科目： 292008
知能類： K1.01 [3.8/3.9]
序號： B3365

A nuclear power plant was operating at steady-state 100% power near the end of a fuel cycle when a reactor scram occurred. Reactor pressure is being maintained at 600 psig in anticipation of commencing a reactor startup.
Four hours after the scram, with reactor pressure still at 600 psig, which one of the following will cause the fission rate in the reactor core to increase?
A. Reactor vessel pressure is allowed to increase by 20 psig.
B. Reactor coolant temperature is allowed to increase by $3^{o}F$.
C. The operator fully withdraws the first group of control rods.
D. An additional two hours is allowed to pass with no other changes in plant parameters.
ANSWER: C.

一核能電廠於接近燃料週期末期以100%功率穩定運轉，此時發生反應爐急停。反應爐預期隨即啟動反應爐，反應爐壓力維持在600psig。急停四小時後，反應爐壓力仍然在600psig，下列何者將導致反應爐爐心分裂速率增加？
A. 反應爐壓力增加20psig
B. 反應爐冷卻水溫度增加$3^{o}F$
C. 運轉員將第一群組控制棒完全抽出
D. 在電廠參數無其他改變下，再經過兩小時
答案： C.

科目： 292008
知能類： K1.01 [3.8/3.9]
序號： B3465 (P3464)
A nuclear power plant was operating at steady-state 100% power near the end of a fuel cycle when a reactor scram occurred. Four hours after the scram, reactor pressure is being maintained at 600 psig in anticipation of commencing a reactor startup.
At this time, which one of the following will cause the fission rate in the reactor core to decrease?
A. Core void fraction is decreased by 2%.
B. Reactor coolant temperature is allowed to decrease by $3^{o}F$.
C. The operator fully withdraws the first group of control rods.
D. An additional two hours is allowed to pass with no other changes in plant parameters.
ANSWER: D.

一核能電廠於接近燃料週期末期以100%功率穩定運轉，此時發生反應爐急停。急停四小時後，預期隨即啟動反應爐，反應爐壓力維持在600psig。下列何者將導致反應爐爐心分裂速率降低？
A. 爐心空泡分率減少20%
B. 反應爐冷卻水溫度下降$3^{o}F$
C. 運轉員將第一群組控制棒完全抽出
D. 在電廠參數無其他改變下，再經過兩小時
答案： D.

科目： 292008
知能類： K1.02 [3.8/3.8]
序號： B1065 (N/A)

A refueling outage has just been completed and a reactor startup is being commenced. Which one of the following lists the method(s) used to add positive reactivity during the startup to criticality?
A. Control rods only
B. Recirculation pump flow only
C. Control rods and recirculation pump flow
D. Recirculation pump flow and steaming rate
ANSWER: A.

一反應爐剛完成燃料填換，並開始啟動。下列何者通常用來增加正反應度以達到臨界的方法？
A. 只用控制棒
B. 只用再循環泵流量
C. 控制棒與再循環泵流量
D. 再循環泵流量與蒸汽流量
答案： A.

科目： 292008
知能類： K1.03 [4.1/4.0]
序號： B266 (P65)

While withdrawing control rods during a reactor startup, the count rate doubles. If the same amount of reactivity that caused the first doubling is added again, the count rate will _____ and the reactor will be _____.
A. more than double; subcritical
B. more than double; critical
C. double; subcritical
D. double; critical
ANSWER: B.

當一反應爐啟動時抽出控制棒，其計數率倍增。若再加入同樣的反應度，則計數率將會____，而反應爐將會____。
A. 大於倍增；次臨界
B. 大於倍增；臨界
C. 倍增；次臨界
D. 倍增；臨界
答案： B.

科目： 292008
知能類： K1.03 [4.1/4.0]
序號： B1565 (P1065)

During a reactor startup, equal increments of positive reactivity are being sequentially added and the count rate is allowed to reach equilibrium after each addition. Which one of the following statements concerning the equilibrium count rate applies after each successive reactivity addition?
A. The time required to reach equilibrium count rate is the same.
B. The time required to reach equilibrium count rate is shorter.
C. The numerical change in equilibrium count rate increases.
D. The numerical change in equilibrium count rate is the same.
ANSWER: C.

在一反應爐啟動時，相等增量之正反應度被漸次加入，而在每次加入後均使計數率達到平衡。在漸次加入反應度之後，下列何者是關於平衡計數率的正確說明？
A. 需要達到平衡計數率的時間均相等
B. 需要達到平衡計數率的時間均將漸次縮短
C. 平衡計數率的改變數值漸次增加
D. 平衡計數率的改變數值不變
答案： C.

科目： 292008
知能類： K1.03 [4.1/4.0]
序號： B1766 (P2468)

A reactor startup is in progress with a current K_{eff} of 0.95 and a current equilibrium source range count rate of 150 cps. Which one of the following equilibrium count rates will occur when K_{eff} becomes 0.98?
A. 210 cps
B. 245 cps
C. 300 cps
D. 375 cps
ANSWER: D.

一反應爐正進行啟動，目前K_{eff} 為0.95，平衡源階計數率為150cps。當K_{eff}變成0.98時，平衡計數率將是多少？
A. 210 cps
B. 245 cps
C. 300 cps
D. 375 cps
答案： D.

科目： 292008
知能類： K1.03 [4.1/4.0]
序號： B1964
A reactor startup is in progress and the reactor is slightly subcritical. Assuming the reactor remains subcritical, a short control rod withdrawal will cause the reactor period to initially shorten, and then...
A. gradually lengthen and stabilize at a negative 80 second period.
B. gradually lengthen and stabilize at infinity.
C. gradually lengthen until reactor power reaches the point of adding heat, then stabilize at infinity.
D. gradually lengthen until the neutron population reaches equilibrium, then stabilize at a negative 80 second period.
ANSWER: B.

一反應爐正進行啟動，並處於次臨界。假設反應爐維持次臨界，一控制棒抽出一小段將會導致反應爐週期起初縮短，然後
A. 慢慢延長，並且在負80秒週期達到穩定
B. 慢慢延長，並且在無限大達到穩定
C. 慢慢延長，直到反應爐功率達到加熱點，然後在無限大達到穩定
D. 慢慢延長，直到中子數量達到平衡，然後在負80秒週期達到穩定
答案： B.

科目： 292008
知能類： K1.03 [4.1/4.0]
序號： B2069

A reactor startup is in progress with a current K_{eff} of 0.95 and a current equilibrium source range count rate of 120 cps. Which one of the following equilibrium count rates will occur when K_{eff} becomes 0.98?
A. 210 cps
B. 245 cps
C. 300 cps
D. 375 cps
ANSWER: C.

一反應爐正進行啟動，目前K_{eff} 為0.95，平衡源階計數率為120cps。當K_{eff}變成0.98時，平衡計數率將是多少？
A. 210 cps
B. 245 cps
C. 300 cps
D. 375 cps
答案： C.

科目： 292008
知能類： K1.03 [4.1/4.0]
序號： B2165 (P1766)

A reactor startup is in progress with the reactor currently subcritical.
Which one of the following describes the change in count rate resulting from a short control rod withdrawal with K_{eff} at 0.95 as compared to an identical control rod withdrawal with K_{eff} at 0.99? (Assume reactivity additions are equal, and the reactor remains subcritical.)

A. Both the prompt jump in count rate and the increase in stable count rate will be the same.
B. Both the prompt jump in count rate and the increase in stable count rate will be smaller with K_{eff} at 0.95.
C. The prompt jump in count rate will be smaller with K_{eff} at 0.95, but the increase in stable count rate will be the same.
D. The prompt jump in count rate will be the same, but the increase in stable count rate will be smaller with K_{eff} at 0.95.

ANSWER: B.

一反應爐正進行啟動，並處於次臨界。下列何者描述了在K_{eff} 為0.95時控制棒抽出一小段所導致的計數率變化與K_{eff} 為0.99時進行相同的控制棒抽出的結果相比？（假設反應度加入量均相同，同時反應爐維持次臨界）

A. 計數率的瞬間跳升與穩定計數率的增加均相同
B. K_{eff} 為0.95時之計數率的瞬間跳升與穩定計數率的增加均較小
C. K_{eff} 為0.95時之計數率的瞬間跳升較小，但穩定計數率的增加均相同
D. 計數率的瞬間跳升均相同，但K_{eff} 為0.95時之穩定計數率的增加較小

答案： B.

科目： 292008
知能類： K1.03 [4.1/4.0]
序號： B2365 (P2366)

A reactor startup is in progress with a current K_{eff} of 0.95 and a current stable source range count rate of 120 cps. Which one of the following equilibrium count rates will occur when K_{eff} becomes 0.97?
A. 200 cps
B. 245 cps
C. 300 cps
D. 375 cps
ANSWER: A.

一反應爐正進行啟動，目前K_{eff} 為0.95，穩定之源階計數率為120cps。當K_{eff}變成0.97時，平衡計數率將是多少？
A. 200 cps
B. 245 cps
C. 300 cps
D. 375 cps
答案： A.

科目： 292008
知能類： K1.03 [4.1/4.0]
序號： B2465 (P2466)
A reactor startup is being performed by adding equal amounts of positive reactivity and waiting for neutron population to stabilize. As the reactor approaches criticality, the numerical change in stable neutron population after each reactivity addition _____, and the time required for the neutron population to stabilize after each reactivity addition _____.
A. increases; remains the same
B. increases; increases
C. remains the same; remains the same
D. remains the same; increases
ANSWER： B.

一反應爐正進行啟動，每次加入等量之正反應度，同時等待中子數達到穩定。當反應爐趨近臨界，每次反應度添加後之穩定中子數的數值變化會_____，而每次反應度添加後中子數達到穩定所需的時間會_____。
A. 增加；維持不變
B. 增加；增加
C. 維持不變；維持不變
D. 維持不變；增加
答案： B.

科目： 292008
知能類： K1.03 [4.1/4.0]
序號： B2566

A reactor startup is in progress with a current K_{eff} of 0.95 and a current equilibrium source range count rate of 120 cps. Which one of the following equilibrium count rates will occur when K_{eff} becomes 0.985?
A. 250 cps
B. 300 cps
C. 350 cps
D. 400 cps
ANSWER: D.

一反應爐正進行啟動，目前K_{eff} 為0.95，穩定之源階計數率為120cps。當K_{eff}變成0.985時，平衡計數率將是多少？
A. 250 cps
B. 300 cps
C. 350 cps
D. 400 cps
答案： D.

科目： 292008
知能類： K1.04 [3.3/3.4]
序號： B67

As a reactor approaches criticality during a reactor startup it takes longer to reach an equilibrium neutron count rate after each control rod withdrawal due to the increased...
A. fraction of fission neutrons leaking from the core.
B. number of neutron generations required to reach a stable level.
C. length of time from neutron generation to absorption.
D. fraction of delayed neutrons appearing as criticality is approached.
ANSWER： B.

一反應爐啟動階段接近臨界時，在每次控制棒抽出後，要達到到平衡中子計數率所需要的時間越來越長，其原因是何者的增加？
A. 由爐心洩漏出的分裂中子的分率
B. 為達到到穩定能階所需產生的中子數
C. 中子從產生到吸收的時間長度
D. 當接近臨界時所出現的延遲中子的分率
答案： B.

科目： 292008
知能類： K1.04 [3.3/3.4]
序號： B365 (P365)

A reactor startup is in progress with a stable source range count rate and the reactor is near criticality. Which one of the following statements describes count rate characteristics during and after a 5-second control rod withdrawal? (Assume the reactor remains subcritical.)

