 [3.1/3.2]
序號： B635

The discharge valve for a large operating centrifugal pump should be positioned slowly to minimize the...
A. change in available net positive suction head.
B. potential for causing water hammer.
C. differential pressure stress exerted on the valve disk and stem.
D. mechanical wear on the valve seat and stem packing.
ANSWER: B.

運轉中的大型離心泵排放閥應該要慢慢的調整開度，為的是要將____降至最低。
A. 可用淨正吸水頭的改變量
B. 產生水錘的可能性
C. 施加在閥盤和閥桿的差壓應力
D. 閥座和閥桿迫緊的機械磨損
答案：B.

科目： 291006
知能類： K1.15 [2.6/2.8]
序號： B3635 (P3633)

A main turbine-generator is operating at 80% load with the following initial steady-state temperatures for the main turbine lube oil heat exchanger:
$T_{oil\ in}$ = 174˚F
$T_{oil\ out}$ = 114˚F
$T_{water\ in}$ = 85˚F
$T_{water\ out}$ = 115˚F
After six months of main turbine-generator operation, the following final steady-state lube oil heat exchanger temperatures are observed:
$T_{oil\ in}$ = 179˚F
$T_{oil\ out}$ = 119˚F
$T_{water\ in}$ = 85˚F
$T_{water\ out}$ = 115˚F
Assume that the final cooling water and lube oil flow rates are the same as the initial flow rates, and that the specific heat values for the cooling water and lube oil do not change.
Which one of the following could be responsible for the differences between the initial and final heat exchanger steady-state temperatures?
A. The heat exchanger tubes have become fouled with scale.
B. The temperature of the cooling water source has increased.
C. The final main turbine-generator load is higher than the initial load.
D. The final main turbine-generator load is lower than the initial load.
ANSWER: A.

主汽輪發電機以80%負載運轉，主汽機的潤滑油熱交換器初始穩態溫度為：
$T_{oil\ in}$ = 174˚F
$T_{oil\ out}$ = 114˚F
$T_{water\ in}$ = 85˚F
$T_{water\ out}$ = 115˚F

主汽輪發電機運轉六個月後，該潤滑油熱交換器的最終穩態溫度為：
$T_{oil\ in}$ = 179˚F
$T_{oil\ out}$ = 119˚F
$T_{water\ in}$ = 85˚F
$T_{water\ out}$ = 115˚F

假設冷卻水和潤滑油的最終流量和初始流量相同，冷卻水和和潤滑油的比熱也沒有改變。

下列何者是造成熱交換器初始和最終穩態溫度改變的原因？

A. 熱交換器管因水垢而阻塞

B. 冷卻水源的溫度升高

C. 主汽機的最終負載高於初始負載

D. 主汽機的最終負載低於初始負載

答案：A.

科目： 291006
知能類： K1.16 [2.5/2.6]
序號： B156

The buildup of scale on heat-transfer surfaces in the reactor vessel...
A. results in lower fuel temperature, which decreases the nuclear fuel cycle efficiency.
B. is controlled by complying with core thermal limits and adhering to fuel preconditioning requirements.
C. is controlled by using reactor water cleanup system and condensate system demineralizers.
D. results in higher coolant temperature, which increases overall plant efficiency.
ANSWER: C.

反應爐槽內熱傳面的水垢囤積____。
A. 是因燃料溫度較低而產生，從而降低核燃料循環效率
B. 受控於對核心熱限值以及燃料預調節的遵從
C. 受控於反應爐水淨化系統以及冷凝水系統的除礦器
D. 是因較高的冷卻水溫度而產生，以提高電廠的整體效率
答案：C.

科目： 291006
知能類： K1.16 [2.5/2.6]
序號： B1136

Tube scaling in a parallel flow heat exchanger causes heat transfer rate to decrease because the...
A. surface area of the tubes decreases.
B. cooling fluid outlet temperature decreases.
C. thermal conductivity of the scale is very low.
D. flow through the heat exchanger becomes more turbulent.
ANSWER: C.

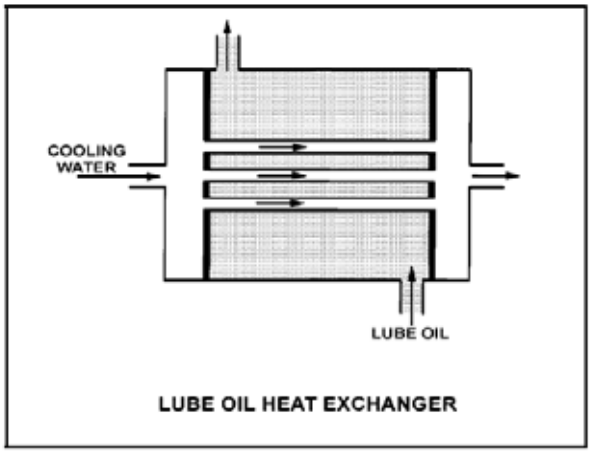
並流式熱交換器的管內水垢會使熱傳導率降低，是因為____
A. 管的熱傳面積減少。
B. 冷卻液體出口溫度降低。
C. 水垢的熱傳導性很低。
D. 通過熱交換器的水流比較不平穩。
答案：C.

科目： 291006
知能類： K1.16 [2.5/2.6]
序號： B1234 (P32)

Refer to the drawing of an operating lube oil heat exchanger (see figure below).
If scaling occurs inside the cooling water tubes, cooling water outlet temperature will _____ and lube oil outlet temperature will _____. (Assume oil and cooling water
flow rates remain the same.)
A. decrease; decrease
B. decrease; increase
C. increase; decrease
D. increase; increase
ANSWER: B.

運轉中的潤滑油熱交換器圖（見下圖）。
如果冷卻水管內產生水垢，冷卻水的出口溫度將會____，潤滑油的出口溫度將會____。（假設潤滑油和冷卻水流量維持不變。）
A. 降低；降低
B. 降低；升高
C. 升高；降低
D. 升高；升高

答案：B.

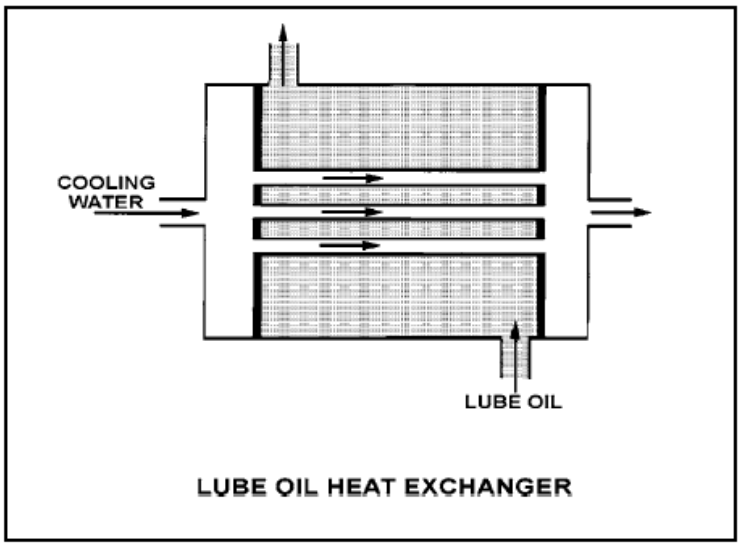


科目： 291006
知能類： K1.16 [2.5/2.6]
序號： B1833 (P2233)

Refer to the drawing of an operating lube oil heat exchanger (see figure below).
If deposits accumulate on the outside of the cooling water tubes, cooling water outlet temperature will _____ and oil outlet temperature will _____. (Assume oil and cooling water inlet temperatures and flow rates remain the same.)
A. increase; decrease
B. increase; increase
C. decrease; decrease
D. decrease; increase
ANSWER: D.

運轉中的潤滑油熱交換器圖（見下圖）。
如果冷卻水管外的沈澱物累積，冷卻水的出口溫度將會____，潤滑油的出口溫度將會____。（假設潤滑油和冷卻水的進口溫度和流量維持不變。）
A. 升高；降低
B. 升高；升高
C. 降低；降低
D. 降低；升高

答案：D.