A. There will be no change in count rate until criticality is achieved.
B. The count rate will rapidly increase (prompt jump) to a stable higher value.
C. The count rate will rapidly increase (prompt jump) then gradually increase and stabilize at a higher value.
D. The count rate will rapidly increase (prompt jump) then gradually decrease and stabilize at the previous value.

ANSWER： C.

一反應爐於穩定源階計數率下進行啟動，同時反應爐接近臨界。下列何者描述了在控制棒抽出過程中與抽出後五秒之計數率特徵？

A. 計數率沒有改變，直到達到臨界
B. 計數率將會快速增加（瞬間躍升）至穩定的較高值
C. 計數率將會快速增加（瞬間躍升），然後緩慢增加並穩定於一較高值
D. 計數率將會快速增加（瞬間躍升），然後緩慢降低並穩定於其原值

答案： C.

科目： 292008
知能類： K1.04 [3.3/3.4]
序號： B366 (P2265)
During a reactor startup, source range monitors (SRMs) indicate a stable count rate of 100 cps, and K_{eff} is 0.95. After a number of control rods have been withdrawn, SRM indication stabilizes at 270 cps. Which one of the following is the new K_{eff}? (Assume reactor period is infinity before and after the rod withdrawal.)
A. 0.963
B. 0.972
C. 0.981
D. 0.990
ANSWER: C.

在反應爐啟動中，源階偵測器(SRM)指示穩定計數率100cps而K_{eff} 為0.95。在數根控制棒被抽出後，SRM指示穩定於270cps。下列何者乃是新的K_{eff}值？（假設反應爐週期在控制棒抽出前後均為無限大）
A. 0.963
B. 0.972
C. 0.981
D. 0.990
答案： C.

科目： 292008
知能類： K1.04 [3.3/3.4]
序號： B865

During reactor startup, critical rod position is affected by...
A. core flow rate.
B. source range initial count rate.
C. recirculation ratio.
D. core age.
ANSWER： D.

在反應爐啟動中，臨界棒位受到何者的影響？
A. 爐心流量
B. 源階初始計數率
C. 再循環比率
D. 爐心年齡
答案： D.

科目： 292008
知能類： K1.04 [3.3/3.4]
序號： B966

During an initial reactor fuel load, the 1/M factor decreases from 1.0 to 0.5 after the first 100 fuel assemblies are loaded. What is the current value of K_{eff}?
A. 0.2
B. 0.5
C. 0.875
D. 1.0
ANSWER: B.

在反應爐初始燃料裝填中，在最初100個燃料元件裝填後，其1/M 因子從1.0減小至0.5。下列何者是目前的K_{eff}值？
A. 0.2
B. 0.5
C. 0.875
D. 1.0
答案： B.

科目： 292008
知能類： K1.04 [3.3/3.4]
序號： B1067 (P1972)

At one point during a reactor startup and approach to criticality, count rate is noted to be 780 cps, and K_{eff} is calculated to be 0.92. Later in the same startup, count rate is 4160 cps. What is the new K_{eff}?
A. 0.945
B. 0.950
C. 0.975
D. 0.985
ANSWER: D.

在反應爐啟動並趨近臨界時，某點的計數率為780cps，而K_{eff} 計算值為0.92。若稍後計數率達4160cps，下列何者乃是新的K_{eff}值？
A. 0.945
B. 0.950
C. 0.975
D. 0.985
答案： D.

科目： 292008
知能類： K1.04 [3.3/3.4]
序號： B1566 (P266)

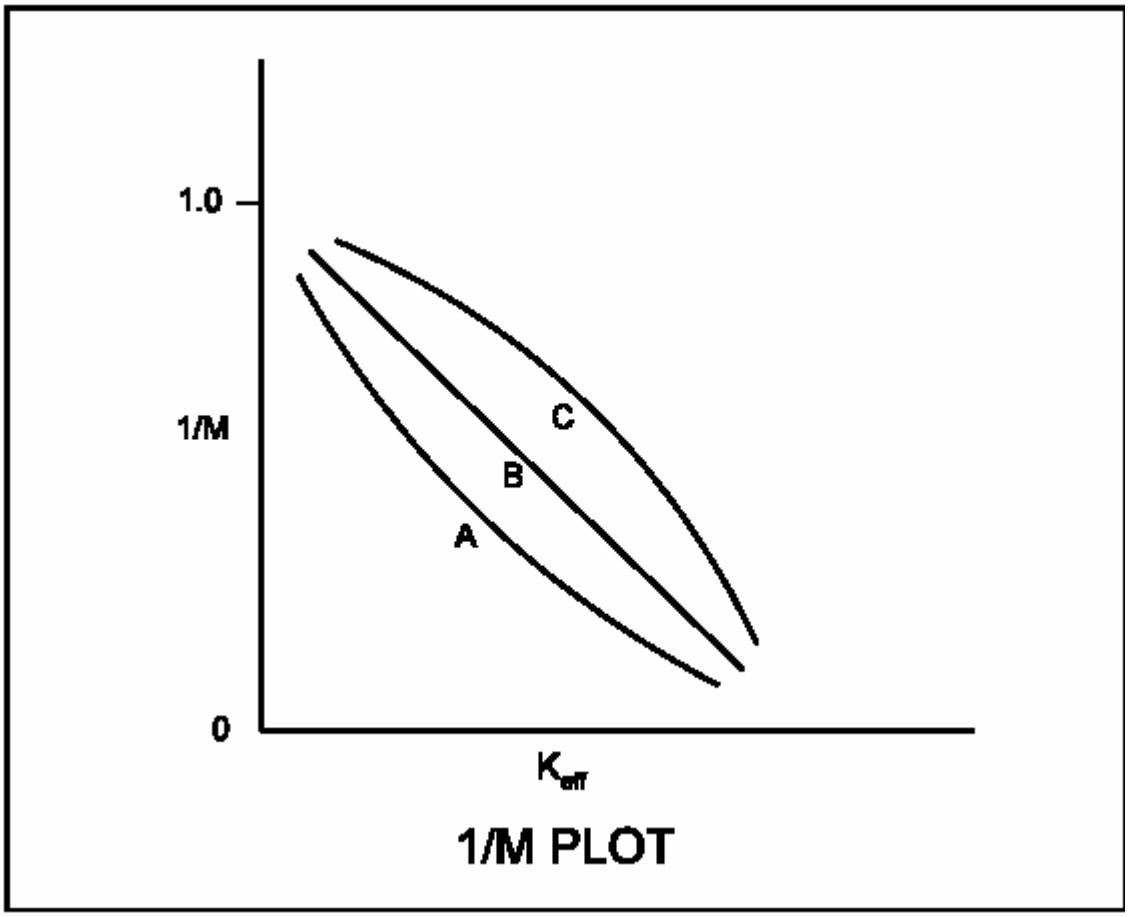
During a reactor startup, the operator adds 1.0%ΔK/K of positive reactivity by withdrawing control rods, thereby increasing equilibrium source range neutron level from 220 cps to 440 cps. Approximately how much additional positive reactivity is required to raise the equilibrium source range neutron level to 880 cps?
A. 4.0% ΔK/K
B. 2.0% ΔK/K
C. 1.0% ΔK/K
D. 0.5% ΔK/K
ANSWER: D.

在反應爐啟動時，運轉員藉由抽出控制棒而加入1.0%ΔK/K的正反應度，因而將平衡源階中子計數率從220cps增加到440cps。則將源階中子計數率增加到880cps所需要再加入之正反應度約為多少？
A. 4.0% ΔK/K
B. 2.0% ΔK/K
C. 1.0% ΔK/K
D. 0.5% ΔK/K
答案： D.

科目： 292008
知能類： K1.04 [3.3/3.4]
序號： B1665 (P1770)

Refer to the drawing of three 1/M plots labeled A, B, and C (see figure below).
The least conservative approach to criticality is represented by plot _____ and could possibly be the result of recording count rates at _____ time intervals after incremental fuel loading steps compared to the situations represented by the other plots.
A. A; shorter
B. A; longer
C. C; shorter
D. C; longer
ANSWER： C.

參考標示為A，B，C的三條1/M曲線圖（見下圖）。圖____表示達到臨界的最不保守方式，而與其他圖所表示的狀況相比，可能是因進行燃料裝填步驟之後以____的時間間隔記錄計數率所致。
A. A；較短
B. A；較長
C. C；較短
D. C；較長
答案： C.



1/M PLOT

科目： 292008
知能類： K1.04 [3.3/3.4]
序號： B1967 (P1265)
During an initial fuel load, the subcritical multiplication factor increases from 1.0 to 4.0 as the first 100 fuel assemblies are loaded. What is the corresponding final k_{eff}?
A. 0.25
B. 0.5
C. 0.75
D. 1.0
ANSWER: C.

燃料裝填時，在最初100個燃料元件裝填後，其次臨界增殖因數從1.0增加至4.0。下列何者是相對應的最終K_{eff}值？
A. 0.25
B. 0.5
C. 0.75
D. 1.0
答案： C.

科目： 292008
知能類： K1.04 [3.3/3.4]
序號： B2167 (P1867)

During a reactor startup, the first reactivity addition caused the count rate to increase from 20 to 40 cps. The second reactivity addition caused the count rate to increase from 40 to 80 cps. Assume k_{eff} was 0.92 prior to the first reactivity addition.
Which one of the following statements describes the magnitude of the reactivity additions?
A. The first reactivity addition was approximately twice as large as the second.
B. The second reactivity addition was approximately twice as large as the first.
C. The first and second reactivity additions were approximately the same.
D. There is not enough data given to determine the relationship between reactivity values.
ANSWER： A.

在一反應爐啟動時，第一次反應度添加導致計數率從20增加至40cps。第二次反應度添加導致計數率從40增加至80cps。假設在第一次反應度添加之前k_{eff}是0.92。下列何者描述了上述兩次反應度添加的大小？
A. 第一次反應度添加量約是第二次的兩倍
B. 第二次反應度添加量約是第一次的兩倍
C. 第一次與第二次反應度添加量大約相等
D. 數據不足無法決定兩次反應度值間的關係
答案： A.

科目： 292008
知能類： K1.04 [3.3/3.4]
序號： B2266
As a reactor approaches criticality during a reactor startup it takes longer to reach an equilibrium neutron count rate after each control rod withdrawal due to the increased...
A. length of time required to complete a neutron generation.
B. number of neutron generations required to reach a stable neutron level.
C. length of time from neutron birth to absorption.
D. fraction of delayed neutrons being produced as criticality is approached.

一反應爐啟動階段接近臨界時，在每次控制棒抽出後，要達到平衡中子計數率所需要的時間越來越長，其原因是何者的增加？
A. 中子產生所需的時間
B. 為達到到穩定中子計數率所需的中子世代數
C. 從中子誕生到被吸收的時間
D. 當接近臨界時所產生的延遲中子分率
答案： B.

科目： 292008
知能類： K1.04 [3.3/3.4]
序號： B2765 (P2766)

During a reactor startup, source range indication is stable at 120 cps with K_{eff} at 0.95. After a period of control rod withdrawal, source range indication stabilizes at 600 cps. Which one of the following is the approximate new K_{eff}?
A. 0.96
B. 0.97
C. 0.98
D. 0.99
ANSWER: D.

在反應爐啟動中，源階計數穩定於120cps，而K_{eff} 為0.95。在控制棒抽出一段時間後，源階計數穩定於600cps。下列何者乃是新的K_{eff}大約值？
A. 0.96
B. 0.97
C. 0.98
D. 0.99
答案： D.

科目： 292008
知能類： K1.04 [3.3/3.4]
序號： B2966 (P2968)

A reactor startup is in progress; control rod withdrawal has just been stopped to assess criticality. Which one of the following is a combination of indications in which each listed indication supports a declaration that the reactor is critical?

A. Period stabilizes at +200 sec; source range count rate is slowly increasing; inverse multiplication (1/M) value equals 0.000.
B. Period is approaching infinity; source range count rate increases and then stabilizes; inverse multiplication (1/M) value equals 0.111.
C. Period stabilizes at +200 sec; source range count rate is slowly increasing; inverse multiplication (1/M) value equals 1.000.
D. Period is approaching infinity; source range count rate increases and then stabilizes; inverse multiplication (1/M) value equals 1.111.

ANSWER： A.

一反應爐正進行啟動，停止控制棒抽出以評估距離臨界的程度。下列何種組合可用以宣布反應爐已達到臨界？

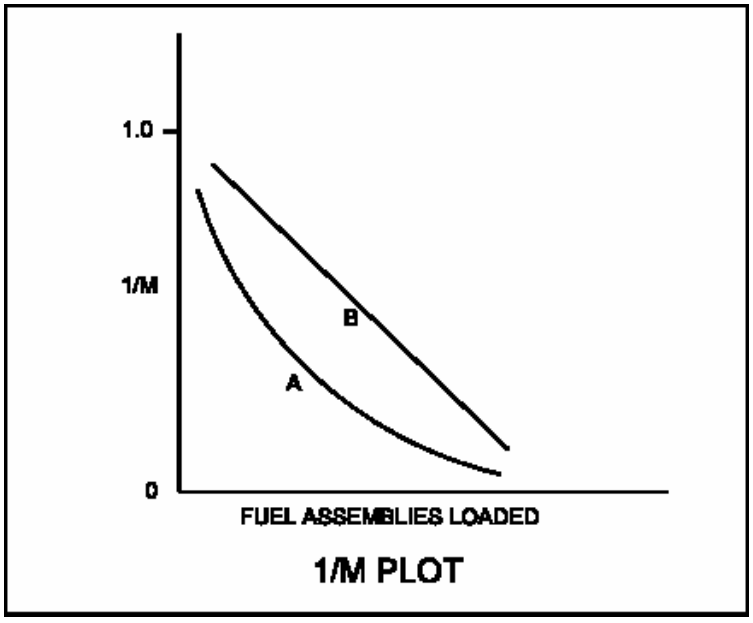
A. 週期穩定於＋200秒；源階計數率緩慢增加；增殖倒數(1/M)值等於0.000
B. 週期趨近於無限大；源階計數率增加並達到穩定；增殖倒數(1/M)值等於0.111
C. 週期穩定於＋200秒；源階計數率緩慢增加；增殖倒數(1/M)值等於1.000
D. 週期趨近於無限大；源階計數率增加並達到穩定；增殖倒數(1/M)值等於1.111

答案： A.

科目： 292008
知能類： K1.04 [3.3/3.4]
序號： B3665 (P3665)

Refer to the drawing of a 1/M plot with curves A and B (see figure below). Assume that each axis has linear units. Curve A would result if each fuel assembly loaded during the early stages of the refueling caused a relatively _____ fractional change in source range count rate compared to the later stages of the refueling; curve B would result if each fuel assembly contained equal _____.
A. small; fuel enrichment
B. small; reactivity
C. large; fuel enrichment
D. large; reactivity
AMSWER： D.

A. 參考具有曲線A與B之1/M 圖（見下圖）。假設兩座標軸均為線性單位。與燃料填換晚期相比較，若在燃料填換初期每個燃料元件的裝填，造成源階計數率較____比例的改變，則會得到曲線A；若每個燃料元件包含相等之____，則會得到曲線B。小；燃料濃縮度
B. 小；反應度
C. 大；燃料濃縮度
D. 大；反應度
答案： D.



科目： 292008
知能類： K1.05 [4.3/4.3]
序號： B267

A reactor startup is in progress with K_{eff} at 0.995 and stable source range indication. If K_{eff} is increased to 0.997 by control rod withdrawal, reactor period will initially become _____ and then _____.
A. positive; approach infinity
B. positive; stabilize at a positive value
C. negative; approach infinity
D. negative; stabilize at a negative value
ANSWER： A.

一反應爐在K_{eff} 為0.995與穩定源階計數狀況下進行啟動。若K_{eff} 藉由控制棒抽出而增加至0.997，則反應週期起初會變為_____，其後會_____。
A. 正；趨近無限大
B. 正；在正值達到穩定
C. 負；趨近無限小
D. 負；在負值達到穩定
答案： A.

科目： 292008
知能類： K1.05 [4.3/4.3]
序號： B1365 (P267)

As criticality is approached during a reactor startup, equal insertions of positive reactivity result in a _____ change in equilibrium count rate and a _____ time to reach each new equilibrium.
A. larger; longer
B. larger; shorter
C. smaller; longer
D. smaller; shorter
ANSWER： A.

於反應爐啟動中趨於臨界時，加入等量的正反應度會導致_____平衡計數率的改變，同時每次達到新平衡所需時間_____。
A. 較大；較長
B. 較大；較短
C. 較小；較長
D. 較小；較短
答案： A.

科目： 292008
知能類： K1.05 [4.3/4.3]
序號： B3566 (P3567)
A reactor startup is in progress for a reactor that is in the middle of a fuel cycle. The reactor is at normal operating temperature and pressure. The main steam isolation valves are open and the main turbine bypass (also called steam dump) valves are closed. The reactor is near criticality. Reactor period is stable at infinity when, suddenly, a turbine bypass valve fails open and remains stuck open, dumping steam to the main condenser. The operator immediately ensures no control motion is occurring and takes no further action. Assume that the reactor vessel water level remains stable, the reactor does not scram, and no other protective actions occur. As a result of the valve failure, reactor period will initially become _____; and reactor power will stabilize _____ the point of adding heat.
A. positive; at
B. positive; above
C. negative, but soon turn; at
D. negative, but soon turn; above
ANSWER： D.

一處於燃料循環週期中期的反應爐進行啟動。此反應爐在正常溫度壓力下運轉。主蒸汽隔離閥開啟，而主汽機旁通閥關閉。此反應爐接近臨界，反應爐週期穩定於無限大，此時突然間，汽機旁通閥因故障無法開啟而卡在開啟位置，將蒸汽排入主冷凝器；運轉員立即確認無控制動作正在進行，並且未採取額外動作。假設反應爐水位維持穩定，反應爐並未急停，同時沒有其他保護動作發生。因閥失效而產生的結果，反應爐週期將會先變成_____；而反應爐功率將會_____加熱點處達到穩定。
A. 正值；在
B. 正值；在高於
C. 負值，但是很快會反轉；在
D. 負值，但是很快會反轉；在高於
答案： D.

科目： 292008
知能類： K1.06 [4.2/4.2]
序號： B1267

A reactor is exactly critical during a reactor startup. Which one of the following must be closely monitored and controlled to ensure safe operation of the reactor as power is raised to the point of adding heat?
A. Reactor period
B. Reactor temperature
C. Source range count rate
D. Power peaking factors
ANSWER： A.

一反應爐於啟動階段正處於臨界。下列何者需要仔細監控，以確保功率提高至加熱點時反應爐能安全運轉？
A. 反應爐週期
B. 反應爐溫度
C. 源階計數率
D. 功率尖峰因數
答案： A.

科目： 292008
知能類： K1.06 [4.2/4.2]
序號： B1567 (P1667)
The following data was obtained at steady-state conditions during a reactor startup:

ROD POSITION (UNITS WITHDRAWN)	COUNT RATE (CPS)
0	180
5	200
10	225
15	257
20	300
25	360
30	450

Assuming uniform differential rod worth, at what approximate rod position should criticality occur?
A. Approximately 40 units withdrawn
B. Approximately 50 units withdrawn
C. Approximately 60 units withdrawn
D. Approximately 70 units withdrawn
ANSWER： B.

一反應爐在啟動過程中，得到如下穩態數據

控制棒位置（單位抽出）	計數率（CPS）
0	180
5	200
10	225
15	257
20	300
25	360
30	450

假設微分控制棒本領平均分佈，則臨界時控制棒之位置為何？
A. 約40單位抽出
B. 約50單位抽出
C. 約60單位抽出
D. 約70單位抽出
答案： B.

科目： 292008
知能類： K1.06 [4.2/4.2]
序號： B1767 (P1966)

The following data was obtained at steady-state conditions during a reactor startup:

ROD POSITION (UNITS WITHDRAWN)	COUNT RATE (CPS)
10	360
15	400
20	450
25	514
30	600
35	720
40	900

Assuming uniform differential rod worth, at what approximate rod position will criticality occur?
A. 50 units withdrawn
B. 60 units withdrawn
C. 70 units withdrawn
D. 80 units withdrawn
ANSWER： B.

在一反應爐於啟動過程中，得到如下穩態數據

控制棒位置（單位抽出）	計數率（CPS）
10	360
15	400
20	450
25	514
30	600
35	720
40	900

假設微分控制棒本領平均分佈，則臨界時控制棒之位置為何？
A. 約50單位抽出
B. 約60單位抽出
C. 約70單位抽出
D. 約80單位抽出
答案： B.

科目： 292008
知能類： K1.06 [4.2/4.2]
序號： B1866

A reactor has just achieved criticality during a xenon-free reactor startup. Instead of stabilizing power at 10_3 cps per the startup procedure, the operator inadvertently allows reactor power to increase to 10_4 cps as indicated on the source range monitors. Assuming reactor vessel coolant temperature and pressure do not change, the critical rod height at 10_4 cps will be _____ the critical rod height at 10_3 cps. (Neglect any effects of changes in fission product poisons.)
A. different but unpredictable compared to
B. less than
C. greater than
D. equal to
ANSWER： D.

一反應爐在無氙反應爐啟動中達到臨界。運轉員並沒有依啟動程序使功率穩定於10^3 cps之數值，而在不小心情況下，使反應爐功率增加至源階偵測器上所顯示之10^4 cps。假設反應爐冷卻水溫度與壓力不變，則10^4 cps時之臨界控制棒抽出位置會_____10^3 cps時之臨界控制棒抽出位置。（忽略分裂產物毒物改變而產生的任何效應。）
A. 不同於，但卻無法比較
B. 小於
C. 大於
D. 等於
答案： D.

科目： 292008
知能類： K1.06 [4.2/4.2]
序號： B2767 (P1167)

The following data was obtained during a reactor startup:

ROD POSITION (UNITS WITHDRAWN)	COUNT RATE (CPS)
0	180
10	210
15	250
20	300
25	360
30	420

Assuming uniform differential rod worth, at what approximate rod height will criticality occur?
A. 35 to 45 units withdrawn
B. 46 to 55 units withdrawn
C. 56 to 65 units withdrawn
D. 66 to 75 units withdrawn
ANSWER： B.

在一反應爐於啟動過程中，得到如下數據

控制棒位置（單位抽出）	計數率（CPS）
0	180
10	210
15	250
20	300
25	360
30	420

假設微分控制棒本領平均分佈，則臨界發生時之控制棒位置為何？
A. 35至45單位抽出
B. 46至55單位抽出
C. 56至65單位抽出
D. 66至75單位抽出
答案： B.