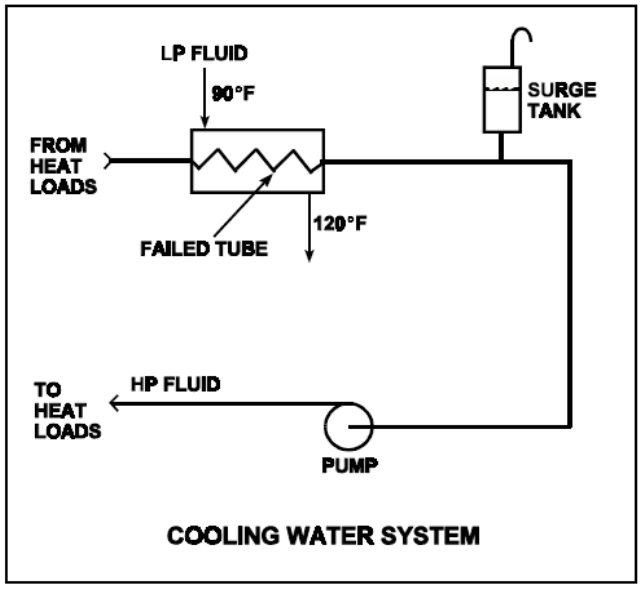


科目： 291006
知能類： K1.17 [2.7/2.8]
序號： B234

Refer to the drawing of an operating cooling water system (see figure below) that is transferring heat between a low pressure (LP) and high pressure (HP) water system.
Which one of the following effects will initially occur as a result of a tube failure in the heat exchanger?
A. Level in the surge tank will increase.
B. HP fluid pump flow rate will decrease.
C. HP fluid heat exchanger differential temperature will increase.
D. LP fluid heat exchanger outlet temperature will increase.
ANSWER: D.

運轉中的冷卻水系統（見下圖）。該系統在低壓(LP)水系統和高壓(HP)水系統之間做熱傳導。
下列何者會在熱交換器中一個管子破漏的初始時發生？
A. 調節槽的水位升高。
B. 高壓液體泵流量降低。
C. 高壓液體熱交換器溫差增加。
D. 低壓液體熱交換器出口溫度升高。

答案：D.



科目： 291006
知能類： K1.17 [2.7/2.8]
序號： B332 (P331)

During normal steady-state plant operation with a constant generator load, plugging of 1% of the tubes in the main condenser will cause absolute pressure in the condenser to _____ and hotwell temperature to _____.
A. increase; increase
B. decrease; increase
C. increase; decrease
D. decrease; decrease
ANSWER: A.

在正常穩態的電廠中發電機以固定負載在運轉，若主冷凝器中1%的管子(熱交換管)塞管將會使冷凝器中的絕對壓力____，熱井的溫度____。
A. 升高；升高
B. 降低；升高
C. 升高；降低
D. 降低；降低

答案：A.

科目： 291006
知能類： K1.17 [2.7/2.8]
序號： B333 (P333)

A nuclear plant is operating normally at 50% power. Which one of the following will result from a cooling water tube rupture in the main condenser?
A. Increased condenser vacuum
B. Increased conductivity of the condensate
C. Decreased condensate pump net positive suction head
D. Decreased condensate pump flow rate
ANSWER: B.

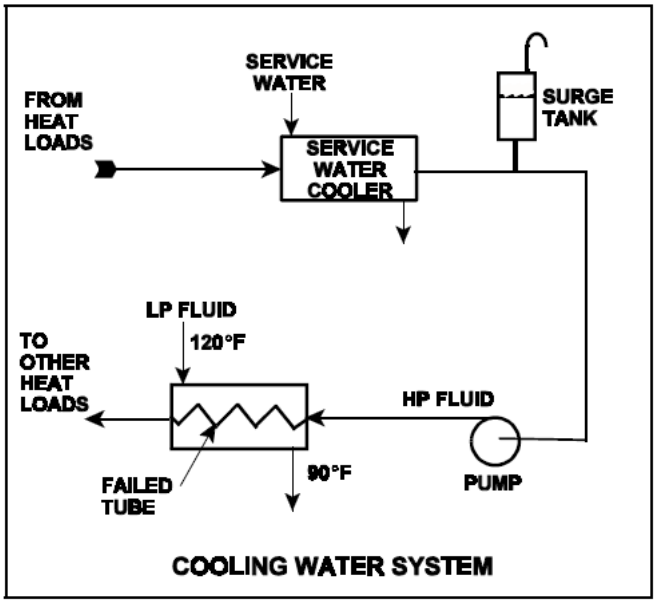
核能發電廠以50%功率運轉。如果主冷凝器中的一個冷卻水管破裂，將會導致下列何種現象？
A. 冷凝器的真空度提高
B. 冷凝水的導電度增加
C. 冷凝水泵的淨正吸水頭降低
D. 冷凝水泵的流量降低
答案：B.

科目： 291006
知能類： K1.17 [2.7/2.8]
序號： B1535 (P1234)

Refer to the drawing of a cooling water system (see figure below).
Which one of the following will occur as a result of the indicated tube failure in the heat exchanger?
A. High pressure (HP) fluid inventory increases.
B. Pressure in the low pressure (LP) system decreases.
C. Temperature in the low pressure (LP) system increases.
D. Level in the surge tank decreases.
ANSWER: D.

運轉中的冷卻水系統（見下圖）。
若熱交換器中的箭頭所指的管子破漏時，會發生下列何種現象？
A. 高壓(HP)液體存量增加。
B. 低壓(LP)系統壓力降低。
C. 低壓(LP)系統溫度升高。
D. 調節槽的水位降低。

答案：D.



科目： 291006
知能類： K1.17 [2.7/2.8]
序號： B1931 (P1134)

Which one of the following effects will occur as a result of multiple tube failures (leaks) in the main condenser with the plant at 50% power? (Assume condenser vacuum does not change.)
A. Condensate depression will decrease.
B. Condensate conductivity will increase.
C. Condensate oxygen concentration will decrease.
D. Condenser inlet cooling water flow rate will decrease.
ANSWER: B.

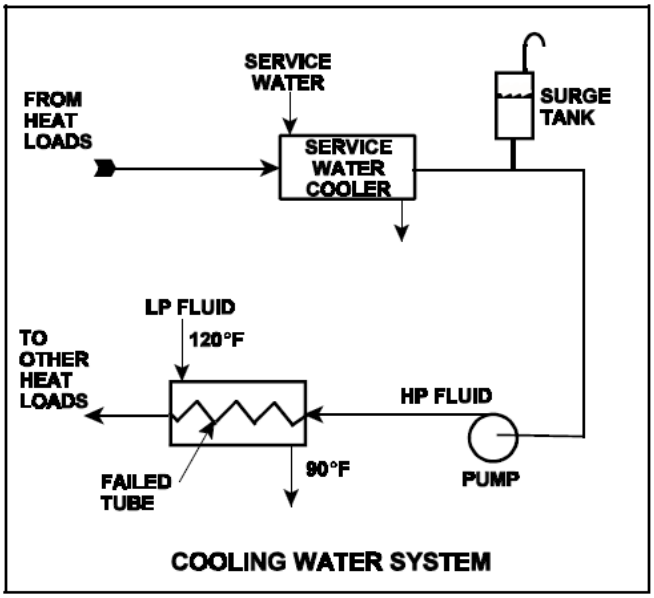
以50%功率運轉的電廠中，一主冷凝器的多支管子破漏，會產生下列何種影響？
A. 冷凝水壓降會減少。
B. 冷凝水導電度提高。
C. 冷凝水氧濃度降低。
D. 冷凝器進口冷卻水流量降低。
答案：B.

科目： 291006
知能類： K1.17 [2.7/2.8]
序號： B3535 (P234)

Refer to the drawing of an operating cooling water system (see figure below).
Which one of the following effects would occur as a result of the failed tube in the heat exchanger?
A. Level in the surge tank increases.
B. Flow in the low pressure system reverses.
C. Pressure in the low pressure system decreases.
D. Low pressure fluid heat exchanger outlet temperature decreases.
ANSWER: D.

運轉中的冷卻水系統（見下圖）。
下列何者為熱交換器中管子破漏所產生的影響？
A. 調節槽的水位升高。
B. 低壓系統的流向倒轉。
C. 低壓系統的壓力降低。
D. 低壓液體熱交換器的出口溫度降低。

答案：D.



科目： 291006
知能類： K1.18 [2.8/2.9]
序號： B936 (P1912)

During normal nuclear power plant operation, why does air entry into the main condenser reduce the thermodynamic efficiency of the steam cycle?
A. The rate of steam flow through the main turbine increases.
B. The condensate subcooling in the main condenser increases.
C. The enthalpy of the low pressure turbine exhaust increases.
D. The air mixes with the steam and enters the condensate.
ANSWER: C.

核能電廠正常運轉時，為何讓空氣進入主冷凝器中會降低蒸汽循環的熱效率？
A. 通過主汽機的蒸汽流量增加。
B. 主冷凝器中的冷凝水次冷度提高。
C. 低壓汽機排汽的熱焓增加。
D. 空氣會和蒸汽混和，進入冷凝水中。
答案：C.

科目： 291006
知能類： K1.18 [2.8/2.9]
序號： B1236

During power plant operation, the accumulation of air and non-condensable gases in the main condenser will...
A. not effect turbine work.
B. not effect turbine efficiency.
C. increase generator load.
D. increase turbine backpressure.
ANSWER: D.