科目： 292008
知能類： K1.06 [4.2/4.2]
序號： B2867 (P1167)

The following data was obtained during a reactor startup:

ROD POSITION (UNITS COUNT WITHDRAWN)	RATE (CPS)
0	180
10	210
15	250
20	300
25	360
30	420

Assuming uniform differential rod worth, at what approximate rod height will criticality occur?
A. 31 to 45 units withdrawn
B. 46 to 60 units withdrawn
C. 61 to 75 units withdrawn
D. 76 to 90 units withdrawn
ANSWER： B.

在一反應爐於啟動過程中，得到如下數據

控制棒位置（單位抽出）	計數率（CPS）
0	180
10	210
15	250
20	300
25	360
30	420

假設微分控制棒本領平均分佈，則臨界發生時之控制棒位置為何？
A. 31至45單位抽出
B. 46至60單位抽出
C. 61至75單位抽出
D. 76至90單位抽出
答案： B.

科目： 292008
知能類： K1.07 [3.9/3.9]
序號： B123 (P68)

With K_{eff} = 0.985, how much reactivity must be added to make a reactor exactly critical?
A. 1.54% ΔK/K
B. 1.52% ΔK/K
C. 1.50% ΔK/K
D. 1.48% ΔK/K
ANSWER： B.

當K_{eff} = 0.985時，需要加入多少的反應度方能使反應爐恰好達到到臨界？
A. 1.54% ΔK/K
B. 1.52% ΔK/K
C. 1.50% ΔK/K
D. 1.48% ΔK/K
答案： B.

科目： 292008
知能類： K1.07 [3.9/3.9]
序號： B667

When a reactor is exactly critical, reactivity is...
A. greater than 1.0% ΔK/K.
B. equal to 1.0% ΔK/K.
C. less than 1.0% ΔK/K.
D. undefined.
ANSWER： C.

當一反應爐正處於臨界，其反應度
A. 大於1.0% ΔK/K
B. 等於1.0% ΔK/K
C. 小於1.0% ΔK/K
D. 無定義
答案： C.

科目： 292008
知能類： K1.07 [3.9/3.9]
序號： B867 (P2267)

When a reactor is exactly critical, reactivity is...
A. infinity.
B. undefined.
C. 0.0 ΔK/K.
D. 1.0 ΔK/K.
ANSWER： C.

當一反應爐正處於臨界，其反應度為
A. 無限大
B. 無定義
C. 0.0ΔK/K
D. 1.0ΔK/K
答案： C.

科目： 292008
知能類： K1.08 [4.1/4.1]
序號： B269 (P69)

During a reactor startup, a stable positive 30 second reactor period is achieved with no further reactivity addition. The reactor is...
A. exactly critical.
B. supercritical.
C. subcritical.
D. prompt critical.
ANSWER： B.

反應爐啟動時，在沒有額外反應度加入情況下，其反應爐週期達到穩定在正30秒。則此反應爐處於
A. 恰好臨界
B. 超臨界
C. 次臨界
D. 瞬發臨界
答案： B.

科目： 292008
知能類： K1.08 [4.1/4.1]
序號： B868 (P868)

Which one of the following indicates that a reactor has achieved criticality during a normal reactor startup?
A. Constant positive period with no rod motion
B. Increasing positive period with no rod motion
C. Constant positive period during rod withdrawal
D. Increasing positive period during rod withdrawal
ANSWER： A.

下列何者描述了反應爐在正常啟動中已達到臨界？
A. 固定正週期，沒有控制棒抽動
B. 逐漸增加之正週期，沒有控制棒抽動
C. 在控制棒抽出中具有固定正週期
D. 在控制棒抽出中具有逐漸增加之正週期
答案： A.

科目： 292008
知能類： K1.08 [4.1/4.1]
序號： B1069

A reactor is critical just below the point of adding heat (POAH) at a temperature of 160°F. Which one of the following will result in reactor power increasing and stabilizing at the POAH? (Assume a negative moderator temperature coefficient.)
A. Reactor recirculation flow increases 10%.
B. Reactor coolant temperature increases 3°F.
C. A single control rod moves in one notch.
D. Core xenon-135 concentration decreases.
ANSWER： D.

一反應爐在溫度160°F且未達到加熱點處達到臨界。下列何者會導致反應爐功率增加，並且在加熱點處達到穩定？（假設緩和劑溫度係數為負。）
A. 反應爐再循環流量增加10%
B. 反應爐冷卻水溫度增加3°F
C. 單一控制棒移動一節
D. 爐心內氙-135濃度降低
答案： D.

科目： 292008
知能類： K1.08 [4.1/4.1]
序號： B2668 (P2667)

A nuclear reactor is critical at 10^{-6}% power. Control rods are withdrawn for 5 seconds and then stopped, resulting in a stable reactor period of positive 100 seconds.
If control rods had been inserted (instead of withdrawn) for 5 seconds with the reactor initially critical at 10^{-6}% power, the stable reactor period would have been: (Assume equal absolute values of reactivity are added in both cases.)

A. longer than negative 100 seconds because, compared to power increases, reactor power decreases are more limited by delayed neutrons.
B. shorter than negative 100 seconds because, compared to power increases, reactor power decreases are less limited by delayed neutrons.
C. longer than negative 100 seconds because, compared to power increases, reactor power decreases result in smaller delayed neutron fractions.
D. shorter than negative 100 seconds because, compared to power increases, reactor power decreases result in larger delayed neutron fractions.

answer： A.

一核子反應爐在功率10^{-6}%達到到臨界。控制棒抽出5秒，然後停止，導致一穩定反應爐週期為正100秒。若控制棒在功率10^{-6}% 達到到臨界時插入（而非抽出）5秒，則穩定反應爐週期將會是：(假設在兩狀況中所加入的反應度絕對值均相等。)

A. 較負100秒長，因為與功率增加相比，反應爐功率減少受到延遲中子之限制較大
B. 較負100秒短，因為與功率增加相比，反應爐功率減少受到延遲中子之限制較小
C. 較負100秒長，因為與功率增加相比，反應爐功率減少所導致的延遲中子分率較小
D. 較負100秒短，因為與功率增加相比，反應爐功率減少所導致的延遲中子分率較大

答案： A.

科目： 292008
知能類： K1.10 [3.6/3.6]
序號： B468

A reactor is being started up from cold shutdown conditions with a stable positive 100-second period and power is entering the intermediate range. Assuming no operator action is taken that affects reactivity, which one of the following will occur?
A. Reactor period remains constant until saturation conditions are reached.
B. Reactor period increases to infinity as heat production in the reactor exceeds ambient losses.
C. Reactor period remains constant until void production begins in the core.
D. Reactor period decreases to zero as the fuel temperature increase adds negative reactivity to the core.
ANSWER： B.

一反應爐從冷停機狀況下啟動，具有正100秒的穩定週期，同時其功率正進入中程能階範圍。假設無影響反應度之運轉員操作，則下列何者會發生？
A. 反應爐週期維持固定，直到飽和狀況達到
B. 因為反應爐產生的熱大於散失至環境中的熱，反應爐週期增加至無窮大
C. 反應爐週期維持固定，直到爐心開始產生空泡
D. 因為燃料溫度增加而對爐心添加了負反應度，反應爐週期降低至零
答案： B.

科目： 292008
知能類： K1.10 [3.6/3.6]
序號： B669

A reactor is being started up with a stable positive 100-second period and power is entering the intermediate range (below the point of adding heat). Assuming no operator action, which one of the following describes the response of reactor period?

A. Prior to reaching the point of adding heat, the fuel temperature increase will add negative reactivity and reactor period will approach infinity.
B. As heat production in the reactor exceeds ambient losses, the temperature of the fuel and moderator will increase, adding negative reactivity, and reactor period will approach infinity.
C. The heat produced by the reactor through all ranges of the intermediate range indication, is insufficient to raise the fuel or moderator temperatures, and reactor period remains constant throughout the intermediate range.
D. As heat production in the reactor exceeds ambient losses, positive reactivity added by the fuel temperature increase counteracts the negative reactivity added by the moderator temperature increase, and reactor period remains constant throughout the intermediate range.

ANSWER： B.

一反應爐進行啟動達到正100秒的穩定週期，其功率正進入中程能階範圍（未達加熱點）。假設沒有運轉員操作，下列何者描述了反應爐週期反應？

A. 在達到加熱點之前，燃料溫度增加將會添加負反應度，而反應爐週期將趨近無限大
B. 因為反應爐產生的熱大於散失至環境中的熱，燃料溫度以及緩和劑溫度將增加，增添負反應度，而反應爐週期將會趨近無限大
C. 在中程能階範圍中所有區段的反應爐產生的熱，不足以提高燃料以及緩和劑溫度，而反應爐週期在整個中程能階範圍中維持不變
D. 因為反應爐產生的熱大於散失至環境中的熱，由燃料溫度升高所添加之正反應度與由緩和劑溫度增加所添加之負反應度抵消，而反應爐週期在整個中程能階範圍中維持不變

答案： B.

科目： 292008
知能類： K1.10 [3.6/3.6]
序號： B2168 (P1870)

A reactor startup is in progress following a one-month shutdown. Upon reaching criticality, the operator establishes a positive 80-second period and stops rod motion. After an additional 30 seconds, reactor power will be _____ and reactor period will be _____. (Assume reactor power remains below the point of adding heat.)
A. increasing; increasing
B. increasing; constant
C. constant; increasing
D. constant; constant
ANSWER： B.

一反應爐在經過一個月的停機後，正進行啟動。當達到臨界時，運轉員建立一正80秒之週期，並且停止控制棒移動。在30秒後，反應爐功率將會____而反應爐週期將會____。（假設反應爐功率維持在加熱點之下。）
A. 增加；增加
B. 增加；維持不變
C. 維持不變；增加
D. 維持不變；維持不變
答案： B.

科目： 292008
知能類： K1.10 [3.6/3.6]
序號： B2671 (P2668)

A reactor is being started up under cold shutdown conditions with a stable positive 100-second period and power is entering the intermediate range. Assuming no operator action is taken that affects reactivity, reactor period will remain constant until...

A. void production begins in the core, then reactor period will increase toward infinity.
B. core heat production exceeds ambient losses, then reactor period will increase toward infinity.
C. xenon-135 production becomes significant, then reactor period will decrease toward zero.
D. fuel temperature begins to increase, then reactor period will decrease toward zero.

ANSWER： B.

一反應爐在冷停機情況下進行啟動，週期為正100秒，同時功率正進入中程能階範圍。假設沒有影響反應度的運轉員操作進行，反應爐的週期將會維持固定，直到

A. 爐心開始產生空泡，然後反應爐週期將會朝無限大增加
B. 爐心產生的熱大於散失至環境中的熱，然後反應爐週期將會朝無限大增加
C. 氙-135生成變為顯著，然後反應爐週期將會朝零減小
D. 燃料溫度開始增加，然後反應爐週期將會朝零減小

答案： B.

科目： 292008
知能類： K1.11 [3.7/3.8]
序號： B568

After recording critical data during a cold reactor startup with main steam isolation valves open, the operator withdraws the control rods to continue the startup. Which one of the following pairs of parameters will provide the first indication of reaching the point of adding heat?
A. Reactor pressure and reactor water level
B. Reactor power and reactor period
C. Reactor pressure and turbine load
D. Reactor water level and core flow rate
ANSWER： B.

在主蒸汽隔離閥開啟情況下，進行反應爐冷爐啟動，於記錄其臨界資料後，運轉員抽出控制棒以繼續其啟動。下列何組參數將會最早表示加熱點已經達到？
A. 反應爐壓力與反應爐水位
B. 反應爐功率與反應爐週期
C. 反應爐壓力與汽機負載
D. 反應爐水位與爐心流量
答案： B.

科目： 292008
知能類： K1.11 [3.7/3.8]
序號： B3934 (P3935)

After taking critical data during a reactor startup, the operator establishes a stable 50-second reactor period to increase power to the point of adding heat (POAH). Which one of the following is the approximate amount of reactivity that must be added to stabilize reactor power at the POAH? (Assume $\bar{\beta}_{eff} = 0.006$.)
A. -0.01 %ΔK/K
B. -0.06 %ΔK/K
C. -0.10 %ΔK/K
D. -0.60 %ΔK/K
ANSWER： C.

在一反應爐啟動中，擷取臨界資料後，運轉員建立起一穩定之50秒反應爐週期，以增加功率至加熱起始點。為使反應爐功率在加熱起始點達到穩定，則所需加之反應度約是下列何者？（假設$\bar{\beta}_{eff} = 0.006$）

A. -0.01 %ΔK/K
B. -0.06 %ΔK/K
C. -0.10 %ΔK/K
D. -0.60 %ΔK/K
答案： C.

科目： 292008
知能類： K1.12 [3.6/3.7]
序號： B133 (P1169)

A reactor is critical well below the point of adding heat when a small amount of positive reactivity is added to the core. If the same amount of negative reactivity is added to the core approximately 1 minute later, reactor power will stabilize at...
A. the initial power level.
B. somewhat higher than the initial power level.
C. somewhat lower than the initial power level.
D. the subcritical multiplication equilibrium level.
ANSWER： B.

一反應爐於一小量之正反應度加入爐心情況下，在低於加熱起始點相當遠處達到臨界。若一分鐘後對爐心加入同樣的負反應度，則反應爐功率將會達到穩定在
A. 初始功率
B. 稍高於初始功率
C. 稍低於初始功率
D. 次臨界增殖平衡功率
答案： B.

科目： 292008
知能類： K1.12 [3.6/3.7]
序號： B2467

Criticality has just been achieved during a reactor startup at 160°F. The operator withdraws control rods as necessary to establish a stable positive 30-second reactor period. No additional operator actions are taken.
How will reactor period and reactor power respond? (Assume a negative moderator temperature coefficient.)

A. Reactor power will increase and stabilize at the POAH; reactor period will remain constant until the POAH is reached and then stabilize at infinity.
B. Reactor power will increase and stabilize at the POAH; reactor period will decrease slowly until the POAH is reached and then stabilize at infinity.
C. Reactor power will increase and stabilize above the POAH; reactor period will remain constant until the POAH is reached and then stabilize at infinity.
D. Reactor power will increase and stabilize above the POAH; reactor period will decrease slowly until the POAH is reached and then stabilize at infinity.

ANSWER： A.

一反應爐於160°F啟動並達到臨界，運轉員將控制棒抽出以建立正30秒之穩定週期，無額外之運轉員操作進行。反應爐週期以及功率之反應為何？（假設緩和劑溫度係數為負。）

A. 反應爐功率將增加並於加熱起始點達到穩定；反應爐週期將維持固定，直到達到加熱起始點，其後穩定於無限大
B. 反應爐功率將增加並於加熱起始點達到到穩定；反應爐週期將緩慢減小，直到達到加熱起始點，其後穩定於無限大
C. 反應爐功率將增加並在高於加熱起始點處達到到穩定；反應爐週期將維持固定直到達到加熱起始點，其後穩定於無限大
D. 反應爐功率將增加並在高於加熱點起始處達到到穩定；反應爐週期將緩慢減小直到達到加熱起始點，其後穩定於無限大

答案： A.

科目： 292008
知能類： K1.12 [3.6/3.7]
序號： B1467 (P2269)

A reactor is critical at the point of adding heat when a small amount of negative reactivity is added to the core. If the same amount of positive reactivity is added to the core approximately 5 minutes later, reactor power will...
A. stabilize at the subcritical multiplication equilibrium neutron level.
B. stabilize at a level lower than the initial power level.
C. continue to decrease on a negative 80 second period.
D. stabilize at the initial power level.
ANSWER： B.

一反應爐於一小量之負反應度加入爐心情況下，在加熱起始點達到臨界。若五分鐘後對爐心加入同量的正反應度，則反應爐功率將會
A. 在次臨界增殖中子平衡計數率達到到穩定
B. 在低於初始功率處達到到穩定
C. 在負80秒週期下持續減少
D. 在初始功率處達到到穩定
答案： B.

科目： 292008
知能類： K1.12 [3.6/3.7]
序號： B2268 (P571)

A reactor startup is in progress and criticality has just been achieved. After recording critical rod height, the operator withdraws control rods for 20 seconds to establish a positive 30-second reactor period. One minute later (prior to the point of adding heat) the operator inserts the same control rods for 25 seconds. (Assume the control rod withdrawal and insertion rates are the same.)
During the rod insertion, the reactor period will become...
A. negative during the entire period of control rod insertion.
B. negative shortly after the control rods pass through the critical rod height.
C. negative just as the control rods pass through the critical rod height.
D. negative shortly before the control rods pass through the critical rod height.
ANSWER： D.

一反應爐正在啟動，並且達到臨界。在記錄臨界控制棒棒位後，運轉員抽出控制棒20秒以建立正30秒之反應爐週期。一分鐘後（在未達加熱起始點前）運轉員將同樣的控制棒插入25秒。（假設控制棒抽出與插入速率相同。）在控制棒插入當中，此反應爐週期將會
A. 在整個控制棒插入期間變為負值
B. 在控制棒通過臨界棒位後不久變為負值
C. 在正當控制棒通過臨界棒位時變為負值
D. 在控制棒通過臨界棒位之前不久變為負值
答案： D.

科目： 292008
知能類： K1.12 [3.6/3.7]
序號： B2568 (P2568)

A reactor is currently at 10^{-3}% power with a positive 60 second reactor period. An amount of negative reactivity is added to the core that places the reactor on a negative 40 second reactor period.
If the same amount of positive reactivity is added to the core approximately 5 minutes later, reactor power will...
A. increase and stabilize at the point of adding heat.
B. increase and stabilize at 10^{-3}% power.
C. continue to decrease on a negative 40 second period until the equilibrium source neutron level is reached.
D. continue to decrease with an unknown period until the equilibrium source neutron level is reached.
ANSWER： A.

一反應爐目前功率為10^{-3}%，並具有正60秒之週期。一負反應度加入爐心，使得反應爐具有負40秒之週期。若五分鐘後，對爐心加入同樣的正反應度，則反應爐功率將
A. 增加並於加熱起始點達到穩定
B. 增加並於10^{-3}% 功率處達到穩定
C. 在負40秒週期下持續減小，直到平衡源階中子計數率達到為止
D. 在不確定的週期下持續減小，直到平衡源階中子計數率達到為止
答案： A.

科目： 292008
知能類： K1.12 [3.6/3.7]
序號： B2969 (P2970)

A reactor startup is in progress and criticality has just been achieved. After recording the critical rod heights, the operator withdraws a control rod for 20 seconds to establish a stable positive 30- second reactor period. One minute later (prior to reaching the point of adding heat), the operator inserts the same control rod for 25 seconds. During the insertion, when will the reactor period become negative?
A. Immediately when the control rod insertion is initiated.
B. After the control rod passes through the critical rod height.
C. Just as the control rod passes through the critical rod height.
D. Prior to the control rod passing through the critical rod height.
ANSWER： D.

一反應爐正在啟動，並且達到臨界。在記錄臨界控制棒棒位後，運轉員抽出控制棒20秒以建立正30秒之週期。一分鐘後（在未達加熱起始點前）運轉員將同樣的控制棒插入25秒。在控制棒插入當中，此反應爐週期何時將成為負值？
A. 在控制棒插入開始之後立刻變化
B. 在控制棒通過臨界控制棒棒位後
C. 正當控制棒通過臨界控制棒棒位時
D. 在控制棒通過臨界控制棒棒位之前
答案： D.

科目： 292008
知能類： K1.12 [3.6/3.7]
序號： B3668 (P3668)

A reactor is slightly supercritical during a reactor startup. A short control rod withdrawal is performed to establish the desired reactor period. Assume that the reactor remains slightly supercritical after the control rod withdrawal, and that reactor power remains well below the point of adding heat.
Immediately after the control rod withdrawal is stopped, the reactor period will initially lengthen and then...
A. stabilize at a positive value.
B. turn and slowly shorten.
C. stabilize at infinity.
D. continue to slowly lengthen.
ANSWER： A.

一反應爐在啟動中達到稍微超臨界。一小段控制棒抽出以建立所需之反應爐週期。假設反應爐在控制棒抽出後仍維持稍微超臨界，同時反應爐功率維持在加熱起始點之下相當距離。當控制棒抽出停止後，反應爐週期一開始將會增長，然後
A. 穩定於一正值
B. 反轉並且緩慢縮短
C. 穩定在無限大
D. 持續緩慢增長
答案： A.

科目： 292008
知能類： K1.12 [3.6/3.7]
序號： B4034

A nuclear reactor is initially critical in the source range. Then a constant rate addition of positive reactivity commences and lasts for 120 seconds. Assume reactor power remains below the point of adding heat for the entire 120 second time interval. During the 120 second time interval, reactor period will initially shorten and then _____; and reactor power will initially increase and then _____.
A. continue to shorten at a decreasing rate; continue to increase at an increasing rate
B. continue to shorten at a decreasing rate; continue to increase at a decreasing rate
C. continue to shorten at a increasing rate; continue to increase at an increasing rate
D. continue to shorten at an increasing rate; continue to increase at a decreasing rate
ANSWER： A.

一反應爐在源階達到臨界。然後開始以固定速率加入正的反應度，並且持續120秒。假設於此120秒期間內反應爐功率維持在加熱起始點之下。在此120秒期間當中, 反應爐週期起初將會縮短然後_____;而反應爐功率起初將會增加然後_____。
A. 持續以遞減速率縮短；持續以遞增速率增加
B. 持續以遞減速率縮短；持續以遞減速率增加
C. 持續以遞增速率縮短；持續以遞增速率增加
D. 持續以遞增速率縮短；持續以遞減速率增加
答案： A.

科目： 292008
知能類： K1.13 [3.8/3.9]
序號： B271

Upon reaching criticality during a reactor startup, the operator establishes a positive reactor period. Upon reaching the point of adding heat, the period will become _____ due to the _____ reactivity feedback of moderator and fuel temperature.
A. shorter; negative
B. shorter; positive
C. longer; negative
D. longer; positive
ANSWER： C.

當反應爐於啟動中達到臨界，運轉員建立起一正反應度週期。在到達加熱起始點時，此週期將會變得_____，因為緩和劑與燃料溫度回饋之_____反應度。
A. 較短；負
B. 較短；正
C. 較長；負
D. 較長；正
答案： C.

科目： 292008
知能類： K1.13
序號： B670 (P670)

After taking critical data during a reactor startup, the operator establishes a 26-second reactor period to increase power to the point of adding heat (POAH). How much negative reactivity feedback must be added at the POAH to stop the power increase? Assume:
$\bar{\beta}$ = 0.00579
l^* = 1 x 10^{-5}seconds
λ_{eff} = 0.1 $seconds^{-1}$
A. 0.16% ΔK/K
B. 0.19% ΔK/K
C. 0.23% ΔK/K
D. 0.29% ΔK/K
ANSWER： A.