電廠正常運轉時，如果主冷凝器中的空氣和不凝結氣體增加，將____。
A. 不會影響汽機作功
B. 不會影響汽機的效率
C. 會增加發電機的負載
D. 會增加汽機的背壓
答案：D.

科目： 291006
知能類： K1.18 [2.8/2.9]
序號： B2235 (P2834)

A nuclear power plant is operating at 100% power when air inleakage results in the buildup of noncondensible gases in the main condenser. Which one of the following will decrease as a result of this air inleakage?
A. Condensate temperature
B. Pressure in the main condenser
C. Suction pressure at the condensate pumps
D. Condenser cooling water outlet temperature
ANSWER: D.

當空氣滲入導致主冷凝器中的不凝結氣體增加時，核能電廠正以100%功率運轉。下列何者將因空氣漏入而降低？
A. 冷凝水溫度
B. 主冷凝器中的壓力
C. 冷凝水泵的進口壓力
D. 冷凝器冷卻水的出口溫度
答案：D.

科目/題號：291006/1 (2016新增)
知能類：K1.04 [2.8/2.8]
序號：B6716

A reactor is shut down with core decay heat being removed by the residual heat removal (RHR) system. Assume that only the RHR heat exchangers are removing heat from the reactor vessel (RV), and that the RHR system provides complete thermal mixing of the RV.
Given the following information:

Reactor core rated thermal power = 2,950 MW
Core decay heat rate = 0.5% rated thermal power
RHR system heat removal rate = 5.3×10^7 Btu/hr
RHR and RV coolant cp = 1.05 Btu/lbm-°F
Combined RV and RHR inventory = 425,000 lbm

Which one of the following actions will establish a reactor cooldown rate between 20°F/hour and 30°F/hour?

A. Increase RHR heat exchanger flow rate to increase the cooldown rate by 10°F/hour.
B. Increase RHR heat exchanger flow rate to increase the cooldown rate by 20°F/hour.
C. Reduce RHR heat exchanger flow rate to decrease the cooldown rate by 10°F/hour.
D. Reduce RHR heat exchanger flow rate to decrease the cooldown rate by 20°F/hour.

ANSWER: B.

一反應器停機後用餘熱移除系統(RHR)將餘熱移除。假如只有餘熱移除系統熱交換器將熱量從反應器爐槽移走，且餘熱移除系統可提供反應器爐槽完全的熱力混合。
已知下列資訊：

反應器爐心額定熱功率 = 2,950 MW
爐心熱衰變率 = 0.5%額定熱功率
餘熱移除系統熱移除速率 = 5.3×10^7 Btu/hr
餘熱移除系統及反應器爐槽冷卻水之比熱cp = 1.05 Btu/lbm-°F
反應器爐槽及餘熱移除系統加總存水量= 425,000 lbm

下列何者措施可以建立反應器冷卻率在20°F/hour與30°F/hr之間？
A.增加反應器餘熱移除系統熱交換器流量率以增加10°F/hr之冷卻率
B.增加反應器餘熱移除系統熱交換器流量率以增加20°F/hr之冷卻率
C.減少反應器餘熱移除系統熱交換器流量率以減少10°F/hr之冷卻率
D.減少反應器餘熱移除系統熱交換器流量率以減少20°F/hr之冷卻率

答案： B

科目/題號：291006/2 (2016 新增)
知能類：K1.04 [2.8/2.8]
序號：B7117

A nuclear power plant is shut down with core decay heat being removed by the residual heat removal (RHR) system. Assume that only the RHR heat exchangers are removing heat from the reactor vessel (RV), and that the RHR system provides complete thermal mixing in the RV.
Given the following information:

Reactor core rated thermal power = 2,950 MW
Core decay heat rate = 0.5% rated thermal power
RHR system heat removal rate = 5.7×10^7 Btu/hr
RHR and RV coolant cp = 1.05 Btu/lbm-°F
Combined RV and RHR inventory = 450,000 lbm

Which one of the following actions will establish a reactor cooldown rate between 20°F/hour and 30°F/hour?

A. Increase RHR heat exchanger flow rate to increase the cooldown rate by 10°F/hour.
B. Increase RHR heat exchanger flow rate to increase the cooldown rate by 20°F/hour.
C. Reduce RHR heat exchanger flow rate to decrease the cooldown rate by 10°F/hour.
D. Reduce RHR heat exchanger flow rate to decrease the cooldown rate by 20°F/hour.

ANSWER: A.

一反應器停機後用餘熱移除系統(RHR)將餘熱移除。假如只有餘熱移除系統熱交換器將熱量從反應器爐槽移走，且餘熱移除系統可提供反應器爐槽完全的熱力混合。
已知下列資訊：

反應器爐心額定熱功率 = 2,950 MW
爐心熱衰變率 = 0.5%額定熱功率
餘熱移除系統熱移除速率 = 5.7×10^7 Btu/hr
餘熱移除系統及反應器爐槽冷卻水之比熱cp = 1.05 Btu/lbm-°F
反應器爐槽及餘熱移除系統加總存水量= 450,000 lbm

下列何者措施可以建立反應器冷卻率在20°F/hr與30°F/hr之間？
A.增加反應器餘熱移除系統熱交換器流量率以增加10°F/hr之冷卻率
B.增加反應器餘熱移除系統熱交換器流量率以增加20°F/hr之冷卻率
C.減少反應器餘熱移除系統熱交換器流量率以減少10°F/hr之冷卻率
D.減少反應器餘熱移除系統熱交換器流量率以減少20°F/hr之冷卻率

答案： A

科目/題號：291006/3 (2016 新增)
知能類：K1.04 [2.8/2.8]
序號：B7616

A nuclear power plant is shut down with core decay heat being removed by the residual heat removal (RHR) system. Assume that only the RHR heat exchangers are removing heat from the reactor vessel (RV), and that the RHR system provides complete thermal mixing in the RV.
Given the following information:

Reactor core rated thermal power = 2,950 MW
Core decay heat rate = 0.6% rated thermal power
RHR system heat removal rate = 8.1×10^7 Btu/hr
RHR and RV coolant cp = 1.05 Btu/lbm-°F
Combined RV and RHR inventory = 450,000 lbm

Which one of the following actions will establish a reactor cooldown rate between 20°F/hour and 30°F/hour?

A. Increase RHR heat exchanger flow rate to increase the cooldown rate by 10°F/hour.
B. Increase RHR heat exchanger flow rate to increase the cooldown rate by 20°F/hour.
C. Reduce RHR heat exchanger flow rate to decrease the cooldown rate by 10°F/hour.
D. Reduce RHR heat exchanger flow rate to decrease the cooldown rate by 20°F/hour.

ANSWER: D.

一反應器停機後用餘熱移除系統(RHR)將餘熱移除。假如只有餘熱移除系統熱交換器將熱量從反應器爐槽移走，而餘熱移除系統可提供反應器爐槽完全的熱混合。
已知下列資訊：

反應器爐心額定熱功率 = 2,950 MW
爐心熱衰變率 = 0.6%額定熱功率
餘熱移除系統熱移除速率 = 8.1×10^7 Btu/hr
餘熱移除系統及反應器爐槽冷卻水之比熱cp = 1.05 Btu/lbm-°F
反應器爐槽及餘熱移除系統加總存水量= 450,000 lbm

下列何者措施可以建立反應器冷卻率在20°F/hour與30°F/hr之間？
A.增加反應器餘熱移除系統熱交換器流量率以增加10°F/hr之冷卻率
B.增加反應器餘熱移除系統熱交換器流量率以增加20°F/hr之冷卻率
C.減少反應器餘熱移除系統熱交換器流量率以減少10°F/hr之冷卻率
D.減少反應器餘熱移除系統熱交換器流量率以減少20°F/hr之冷卻率

答案： D

科目/題號：291006/4 (2016 新增)
知能類：K1.07 [2.6/2.8]
序號：B5317 (P5316)

A main turbine-generator was operating at 80 percent load with the following initial steady-state lube oil and cooling water temperatures for the main turbine lube oil heat exchanger:

Toil in = 174°F
Toil out = 114°F
Twater in = 85°F
Twater out = 115°F

Six months later, the current steady-state heat exchanger temperatures are:

Toil in = 174°F
Toil out = 120°F
Twater in = 85°F
Twater out = 120°F

Assume that the lube oil mass flow rate does not change, and that the specific heat values for the cooling water and lube oil do not change. Also assume that the main turbine lube oil system is a closed system.

The differences between the initial and current steady-state heat exchanger temperatures could be caused by the current main turbine-generator load being _____ with the current heat exchanger cooling water mass flow rate being _____.