在擷取了反應爐啟動的臨界資料後，運轉員建立起一26秒的週期，以增加功率達到加熱起始點。在加熱起始點要停止功率增加，則需加入多少的負反應度回饋？假設
$\bar{\beta}$ = 0.00579
l^* = 1 x 10^{-5}seconds
λ_{eff} = 0.1 $seconds^{-1}$
A. 0.16% ΔK/K
B. 0.19% ΔK/K
C. 0.23% ΔK/K
D. 0.29% ΔK/K
答案： A.

科目： 292008
知能類： K1.13 [3.8/3.9]
序號： B968

After taking critical data during a reactor startup, the operator establishes a positive 26-second reactor period to increase power to the point of adding heat (POAH). How much negative reactivity must be added to stabilize power at the POAH? (Assume $\bar{\beta}_{eff} = 0.00579$.)
A. 0.10% ΔK/K
B. 0.16% ΔK/K
C. 1.0% ΔK/K
D. 1.6% ΔK/K
ANSWER： B.

在擷取了反應爐啟動的臨界資料後，運轉員建立起一26秒的週期，以增加功率達到加熱起始點。為使功率穩定於加熱起始點，則需加入多少的負反應度？（假設 $\bar{\beta}_{eff} = 0.00579$）

A. 0.10% ΔK/K
B. 0.16% ΔK/K
C. 1.0% ΔK/K
D. 1.6% ΔK/K
答案： B.

科目： 292008
知能類： K1.13 [3.8/3.9]
序號： B1667

After taking critical data during a reactor startup, the operator establishes a stable 38-second reactor period to increase power to the point of adding heat (POAH). Which one of the following is the approximate negative reactivity required to stop the power increase at the POAH? (Assume that $\bar{\beta}_{eff} = 0.00579$.)
A. 0.01% ΔK/K
B. 0.12% ΔK/K
C. 0.16% ΔK/K
D. 0.21% ΔK/K
ANSWER： B.

在擷取了反應爐啟動的臨界資料後，運轉員建立起38秒的穩定週期，以增加功率達到加熱起始點。在加熱起始點要停止功率增加，則需加入多少的負反應度？（假設$\bar{\beta}_{eff} = 0.00579$）

A. 0.01% ΔK/K
B. 0.12% ΔK/K
C. 0.16% ΔK/K
D. 0.21% ΔK/K
答案： B.

科目： 292008
知能類： K1.13 [3.8/3.9]
序號： B1769

After taking critical data during a reactor startup, the operator establishes a positive 31-second reactor period to increase power to the point of adding heat (POAH). Which one of the following is the appropriate amount of reactivity needed to stabilize power at the POAH?
(Assume $\bar{\beta}_{eff} = 0.00579$.)
A. -0.14% ΔK/K
B. -0.16% ΔK/K
C. -1.4% ΔK/K
D. -1.6% ΔK/K
ANSWER： A.

在擷取了反應爐啟動的臨界資料後，運轉員建立起正31秒的週期，以增加功率達到加熱起始點。為使功率穩定於加熱起始點，則需加入多少的負反應度？（假設 $\bar{\beta}_{eff} = 0.00579$）

A. -0.14% ΔK/K
B. -0.16% ΔK/K
C. -1.4% ΔK/K
D. -1.6% ΔK/K
答案： A.

科目： 292008
知能類： K1.13 [3.8/3.9]
序號： B2369 (P2370)

After taking critical data during a reactor startup, the operator establishes a positive 48-second reactor period to increase power to the point of adding heat (POAH). Which one of the following is the approximate amount of reactivity needed to stabilize power at the POAH?
(Assume $\bar{\beta}_{eff} = 0.00579$.)
A. -0.10% ΔK/K
B. -0.12% ΔK/K
C. -0.01% ΔK/K
D. -0.012% ΔK/K
ANSWER： A.

在擷取了反應爐啟動的臨界資料後，運轉員建立起正48秒的週期，以增加功率達到加熱起始點。為使功率穩定於加熱起始點，則需加入多少的負反應度？（假設 $\bar{\beta}_{eff} = 0.00579$）

A. -0.10% ΔK/K
B. -0.12% ΔK/K
C. -0.01% ΔK/K
D. -0.012% ΔK/K
答案： A.

科目： 292008
知能類： K1.13 [3.8/3.9]
序號： B3068 (P3068)

After taking critical data during a reactor startup, the operator establishes a stable 34-second reactor period to increase power to the point of adding heat (POAH). Which one of the following is the approximate amount of reactivity that must be added to stabilize reactor power at the POAH? (Assume $\bar{\beta}_{eff}$ = 0.0066.)
A. -0.10 %ΔK/K
B. -0.12 %ΔK/K
C. -0.15 %ΔK/K
D. -0.28 %ΔK/K
ANSWER： C.

在擷取了反應爐啟動的臨界資料後，運轉員建立起34秒的穩定週期，以增加功率達到加熱起始點。為使功率穩定於加熱起始點，則需加入多少的負反應度？（假設$\bar{\beta}_{eff}$ = 0.0066）

A. -0.10 %ΔK/K
B. -0.12 %ΔK/K
C. -0.15 %ΔK/K
D. -0.28 %ΔK/K
答案： C.

科目： 292008
知能類： K1.13 [3.4/3.6]
序號： B3934 (P3935)

After taking critical data during a reactor startup, the operator establishes a stable 0.52 dpm startup rate to increase power to the point of adding heat (POAH). Which one of the following is the approximate amount of reactivity that must be added to stabilize reactor power at the POAH?
(Assume $\bar{\beta}_{eff} = 0.006$.)
A. -0.01 %ΔK/K
B. -0.06 %ΔK/K
C. -0.10 %ΔK/K
D. -0.60 %ΔK/K
ANSWER： C.

在擷取了反應爐啟動的臨界資料後，運轉員建立起穩定的0.52dpm啟動速率，以增加功率達到加熱起始點。為使功率穩定於加熱起始點，則需加入多少的反應度？（假設$\bar{\beta}_{eff} = 0.006$）

A. -0.01 %ΔK/K
B. -0.06 %ΔK/K
C. -0.10 %ΔK/K
D. -0.60 %ΔK/K
答案： C.

科目： 292008
知能類： K1.14 [3.5/3.5]
序號： B769

During a reactor heat-up, a center control rod is notched outward with no subsequent operator action. The heat-up rate will...
A. increase initially, then gradually decrease.
B. decrease initially, then gradually increase.
C. increase and stabilize at a new higher value.
D. decrease and stabilize at a new lower value.
ANSWER： A.

在反應爐加熱中，一中央控制棒在沒有後續運轉員操作下被抽出一節。則加熱率將會
A. 初始增加，其後漸漸減小
B. 初始減小，其後漸漸增加
C. 增加並在一新的較高值達到穩定
D. 減小並在一新的較低值達到穩定
答案： A.

科目： 292008
知能類： K1.14 [3.5/3.5]
序號： B1071

A reactor heat-up from 180°F to 500°F is in progress. To maintain a constant heat-up rate, as reactor temperature increases reactor power will have to...
A. increase due to increasing density of water.
B. decrease due to decreasing specific heat of water.
C. increase due to increasing heat losses to ambient.
D. decrease due to decreasing heat of vaporization of water.
ANSWER： C.

一反應爐從180°F加熱至500°F的過程中，為了維持穩定的加熱率，當反應爐溫度增加時，其功率必須
A. 增加，因為水的密度增加
B. 減小，因為水的比熱減小
C. 增加，因為對環境的熱損增加
D. 減小，因為水的蒸發熱量減小
答案： C.

科目： 292008
知能類： K1.14 [3.5/3.5]
序號： B1468

A nuclear reactor is undergoing a startup with reactor pressure and temperature initially stable at 731.4 psia and 508°F. Main steam isolation valves are closed and reactor criticality has been achieved. The reactor currently has a stable positive 100-second reactor period with reactor power well below the point of adding heat (POAH).
Which one of the following will occur first when reactor power reaches the POAH?
A. Reactor period will shorten.
B. Reactor pressure will increase.
C. Reactor coolant temperature will decrease.
D. Intermediate range power level will decrease.
ANSWER： B.

一反應爐在初始穩定壓力731.4psia與溫度508°F下正進行啟動，主蒸汽隔離閥關閉，反應爐已達臨界，反應爐目前具有一正100秒週期，其功率遠低於加熱起始點。當功率達到加熱起始點時，下列何者最先發生？
A. 反應爐週期將縮短
B. 反應爐壓力將增加
C. 反應爐冷卻水溫度將降低
D. 中程階功率將減小
答案： B.

科目： 292008
知能類： K1.15 [3.7/3.7]
序號： B469

A reactor is stable at the point of adding heat (POAH) with the reactor coolant at 160^{o}F during the reactor heat-up and pressurization phase of a reactor startup. Control rods are withdrawn a few notches to raise reactor power and establish a heat-up rate. Assume no core voiding occurs.
If no further control rod withdrawal occurs, reactor power will...
A. remain stable until voiding begins to occur.
B. increase until the control rods are reinserted.
C. decrease and stabilize at a subcritical power level.
D. decrease and stabilize at the POAH.
ANSWER： D.

一反應爐於啟動加壓加熱過程中在加熱起始點達到穩定，反應爐冷却水溫度為160^{o}F。控制棒被抽出幾節，以提高反應爐功率並建立一加熱率。假設沒有爐心空泡發生。若無進一步抽出控制棒，則反應爐功率將會
A. 維持穩定，直到空泡開始發生
B. 增加，直到控制棒被重新插入
C. 減小，並且在次臨界功率達到穩定
D. 減小，並且在加熱起始點達到穩定
答案： D.

科目： 292008
知能類： K1.15 [3.7/3.7]
序號： B1966 (P1367)

A reactor is critical at 5 x 10^{-2}% power during a cold reactor startup at the beginning of core life. Reactor period is stable at positive 87 seconds. Assuming no operator action, no reactor scram, and no steam release, what will be reactor power 10 minutes later?
A. Below the point of adding heat (POAH)
B. At the POAH
C. Above the POAH but less than 49%
D. Approximately 50%
ANSWER： B.

一反應爐於爐心壽命初期，在冷爐啟動中於5 x 10^{-2}%功率達到臨界。反應爐週期於正87秒達到穩定。假設沒有運轉員操作，沒有反應爐急停，沒有蒸汽排放，則十分鐘後反應爐的功率將為何？
A. 低於加熱起始點
B. 位於加熱起始點
C. 高於加熱起始點但小於49%
D. 約在50%
答案： B.

科目： 292008
知能類： K1.15 [3.7/3.7]
序號： B2569

A reactor is critical at 10^{-3}% power during a cold reactor startup at the beginning of core life. Reactor period is stable at positive 60 seconds. Assuming no operator action, no reactor scram, and no steam release, what will be reactor power 10 minutes later?
A. Below the point of adding heat (POAH)
B. At the POAH
C. Approximately 22%
D. Greater than 100%
ANSWER： B.

一反應爐於爐心壽命初，在冷爐啟動中於10^{-3}%功率達到臨界。反應爐週期於正60秒達到穩定。假設沒有運轉員操作，沒有反應爐急停，沒有蒸汽排放，則十分鐘後反應爐的功率將為何？
A. 低於加熱起始點
B. 位於加熱起始點
C. 約在22%
D. 大於100%
答案： B.

科目： 292008
知能類： K1.16 [3.6/3.7]
序號： B870

During a reactor plant startup, reactor pressure is increased from 5 psig to 50 psig in a 2-hour period. What was the average heat-up rate?
A. 35°F/hr
B. 60 °F /hr
C. 70 °F /hr
D. 120 °F /hr
ANSWER： A.

在一反應爐啟動中，其壓力在兩小時期間從5psig增加到50psig。則平均加熱率為多少？
A. 35 °F /hr
B. 60 °F /hr
C. 70 °F /hr
D. 120 °F /hr
答案： A.

科目： 292008
知能類： K1.16 [3.6/3.7]
序號： B1972

A reactor is critical and a reactor coolant heat-up is in progress with coolant temperature currently at 140 ^{o}F. If the point of adding heat is 1% reactor power, and reactor power is held constant at 3% during the heat-up, which one of the following describes the coolant heat-up rate (HUR) from 140 ^{o}F to 200^{o}F?
A. HUR will initially decrease and then increase.
B. HUR will slowly decrease during the entire period.
C. HUR will slowly increase during the entire period.
D. HUR will remain the same during the entire period.
ANSWER： B.

一反應爐處於臨界，而反應爐冷卻水加熱正在進行，冷卻水溫度目前為140 ^{o}F。若加熱起始點為1%功率，同時反應爐功率在加熱過程中維持穩定於3%,則下列何者描述了從140 ^{o}F到200 ^{o}F之冷卻水加熱率(HUR)？
A. HUR起初會減小，然後增加
B. HUR在整個過程中會緩慢減小
C. HUR在整個過程中會緩慢增加
D. HUR在整個過程中會維持不變
答案： B.

科目： 292008
知能類： K1.18 [3.8/3.8]
序號： B1270

Which one of the following will add the most positive reactivity during a power decrease from 100% to 65% over a 1 hour period? (Assume the power change is performed only by changing core recirculation flow rate.)
A. Fuel temperature change
B. Moderator temperature change
C. Fission product poison change
D. Core void fraction change
ANSWER： A.

在一小時內, 功率從100%降低至65%過程中, 下列何者將加入最多的正反應度？（假設功率改變只靠爐心再循環流量改變。）
A. 燃料溫度改變
B. 緩和劑溫度改變
C. 分裂產物之毒素改變
D. 爐心空泡比改變
答案： A.

科目： 292008
知能類： K1.18 [3.8/3.8]
序號： B1371 (P1470)

With a reactor on a constant period, which one of the following power changes requires the longest time to occur?
A. 1% power to 4% power
B. 5% power to 15% power
C. 20% power to 35% power
D. 40% power to 60% power
ANSWER： A.

對於一具有固定週期之反應爐，下列何種功率變化達成所需的時間最長？
A. 1%功率至4%功率
B. 5%功率至15%功率
C. 20%功率至35%功率
D. 40%功率至60%功率
答案： A.

科目： 292008
知能類： K1.18 [3.8/3.8]
序號： B1570 (P1567)

With a reactor on a constant period of 30 seconds, which one of the following power changes requires the least time to occur?
A. 1% power to 6% power
B. 10% power to 20% power
C. 20% power to 35% power
D. 40% power to 60% power

對於一具有固定週期30秒之反應爐，下列何種功率變化所需的時間最短？
A. 1%功率至6%功率
B. 10%功率至20%功率
C. 20%功率至35%功率
D. 40%功率至60%功率
答案： D.

科目： 292008
知能類： K1.18 [3.8/3.8]
序號： B1765

Which one of the following lists the method(s) used to add positive reactivity during a normal power increase from 10% to 100%?
A. Control rod withdrawal only
B. Recirculation pump flow increase only
C. Control rod withdrawal and recirculation pump flow increase
D. Recirculation pump flow increase and steaming rate increase

在正常功率從10%增加到100%過程中，下列何方法用以添加正反應度？
A. 只有控制棒抽出
B. 只有再循環泵流量增加
C. 控制棒抽出與再循環泵流量增加
D. 再循環泵流量增加與蒸汽流量增加
答案： C.

科目： 292008
知能類： K1.18 [3.8/3.8]
序號： B2070 (P2071)

Neglecting the effects of changes in core Xe-135, which one of the following power changes requires the greatest amount of positive reactivity addition?
A. 3% power to 5% power
B. 5% power to 15% power
C. 15% power to 30% power
D. 30% power to 60% power
ANSWER： D.

忽略爐心氙-135變化之影響，下列何種功率變化需要的正反應度添加最多？
A. 3%功率至5%功率
B. 5%功率至15%功率
C. 15%功率至30%功率
D. 30%功率至60%功率
答案： D.

科目： 292008
知能類： K1.18 [3.8/3.8]
序號： B2072 (P2069)

With a reactor on a constant period of 180 seconds, which one of the following power changes requires the longest amount of time to occur?
A. 3% power to 5% power
B. 5% power to 15% power
C. 15% power to 30% power
D. 30% power to 60% power
ANSWER： B.

對於一具有固定週期180秒之反應爐，下列何種功率變化所需的時間最長？
A. 3%功率至5%功率
B. 5%功率至15%功率
C. 15%功率至30%功率
D. 30%功率至60%功率
答案： B.

科目： 292008
知能類： K1.18 [3.8/3.8]
序號： B2166

A nuclear power plant is operating at 80% of rated power near the end of a fuel cycle. Which one of the following lists the typical method(s) used to add positive reactivity during a normal power increase to 100%?
A. Withdrawal of deep control rods and increasing recirculation flow rate
B. Withdrawal of deep control rods only
C. Withdrawal of shallow control rods and increasing recirculation flow rate
D. Withdrawal of shallow control rods only
ANSWER： A.

一核能電廠於接近燃料週期末期以80%額定功率運轉，若要使功率正常增加至100%，下列何者列出了用以添加正反應度的方法？
A. 深控制棒抽出與增加再循環流量
B. 只有深控制棒抽出
C. 淺控制棒抽出與增加再循環流量
D. 只有淺控制棒抽出
答案： A.

科目： 292008
知能類： K1.18 [3.8/3.8]
序號： B2270

With a reactor on a constant period, which one of the following power changes requires the shortest time to occur?
A. 1% power to 4% power
B. 5% power to 15% power
C. 20% power to 35% power
D. 40% power to 60% power
ANSWER： D.

對於一具有固定週期之反應爐，下列何種功率變化所需的時間最短？
A. 1%功率至4%功率
B. 5%功率至15%功率
C. 20%功率至35%功率
D. 40%功率至60%功率
答案： D.

科目： 292008
知能類： K1.18 [3.8/3.8]
序號： B2470
Neglecting the effects of core Xe-135, which one of the following power changes requires the greatest amount of positive reactivity addition?
A. 3% power to 10% power
B. 10% power to 25% power
C. 25% power to 60% power
D. 60% power to 100% power
ANSWER： D.

忽略爐心內氙-135變化之影響，下列何種功率變化需要添加的正反應度最多？
A. 3%功率至10%功率
B. 10%功率至25%功率
C. 25%功率至60%功率
D. 60%功率至100%功率
答案： D.

科目： 292008
知能類： K1.18 [3.8/3.8]
序號： B2669 (P2169)

Neglecting the effects of core Xe-135, which one of the following power changes requires the smallest amount of positive reactivity addition?
A. 2% power to 5% power
B. 5% power to 15% power
C. 15% power to 30% power
D. 30% power to 50% power
ANSWER： A.

忽略爐心內氙-135變化之影響，下列何種功率變化需要添加的正反應度最少？
A. 2%功率至5%功率
B. 5%功率至15%功率
C. 15%功率至30%功率
D. 30%功率至50%功率
答案： A.

科目： 292008
知能類： K1.18 [3.8/3.8]
序號： B2770 (P2770)

With a reactor on a constant period of 180 seconds, which one of the following power changes requires the shortest amount of time to occur?
A. 3% power to 5% power
B. 5% power to 15% power
C. 15% power to 30% power
D. 30% power to 60% power
ANSWER： A.

對於一具有固定週期180秒之反應爐，下列何種功率變化所需的時間最短？
A. 3%功率至5%功率
B. 5%功率至15%功率
C. 15%功率至30%功率
D. 30%功率至60%功率
答案： A.

科目： 292008
知能類： K1.18 [3.8/3.8]
序號： B3769 (P3753)

Neglecting the effects of changes in core Xe-135, which one of the following power changes requires the smallest amount of positive reactivity addition?
A. 3% power to 10% power
B. 10% power to 15% power
C. 15% power to 30% power
D. 30% power to 40% power
ANSWER： B.

忽略爐心內氙-135變化之影響，下列何種功率變化需要添加的正反應度最少？
A. 3%功率至10%功率
B. 10%功率至15%功率
C. 15%功率至30%功率
D. 30%功率至40%功率
答案： B.

科目： 292008
知能類： K1.19 [3.1/3.2]
序號： B69

For which one of the following events will the Doppler coefficient act first to change the reactivity addition to the core?
A. A control rod drop during reactor power operation
B. The loss of one feedwater heater (extraction steam isolated) during reactor power operation
C. Tripping of the main turbine at 45% reactor power
D. A safety relief valve opening during reactor power operation
ANSWER： A.

對於下列那一事件，都卜勒係數會最先反應而改變添加於爐心之反應度？
A. 在反應爐功率運轉中發生控制棒掉落事件
B. 在反應爐功率運轉中發生喪失一飼水加熱器
C. 主汽機在45%反應爐功率時跳脫
D. 在反應爐功率運轉中發生一安全釋壓閥開啟
答案： A.

科目： 292008
知能類： K1.19 [3.1/3.2]
序號： B367

Reactor power was increased from 20% to 30% in 1 hour using only control rod withdrawal. Which one of the following describes the response of void fraction during the power increase?
A. Void fraction initially decreases, then increases back to the original value.
B. Void fraction initially increases, then decreases back to the original value.
C. Void fraction decreases and stabilizes below the original value.
D. Void fraction increases and stabilizes above the original value.
ANSWER： D.

若反應爐功率的提升只使用控制棒抽出方式，在一小時內從20%增加至30%。下列何者描述了在功率增加過程中空泡比的反應？
A. 空泡比起初減小，然後增加回到原始值
B. 空泡比起初增加，然後減小回到原始值
C. 空泡比減小，並在低於原始值處達到穩定
D. 空泡比增加，並在高於原始值處達到穩定
答案： D.

科目： 292008
知能類： K1.19 [3.1/3.2]
序號： B1169

Which one of the following describes the core void fraction response that accompanies a reactor power increase from 20% to 30% using only control rod withdrawal?
A. Decreases and stabilizes at a lower void fraction
B. Increases and stabilizes at a higher void fraction
C. Initially decreases, then increases and stabilizes at the initial void fraction
D. Initially increases, then decreases and stabilizes at the initial void fraction
ANSWER： B.

反應爐功率只使用控制棒抽出方式，在一小時內從20%增加至30%。下列何者描述了在功率增加過程中空泡比的反應？
A. 減小，並於一較低之空泡比達到穩定
B. 增加，並於一較高之空泡比達到穩定
C. 起初減小，然後增加並於初始空泡比達到穩定
D. 起初增加，然後減小並於初始空泡比達到穩定
答案： B.

科目： 292008
知能類： K1.19 [3.1/3.2]
序號： B1368

A nuclear power plant is operating at 90% of rated power late in core life. When an operator withdraws a shallow rod two notches a power decrease occurs. This power decrease can be attributed to rod worth being _____ and _____ bundle void content.
A. high; decreased
B. high; increased
C. low; increased
D. low; decreased
ANSWER： C.