A. higher; lower
B. higher; higher
C. lower; lower
D. lower; higher

ANSWER: C

一主汽機發電機在80%負載下運轉，其主汽機潤滑油熱交換器潤滑油及冷卻水之最初穩定溫度狀態如下：

潤滑油進口溫度 = 174°F
潤滑油出口溫度 = 114°F
冷卻水進口溫度 = 85°F
冷卻水出口溫度 = 115°F

經過6個月後，現在的熱交換器穩定溫度為：

潤滑油進口溫度 = 174°F
潤滑油出口溫度 = 120°F
冷卻水進口溫度 = 85°F
冷卻水出口溫度 = 120°F

假設潤滑油質量流量率不變，且冷卻水及潤滑油之比熱值不變。再假設主汽機潤滑油系統為一封閉的系統。熱交換器最初與現在的穩定溫度的差異，可能是因為主汽機發電機的負載_____，以及現在熱交換器的冷卻水質量流量率_____所引起。

A.升高；降低
B.升高；升高
C.降低；降低
D.降低；升高

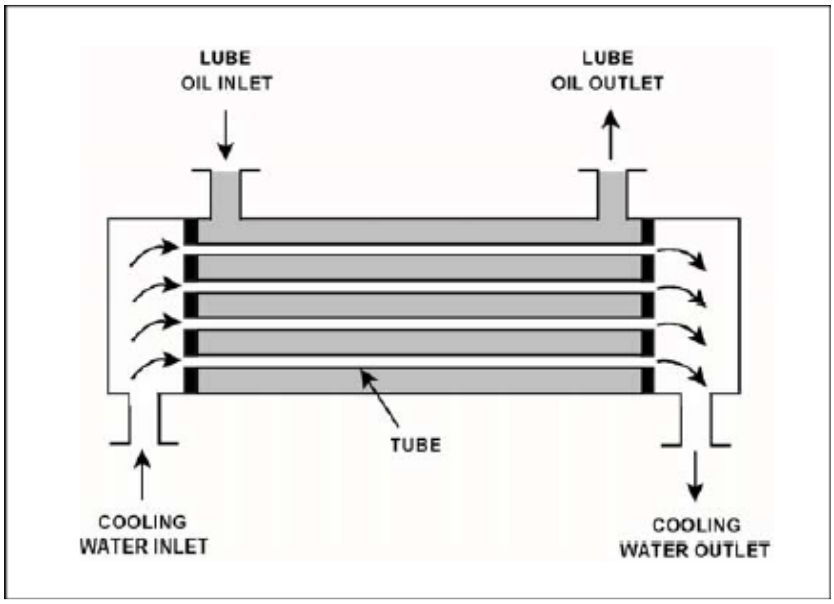
答案： C

科目/題號：291006/5 (2016 新增)
知能類：K1.07 [2.7/2.8]
序號：B5716 (P5716))

Refer to the drawing of an operating parallel-flow lube oil heat exchanger (see figure below). Assume that lube oil (LO) inlet temperature is greater than cooling water (CW) inlet temperature.
Unlike a counter-flow heat exchanger, in a parallel-flow heat exchanger the _____ temperature can never be greater than the _____ temperature.
A. LO outlet; CW inlet
B. LO outlet; CW outlet
C. CW outlet; LO inlet
D. CW outlet; LO outlet
ANSWER: D.

參考運轉中並流式潤滑油熱交換器圖(見下圖)。假設潤滑油進口溫度高於冷卻水進口溫度。
跟逆流式熱交換器不一樣，在並流式潤滑油熱交換器其_____溫度不可能高於_____溫度。
A.潤滑油出口；冷卻水進口
B.潤滑油出口；冷卻水出口
C.冷卻水出口；潤滑油進口
D.冷卻水出口；潤滑油出口

答案： D



科目/題號：291006/6 (2016 新增)
知能類：K1.07 [2.7/2.8]
序號：B5917 (P5916)

Refer to the drawing of an operating process water cleanup system (see figure below). Assume there is no heat loss from the process water cleanup system to the surroundings and the process water flow rate does not change. If valve D closes fully, what will be the final steady-state temperature of the process water flowing through the filter?

A. 212°F

B. 302°F

C. 450°F

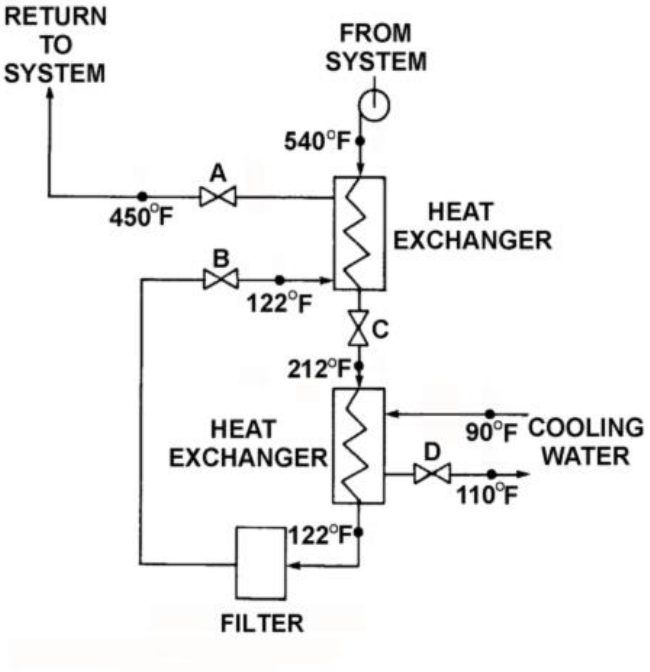
D. 540°F

ANSWER: D.

參考運轉中流程用水淨化系統(見下圖)。假設流程用水沒有熱流失到周遭環境，且流程用水流量率不變。如果閥門D完全關閉，流程用水流經過濾器的最終穩定溫度是多少？

A. 212°F
B. 302°F
C. 450°F
D. 540°F

答案： D



科目/題號：291006/7 (2016 新增)
知能類：K1.07 [2.7/2.8]
序號：B7017 (P7016)

Given the following parameter values for a feedwater heater:

Feedwater inlet temperature = 320°F

Feedwater inlet pressure = 1,000 psia

Feedwater mass flow rate = 1.0 x 10^6 lbm/hr

Extraction steam pressure = 500 psia

Assume that the extraction steam enters the heater as a dry saturated vapor and leaves the heater as a saturated liquid at 500 psia.

Which one of the following is the approximate mass flow rate of extraction steam required to increase feedwater temperature to 380°F?

A. 5.2 x 10^4 lbm/hr

B. 7.9 x 10^4 lbm/hr

C. 8.4 x 10^4 lbm/hr

D. 8.9 x 10^4lbm/hr

ANSWER: C.

已知下列飼水加熱器參數值:

飼水進口溫度 = 320°F

飼水進口壓力 = 1,000 psia

飼水質量流量率 = 1.0 x 10^6 lbm/hr

抽汽壓力 = 500 psia

假設抽汽以乾燥飽和蒸汽進入加熱器，再以500 psia飽和液體離開加熱器。

下列何者是提高飼水溫度到380°F所需的大約抽汽質量流量率？

A. 5.2 x 10^4lbm/hr

B. 7.9 x 10^4 lbm/hr

C. 8.4 x 10^4 lbm/hr

D. 8.9 x 10^4 lbm/hr

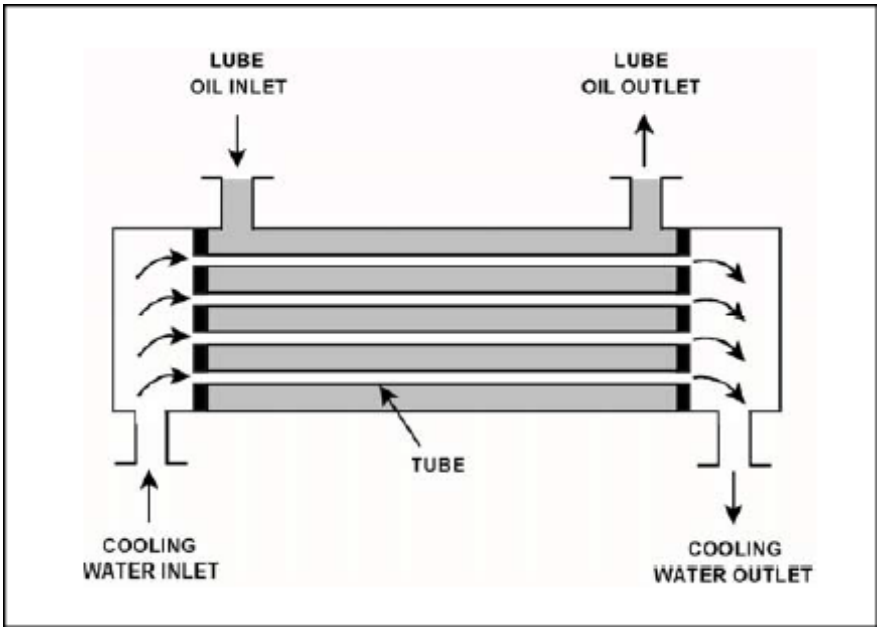
答案： C

科目/題號：291006/8 (2016 新增)
知能類：K1.07 [2.7/2.8]
序號：B7316 (P7316)

Refer to the drawing of an operating parallel-flow lube oil heat exchanger (see figure below).
Unlike a counter-flow heat exchanger, in the parallel-flow heat exchanger the _____ temperature will always be greater than the _____ temperature.
A. CW outlet; LO inlet
B. CW outlet; LO outlet
C. LO outlet; CW inlet
D. LO outlet; CW outlet
ANSWER: D.

參考運轉中並流式潤滑油熱交換器圖(見下圖)。
跟逆流式熱交換器不一樣，在並流式潤滑油熱交換器其_____溫度總是高於_____溫度。
A.冷卻水出口；潤滑油進口
B.冷卻水出口；潤滑油出口
C.潤滑油出口；冷卻水進口
D.潤滑油出口；冷卻水出口

答案： D



科目/題號：291006/9 (2016 新增)
知能類：K1.08 [2.9/3.0]
序號：B4416 (P4416)

Refer to the drawing of a lube oil heat exchanger (see figure below).
The lube oil heat exchanger is in service with the following inlet temperatures:
Lube oil inlet temperature = 120°F
Cooling water inlet temperature = 60°F
Assuming that cooling water flow rate is greater than lube oil flow rate, which one of the following pairs of heat exchanger outlet temperatures is possible? (Assume both fluids have the same specific heat.)

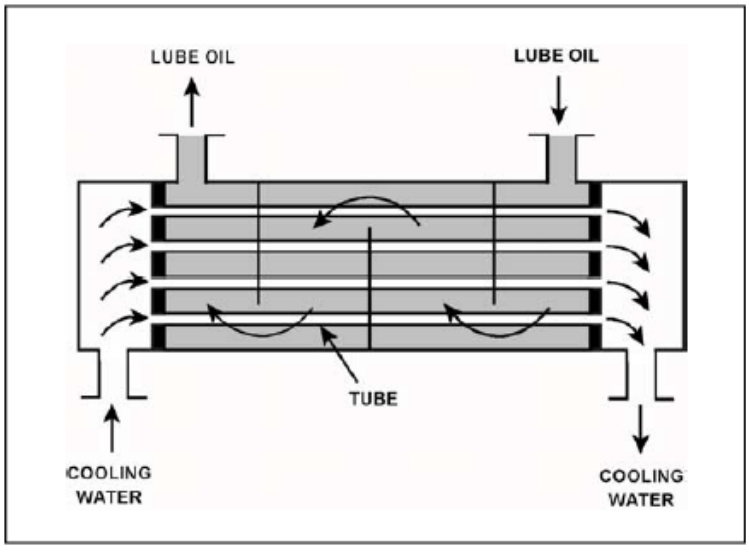
	Lube Oil Outlet Temp	Cooling Water Outlet Temp
A.	90°F	100°F
B.	90°F	85°F
C.	95°F	100°F
D.	95°F	85°F

ANSWER: B.

參考潤滑油熱交換器圖(見下圖)。該潤滑油熱交換器在下列進口溫度下運轉：
潤滑油進口溫度 = 120°F
冷卻水進口溫度 = 60°F
假設冷卻水流量率大於潤滑油流量率，下列組合中何者是熱交換器可能的出口溫度？(假設兩種流體均具有相同的比熱)

	潤滑油出口溫度	冷卻水出口溫度
A.	90°F	100°F
B.	90°F	85°F
C.	95°F	100°F
D.	95°F	85°F

答案： B



科目/題號：291006/10 (2016 新增)
知能類：K1.08 [2.9/3.0]
序號：B5517 (P5516)

Refer to the drawing of a lube oil heat exchanger (see figure below).
The lube oil heat exchanger is in service with the following inlet temperatures:
Lube oil inlet temperature = 130°F
Cooling water inlet temperature = 70°F
Given that cooling water mass flow rate is greater than lube oil mass flow rate, which one of the following pairs of heat exchanger outlet temperatures is not possible? (Assume both fluids have the same specific heat.)

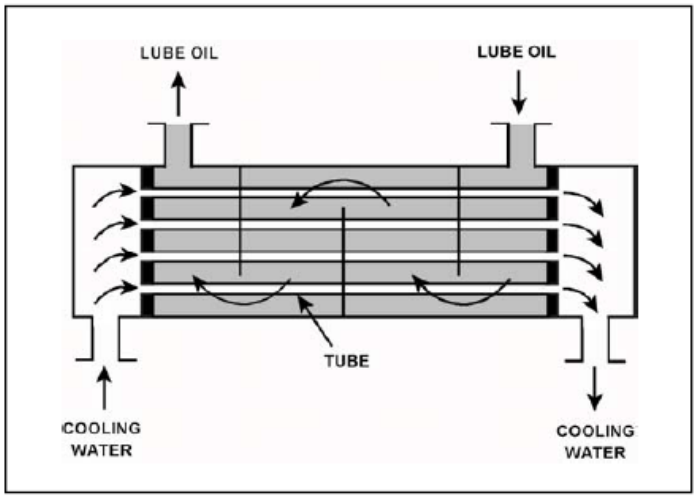
	Lube Oil Outlet Temp	Cooling Water Outlet Temp
A.	90°F	105°F
B.	90°F	100°F
C.	110°F	95°F
D.	110°F	85°F

ANSWER: C.

參考潤滑油熱交換器圖(見下圖)。
該潤滑油熱交換器在下列進口溫度下運轉：
潤滑油進口溫度 = 130°F
冷卻水進口溫度 = 70°F
已知冷卻水質量流量率大於潤滑油質量流量率，下列組合中何者不可能是熱交換器的出口溫度？(假設兩種流體均具有相同的比熱)

	潤滑油出口溫度	冷卻水出口溫度
A.	90°F	105°F
B.	90°F	100°F
C.	110°F	95°F
D.	110°F	85°F

答案： C

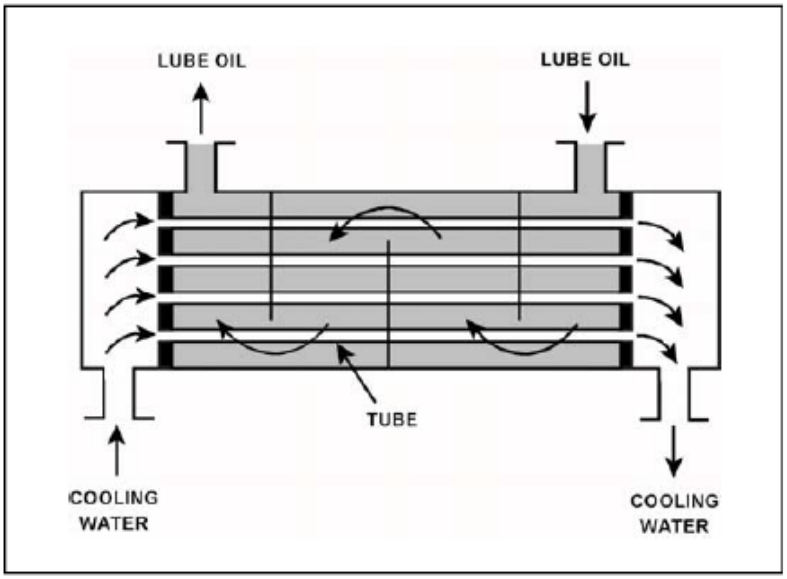


科目/題號：291006/11 (2016 新增)
知能類：K1.08 [2.9/3.0]
序號：B5617 (P5616)

Refer to the drawing of an operating lube oil heat exchanger (see figure below). Assume that the inlet lube oil and inlet cooling water temperatures are constant and the lube oil flow rate remains the same. If the cooling water flow rate increases, the lube oil outlet temperature will _____; and the cooling water outlet temperature will _____.
A. increase; increase
B. increase; decrease
C. decrease; increase
D. decrease; decrease
ANSWER: D.

參考一運轉中潤滑油熱交換器圖(見下圖)。
假設潤滑油的進口溫度及冷卻水的進口溫度都是固定的且潤滑油的流量率維持不變。如果冷卻水的流量率增加，潤滑油出口溫度將_____；又冷卻水的出口溫度將_____。
A.增加；增加
B.增加；減少
C.減少；增加
D.減少；減少

答案： D



科目/題號：291006/12 (2016 新增)
知能類：K1.08 [2.9/3.0]
序號：B6516 (P6516)

Refer to the drawing of a heat exchanger (see figure below).
The heat exchanger is in service with the following inlet temperatures:
Service water inlet temperature = 130°F
Cooling water inlet temperature = 70°F
Assume that both fluids have the same specific heat, and that service water mass flow rate is greater than cooling water mass flow rate. Which one of the following pairs of heat exchanger outlet temperatures is possible?

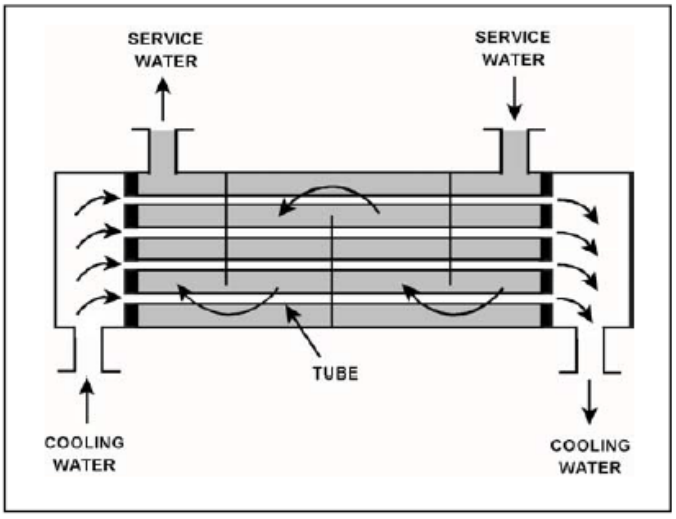
	Service Water Outlet Temp.	Cooling Water Outlet Temp.
A.	120°F	82°F
B.	110°F	90°F
C.	100°F	98°F
D.	90°F	106°F

ANSWER: A.

參考熱交換器圖(見下圖)。
該熱交換器以下列進口溫度運轉：
廠用水進口溫度 = 130°F
冷卻水進口溫度= 70°F
假設兩種流體均有相同的比熱，而廠用水質量流量率大於冷卻水質量流量率。
下列何者是熱交換器出口溫度的可能組合？

	廠用水 出口溫度	冷卻水 出口溫度
A.	120°F	82°F
B.	110°F	90°F
C.	100°F	98°F
D.	90°F	106°F

答案： A



科目/題號：291006/13 (2016 新增)
知能類：K1.08 [2.9/3.0]
序號：B7517 (P7516)

Refer to the drawing of a heat exchanger (see figure below).
The heat exchanger is in service with the following inlet temperatures:
Cooling water inlet temperature = 70°F
Service water inlet temperature = 130°F
Assume that both fluids have the same specific heat, and that cooling water mass flow rate is greater than service water mass flow rate. Which one of the following pairs of heat exchanger outlet temperatures is not possible?

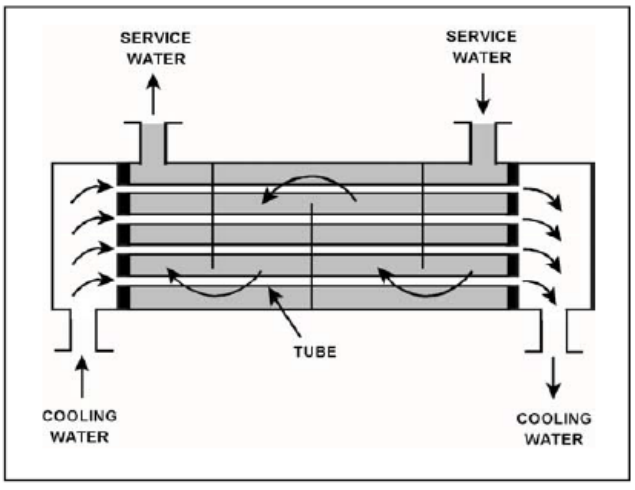
	Cooling Water Outlet Temp.	Service Water Outlet Temp.
A.	78°F	120°F
B.	90°F	110°F
C.	98°F	100°F
D.	100°F	90°F

ANSWER: B.

參考熱交換器圖(見下圖)。
該熱交換器以下列進口溫度運轉：
冷卻水進口溫度 = 70°F
廠用水進口溫度= 130°F
假設兩種流體均有相同的比熱，而冷卻水質量流量率大於廠用水質量流量率。
下列何者不可能是熱交換器出口溫度的組合？

	冷卻水 出口溫度	廠用水 出口溫度
A.	78°F	120°F
B.	90°F	110°F
C.	98°F	100°F
D.	100°F	90°F

答案： B



科目/題號：291006/14 (2016 新增)
知能類：K1.14 [3.1/3.2]
序號：B1135

After starting a large motor-driven centrifugal cooling water pump, the pump discharge valve should be opened slowly to minimize the...
A. potential for a water hammer.
B. potential for pump cavitation.
C. motor running current requirements.
D. net positive suction head requirements.
ANSWER: A.

一大型馬達驅動的離心冷卻水泵在起動後出口閥應該慢慢打開以降低...
A.水鎚的可能性
B.泵孔蝕的可能性
C.馬達運轉電流的需求
D.淨正吸水頭的需求

答案： A

科目/題號：291006/15 (2016 新增)
知能類：K1.15 [2.6/2.8]
序號：B4616 (P4617)

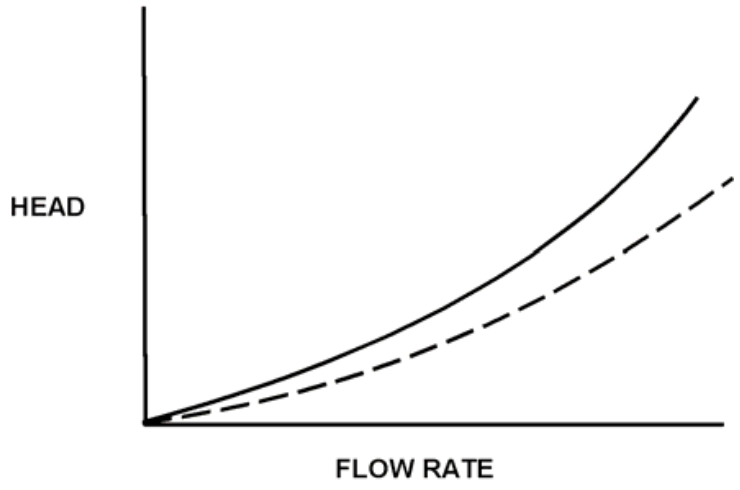
Refer to the drawing of two system curves for a main condenser cooling water system (see figure below).
Which one of the following will cause the system curve to shift from the solid curve toward the dashed curve?

A. The main condenser tubes are cleaned.
B. The main condenser tubes become increasingly fouled.
C. Cooling water flow rate is increased by 25 percent by starting an additional cooling water pump.
D. Cooling water flow rate is decreased by 25 percent by stopping one of the operating cooling water pumps.

ANSWER: A.

參考一主冷凝器冷卻水系統的兩個系統曲線圖(見下圖)。
下列何者可使系統曲線從實線向虛線偏移?
A.主冷凝器管被清洗過
B.主冷凝器管越來越阻塞
C.再起動一台冷卻水泵使冷卻水流量增加25%
D.停止運轉中的一台冷卻水泵使冷卻水流量減少25%

答案： A



科目/題號：291006/16 (2016 新增)
知能類：K1.15 [2.6/2.8]
序號：B5117 (P5116)

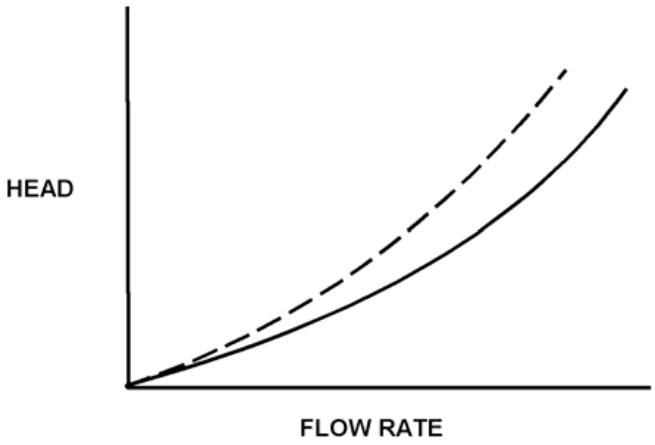
Refer to the drawing of two system curves for a typical main condenser cooling water system (see figure below).
Which one of the following will cause the system curve to shift from the solid curve toward the dashed curve?

A. The main condenser tubes are cleaned.
B. The main condenser tubes become increasingly fouled.
C. Cooling water system flow rate is increased by 25 percent by starting an additional cooling water pump.
D. Cooling water system flow rate is decreased by 25 percent by stopping one of the operating cooling water pumps.

ANSWER: B.

參考一典型主冷凝器冷卻水系統的兩個系統曲線圖(見下圖)。
下列何者可使系統曲線從實線向虛線偏移？
A.主冷凝器管被清洗過
B.主冷凝器管越來越阻塞
C.再起動一台冷卻水泵使冷卻水流量增加25%
D.停止運轉中的一台冷卻水泵使冷卻水流量減少25%

答案： B



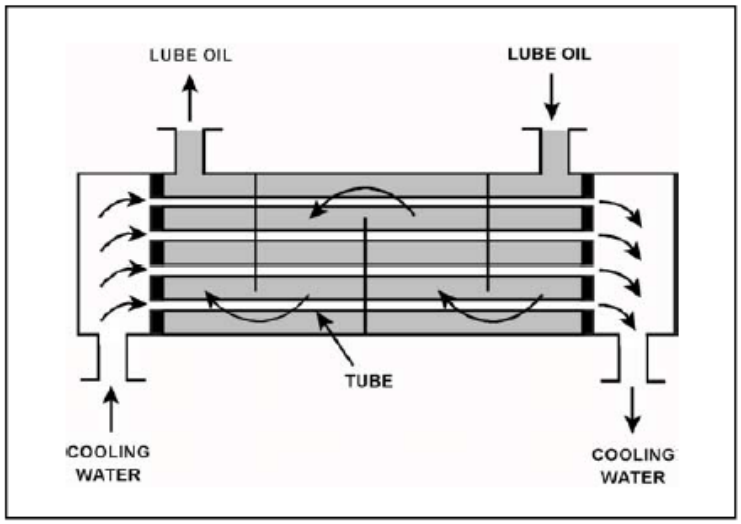
科目/題號：291006/17 (2016 新增)
知能類：K1.15 [2.6/2.8]
序號：B7625 (P7625)

Refer to the drawing of an operating lube oil heat exchanger (see figure below).
The heat exchanger was initially placed in continuous service 6 months ago. During the 6-month period of operation, mineral deposits have accumulated inside the heat exchanger tubes.
The following parameters are currently stable at their initial values:
- Lube oil mass flow rate
- Lube oil inlet temperature
- Lube oil outlet temperature
- Cooling water inlet temperature

Compared to their initial values, the current cooling water outlet temperature is _____; and the current cooling water mass flow rate is _____.
A. lower; smaller
B. lower; greater
C. higher; greater
D. higher; smaller
ANSWER: B.

參考一運轉中潤滑油熱交換器圖(見下圖)。
該熱交換器於六個月前開始連續運轉。在這六個月運轉期間，礦物質沉澱物在冷卻水管內累積。
下列參數值目前仍穩定在其初始值：
- 潤滑油質量流量率
- 潤滑油進口溫度
- 潤滑油出口溫度
- 冷卻水進口溫度

與他們的初始值相比較，目前冷卻水出口溫度_____；而目前冷卻水質量流量率_____。
A.比較低；比較小
B.比較低；比較大
C.比較高；比較大
D.比較高；比較小
答案： B

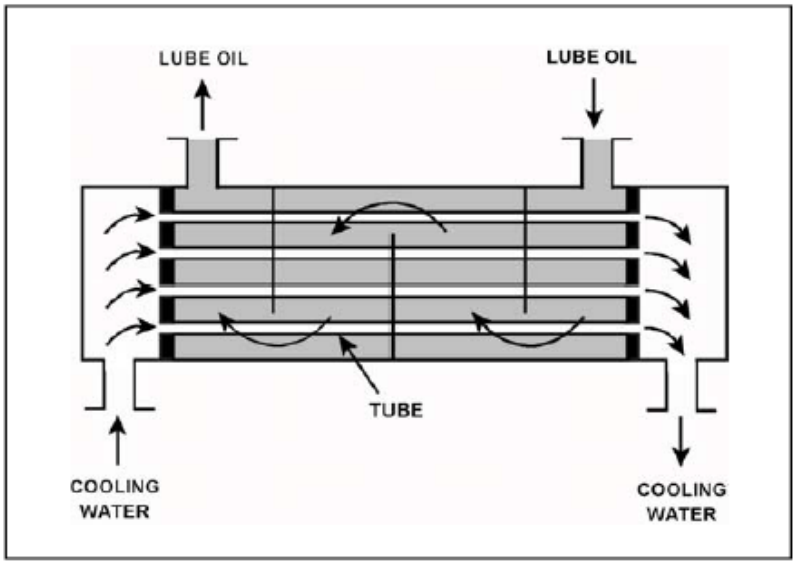

LUBE OIL
LUBE OIL
TUBE
COOLING WATER
COOLING WATER

科目/題號：291006/18 (2016 新增)
知能類：K1.16 [2.5/2.6]
序號：B6617 (P6616)

Refer to the drawing of an operating lube oil heat exchanger (see figure below).
If mineral deposits accumulate on the inside of the cooling water tubes, cooling water outlet temperature will _____; and lube oil outlet temperature will _____.
(Assume the lube oil and cooling water inlet temperatures and flow rates do not change.)
A. increase; decrease
B. increase; increase
C. decrease; decrease
D. decrease; increase
ANSWER: D.

參考一運轉中潤滑油熱交換器圖(見下圖)。
如果礦物質沉澱物在冷卻水管內累積。冷卻水出口溫度將_____;而潤滑油出口溫度將_____。
(假設潤滑油及冷卻水的進口溫度以及流量率都不變)
A.增加；減少
B.增加；增加
C.減少；減少
D.減少；增加

答案： D



科目/題號：291006/19 (2016 新增)
知能類：K1.17 [2.7/2.8]
序號：B4918 (P4917)

A nuclear power plant was initially operating at steady-state 50 percent power with 50 gpm of main condenser cooling water inleakage through a cooling water tube rupture. Power was then increased, and is currently stable at 60 percent.
Assume the size of the cooling water tube rupture does not change, and the main condenser cooling water inlet pressure and inlet temperature do not change.
When compared to the flow rate of main condenser cooling water inleakage at 50 percent power, the flow rate of cooling water inleakage at 60 percent power is _____ because the main condenser pressure at 60 percent power is _____.
A. higher; lower
B. higher; higher
C. lower; lower
D. lower; higher
ANSWER: D.

一核電廠初始時以50%功率穩定運轉，有50 gpm主冷凝器冷卻水經由冷卻水管破口滲入。之後其功率增加，目前穩定在60%。
假設冷卻水管破口大小並未改變，主冷凝器冷卻水進口壓力及進口溫度也未改變。
當與50%功率時有50 gpm主冷凝器冷卻水滲入時做比較，在60%功率時主冷凝器冷卻水滲入的流量率_____，因為主冷凝器的壓力在60%功率時_____。
A.較高；較低
B.較高；較高
C.較低；較低
D.較低；較高

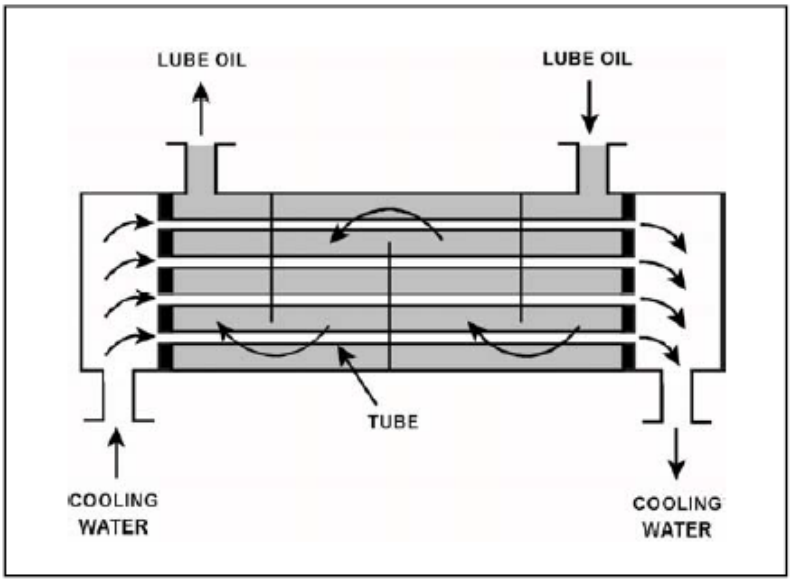
答案： D

科目/題號：291006/20 (2016 新增)
知能類：K1.18 [2.9/3.0]
序號：B4018 (P4016)

Refer to the drawing of an operating lube oil heat exchanger (see figure below).
The heat exchanger is operating with the following initial parameters:
Cooling water inlet temperature (Tcw-in) = 75°F
Cooling water outlet temperature (Tcw-out) = 95°F
Oil inlet temperature (Toil-in) = 150°F
Oil outlet temperature (Toil-out) = 120°F
Air introduction to the heat exchanger results in some of the heat exchanger tubes becoming uncovered. As a result, Tcw-out decreases to 91°F. Assume the inlet temperatures, mass flow rates, and specific heats of both fluids do not change.
Which one of the following will be the resulting temperature of the lube oil exiting the heat exchanger (Toil-out)?
A. 126°F
B. 130°F
C. 134°F
D. 138°F
ANSWER: A.

參考潤滑油熱交換器圖(見下圖)。
該熱交換器初始運轉參數如下：
冷卻水進口溫度(Tcw-in) = 75°F
冷卻水出口溫度(Tcw-out) = 95°F
潤滑油進口溫度(Toil-in) = 150°F
潤滑油出口溫度(Toil-out) = 120°F
由於空氣進入熱交換器，以致於有些熱交換器水管未被冷卻水覆蓋，因此讓冷卻水出口溫度降到91°F。假設兩種流體的進口溫度、質量流量率及比熱均不變。
下列何者為熱交換器的潤滑油出口溫度？
A. 126°F
B. 130°F
C. 134°F
D. 138°F

答案： A


LUBE OIL
LUBE OIL
TUBE
COOLING WATER
COOLING WATER

科目/題號：291006/21 (2016 新增)
知能類：K1.18 [2.8/2.9]
序號：B4817 (P4816)

Refer to the drawing of an operating lube oil heat exchanger (see figure below).
The heat exchanger is operating with the following initial parameters:

Cooling water inlet temperature (Tcw-in) = 75°F
Cooling water outlet temperature (Tcw-out) = 95°F
Oil inlet temperature (Toil-in) = 150°F
Oil outlet temperature (Toil-out) = 110°F

Air leakage into the heat exchanger causes some of the heat exchanger tubes to become uncovered. As a result, Tcw-out decreases to 89°F. Assume the inlet temperatures, mass flow rates, and specific heats of both fluids do not change.
Which one of the following will be the resulting temperature of the lube oil exiting the heat exchanger (Toil-out)?

A. 116°F

B. 122°F

C. 130°F

D. 138°F

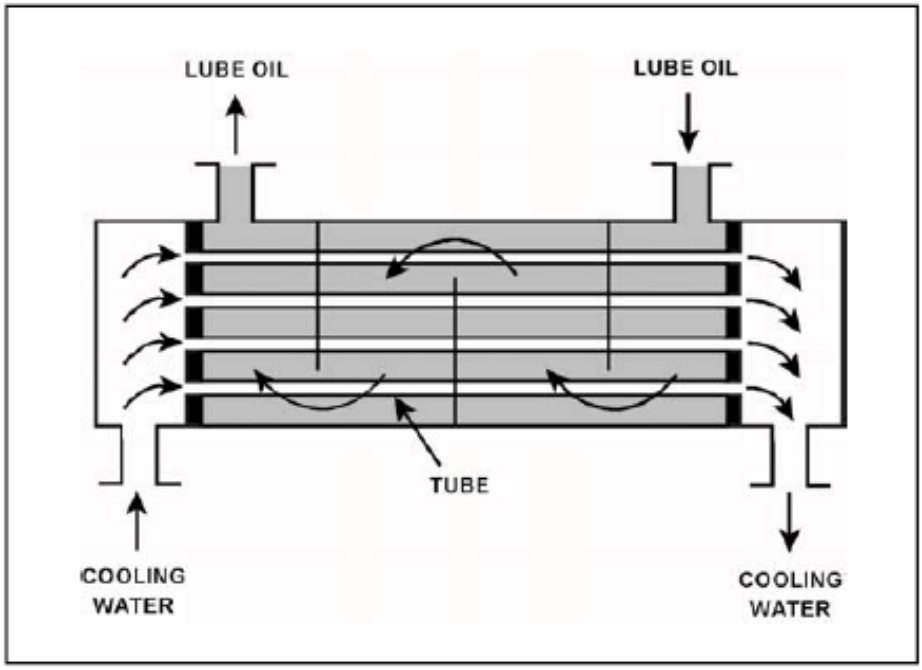
ANSWER: B.

參考潤滑油熱交換器圖(見下圖)。
該熱交換器初始運轉參數如下：

冷卻水進口溫度(Tcw-in) = 75°F
冷卻水出口溫度(Tcw-out) = 95°F
潤滑油進口溫度(Toil-in) = 150°F
潤滑油出口溫度(Toil-out) = 110°F

由於空氣進入熱交換器，以致有些熱交換器水管未被冷卻水覆蓋。因此讓冷卻水出口溫度降到89°F。假設兩種流體的進口溫度、質量流量率及比熱均不變。
下列何者為熱交換器的潤滑油出口溫度？
A. 116°F
B. 122°F
C. 130°F
D. 138°F

答案： B

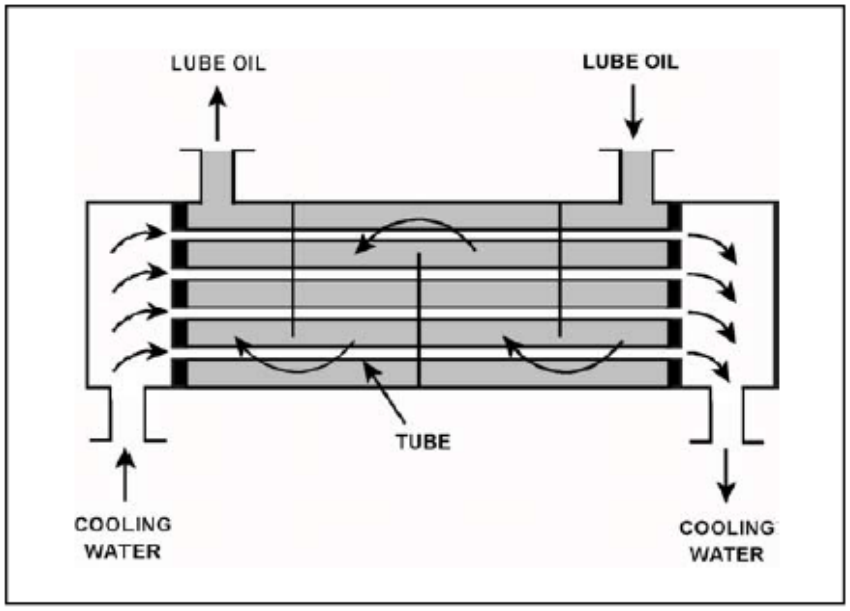

LUBE OIL
LUBE OIL
TUBE
COOLING WATER
COOLING WATER

科目/題號：291006/22 (2016 新增)
知能類：K1.18 [2.8/2.9]
序號：B5418 (P5417)

Refer to the drawing of an operating lube oil heat exchanger (see figure below).
The heat exchanger was operating with the following initial parameters:
Cooling water inlet temperature (Tcw-in) = 71°F
Cooling water outlet temperature (Tcw-out) = 91°F
Oil inlet temperature (Toil-in) = 175°F
Oil outlet temperature (Toil-out) = 125°F
The heat exchanger was vented, resulting in the following current parameters:
Cooling water inlet temperature (Tcw-in) = 71°F
Cooling water outlet temperature (Tcw-out) = 95°F
Oil inlet temperature (Toil-in) = 175°F
Oil outlet temperature (Toil-out) = ?
Assume that the mass flow rates and specific heats of both fluids were unchanged.
Which one of the following is the current lube oil outlet temperature (Toil-out)?
A. 115°F
B. 120°F
C. 130°F
D. 135°F
ANSWER: A.

參考潤滑油熱交換器圖(見下圖)。
該熱交換器初始運轉參數如下：
冷卻水進口溫度(Tcw-in) = 71°F
冷卻水出口溫度(Tcw-out) = 91°F
潤滑油進口溫度(Toil-in) = 175°F
潤滑油出口溫度(Toil-out) = 125°F
熱交換器逸氣後，目前參數如下：
冷卻水進口溫度(Tcw-in) = 71°F
冷卻水出口溫度(Tcw-out) = 95°F
潤滑油進口溫度(Toil-in) = 175°F
潤滑油出口溫度(Toil-out) = ?
假設兩種流體的質量流量率及比熱均不變。
下列何者為目前的潤滑油出口溫度？
A. 115°F
B. 120°F
C. 130°F
D. 135°F

答案： A


LUBE OIL
LUBE OIL
TUBE
COOLING WATER
COOLING WATER