一核能電廠於爐心壽命末期在90%額定功率下運轉。當運轉員抽出一淺棒兩節，功率開始下降。此功率降低可歸因於____控制棒本領，以及_____的燃料束空泡含量。
A. 高；減少
B. 高；增加
C. 低；增加
D. 低；減少
答案： C.

科目： 292008
知能類： K1.19 [3.1/3.2]
序號： B2670

A reactor is operating with the following initial conditions:
Power level = 100%
Control rod density = 60%
After a load decrease reactor conditions are as follows:
Power level = 80%
Control rod density = 62%
All parameters attained normal steady-state values before and after the power change.
Given the following:
Total control rod
reactivity change = -2.2×10^{-1}% ΔK/K
Power coefficient = -1.5×10^{-2}% ΔK/K/% power
How much reactivity was added by changes in core recirculation flow rate during the load decrease? (Assume fission product poison reactivity does not change.)
A. 0.0% ΔK/K
B. -5.2×10^{-1}% ΔK/K
C. -2.0×10^{-1}% ΔK/K
D. -8.0×10^{-2}% ΔK/K

一反應爐以如下初始條件運轉：
功率= 100%
控制棒密度= 60%
在負載減少後反應爐狀況如下：
功率= 80%
控制棒密度= 62%
所有參數在功率變動之前與之後取得正常穩態值。
根據以下條件：
全部控制棒造成之反應度變化= -2.2×10^{-1}% ΔK/K
功率係數= -1.5×10^{-2}% ΔK/K/% power
在負載減少情況下，藉由爐心再循環流量的改變而加入的反應度有多少？（假設分裂產物毒素之反應度沒有變化。）
A. 0.0% ΔK/K
B. -5.2×10^{-1}% ΔK/K
C. -2.0×10^{-1}% ΔK/K

D. -8.0 x 10^{-2}% ΔK/K
答案： D.

科目： 292008
知能類： K1.19 [3.1/3.2]
序號： B2970 (N/A)
If a reactor power increase is accomplished using only the control rods, which one of the following would result in the greatest amount of negative reactivity feedback from the void coefficient?
A. A void fraction increase from 5% to 10% at beginning of core life
B. A void fraction increase from 5% to 10% at end of core life
C. A void fraction increase from 40% to 45% at beginning of core life
D. A void fraction increase from 40% to 45% at end of core life
ANSWER： C.

若一反應爐只利用控制棒提升功率，則下列何者將導致由空泡係數所生之最大負反應度回饋？
A. 在爐心壽命初期，空泡比從5%增加至10%
B. 在爐心壽命末期，空泡比從5%增加至10%
C. 在爐心壽命初期，空泡比從40%增加至45%
D. 在爐心壽命末期，空泡比從40%增加至45%
答案： C.

科目： 292008
知能類： K1.20 [3.3/3.4]
序號： B70
A nuclear power plant is operating at 100% power and core flow rate. Reactor power is reduced to 90% by inserting control rods. (Recirculating pump speed remains constant.)
What is the effect on core flow rate?
A. Core flow rate will decrease due to an increase in core voiding.
B. Core flow rate will increase due to the decrease in recirculation ratio.
C. Core flow rate will increase due to the decrease in two-phase flow resistance.
D. Core flow rate will decrease due to an increase in two-phase flow resistance.
ANSWER： C.

一核能電廠在100%功率與爐心流量下運轉，反應爐功率藉由控制棒插入而降低至90%（再循環泵速度維持不變），對爐心流量的影響為何？
A. 爐心流量將會減少，因為爐心空泡增加
B. 爐心流量將會增加，因為再循環率減小
C. 爐心流量將會增加，因為雙相流阻力減小
D. 爐心流量將會減小，因為雙相流阻力增加
答案： C.

科目： 292008
知能類： K1.20 [3.3/3.4]
序號： B183

A power increase is initiated by an increase in recirculation flow, causing voids to be swept away and adding positive reactivity. Which one of the following statements best describes the response of the reactivity coefficients?

A. Increasing fuel temperature implies more heat transfer to the coolant; increased moderator temperature causes more void formation, and power stabilizes at a new higher level.
B. Increasing fuel temperature implies more heat transfer to the coolant, thus increasing steam generation; the increased void fraction and fuel temperature add negative reactivity, and power stabilizes at a new higher level.
C. Increasing fuel temperature implies more heat transfer to the coolant, thus increasing steam generation; the increased steam generation raises reactor pressure and moderator temperature, offsetting the decreasing voids, and power stabilizes at a new higher level.
D. Increased moderator and fuel temperature stabilize power at a new higher level.

ANSWER： B.

再循環流量增加而導致功率增加，引發空泡被掃除，並加入正反應度。下列何者最能描述反應度係數的反應？

A. 增加燃料溫度代表傳導至冷卻水的熱更多；緩和劑溫度增加，導致空泡形成，最後功率在一新的較高值達到穩定。
B. 增加燃料溫度代表傳導至冷卻水的熱更多，因此增加蒸汽生成；空泡比以及燃料溫度的增加添加了負反應度，最後功率在一新的較高值達到穩定。
C. 增加燃料溫度代表傳導至冷卻水的熱更多，因此增加蒸汽生成；增加蒸汽生成提高反應爐壓力與緩和劑溫度，彌補了空泡的減少，最後功率在一新的較高值達到穩定。
D. 增加的緩和劑與燃料溫度使功率在一新的較高值達到穩定。

答案： B.

科目： 292008
知能類： K1.20 [3.3/3.4]
序號： B1469

Reactor power is increased from 70% to 90% by changing recirculation flow. Which one of the following describes the effect on the plant?
A. Core void fraction increases.
B. Feedwater temperature decreases.
C. Reactor vessel outlet steam pressure increases.
D. Condensate depression in the main condenser hotwell increases.
ANSWER： C.

反應爐藉由改變再循環流量而使功率從70%增加至90%。下列何者描述了對於電廠的效應？
A. 爐心空泡比增加
B. 飼水溫度降低
C. 反應爐出口蒸汽壓力增加
D. 主冷凝器熱井中冷凝水次冷度增加
答案： C.

科目： 292008
知能類： K1.21 [2.9/3.0]
序號： B270

A nuclear power plant has been operating at full power for several months. Following a normal reactor shutdown, steam production will continue for a period of time, with the rate (Btu/hr) of steam production dependent upon the...
A. rate of reactor power decrease from full power to the point of adding heat.
B. pressure being maintained in the reactor pressure vessel (RPV).
C. previous power history of the plant and the time elapsed since shutdown.
D. recirculation flow rate and the water level being maintained in the RPV.
ANSWER： C.

一核能電廠在全功率下運轉數月。在正常停機後，蒸汽產生將會繼續一段時間，而其蒸汽產生率（Btu/hr）將視何者而定？
A. 從全功率至加熱起始點之反應爐功率降低速率
B. 反應爐壓力槽中所維持之壓力
C. 電廠原本之功率歷史以及自停機後所經過之時間
D. 再循環流量以及反應爐壓力槽中所維持之水位
答案： C.

科目： 292008
知能類： K1.21 [2.9/3.0]
序號： B1372 (P1272)

Following a reactor shutdown from three-months operation at full power, core heat production will continue for a period of time. The rate of core heat production will be dependent upon the...
A. amount of fuel that has been depleted.
B. amount of time that has elapsed since K_{eff} decreased below 1.0.
C. amount of time required for the reactor pressure vessel to cool down.
D. rate at which the photoneutron source strength decays following shutdown.
ANSWER： B.

在反應爐經過三個月全功率運轉後進行停機，其後爐心熱量的產生將會繼續一段時間。其產生率將會依何者而變？
A. 被燃耗之燃料量
B. 自K_{eff}降低到1.0以下後所經歷的時間
C. 反應爐壓力槽冷卻所需要的時間
D. 在停機之後光中子源強度衰減之速率
答案： B.

科目： 292008
知能類： K1.21 [2.9/3.0]
序號： B3169 (P3171)

A nuclear power plant is operating at 60% of rated power in the middle of a fuel cycle when a turbine control system malfunction closes the turbine steam inlet valves an additional 5 percent. Which one of the following describes the initial reactor power change and the cause for the power change?

A. Decrease, because the rate of neutron absorption in the moderator initially increases.
B. Decrease, because the rate of neutron absorption at U-238 resonance energies initially increases.
C. Increase, because the rate of neutron absorption in the moderator initially decreases.
D. Increase, because the rate of neutron absorption at U-238 resonance energies initially decreases.

ANSWER： D.

一核能電廠於燃料循環中期以60%的額定功率運轉，此時一汽機控制系統故障，而多關閉汽機進口閥5%。下列何者描述了初始功率變化，以及此功率變化的原因？

A. 下降，因為緩和劑中之中子吸收速率增加
B. 下降，因為U-238共振能量(resonance energies)之中子吸收速率增加
C. 增加，因為緩和劑中之中子吸收速率減小
D. 增加，因為U-238共振能量之中子吸收速率減小

答案： D.

科目： 292008
知能類： K1.21 [2.9/3.0]
序號： B4036

A nuclear power plant is operating at 60% of rated power in the middle of a fuel cycle when a turbine control system malfunction opens the turbine steam inlet valves an additional 5 percent. Which one of the following describes the initial reactor power change and the cause for the power change?

A. Decrease, because the rate of neutron absorption in the moderator initially increases.
B. Decrease, because the rate of neutron absorption at U-238 resonance energies initially increases.
C. Increase, because the rate of neutron absorption in the moderator initially decreases.
D. Increase, because the rate of neutron absorption at U-238 resonance energies initially decreases.

ANSWER： B.

一核能電廠於燃料循環中期以60%的額定功率運轉，此時一汽機控制系統故障，而多開啟汽機進口閥5%。下列何者描述了初始功率變化，以及此功率變化的原因？

A. 下降，因為緩和劑中之中子吸收速率增加
B. 下降，因為U-238共振能量(resonance energies)之中子吸收速率增加
C. 增加，因為緩和劑中之中子吸收速率減小
D. 增加，因為U-238共振能量之中子吸收速率減小

答案： B.

科目： 292008
知能類： K1.22 [3.5/3.6]
序號： B570

A nuclear power plant is operating normally at 50% of rated power when a steam line break occurs that releases 5% of rated steam flow. Assume no operator or protective actions occur, automatic pressure control returns reactor pressure to its value prior to the break, and feedwater injection temperature remains the same.
How will reactor power respond to the steam line break?
A. Decrease and stabilize at a lower power level
B. Increase and stabilize at a higher power level
C. Decrease initially, then increase and stabilize at the previous power level
D. Increase initially, then decrease and stabilize at the previous power level
ANSWER： C.

一核能電廠在50%額定功率下運轉，此時一蒸汽管線破裂，而釋放出5%的額定蒸汽流量。假設無運轉員或保護動作發生，自動壓力控制將反應爐壓力回復至破裂之前之數值，飼水注入溫度維持不變。反應爐功率對於蒸汽管線破裂的反應為何？
A. 降低，並且在一較低功率達到穩定
B. 增加，並且在一較高功率達到穩定
C. 開始時降低，然後增加並穩定在原本之功率
D. 開始時增加，然後降低並穩定在原本之功率
答案： C.

科目： 292008
知能類： K1.22 [3.5/3.6]
序號： B971

A nuclear power plant is operating at 85% of rated power when a failure of the steam pressure control system opens the turbine control valves to admit 10% more steam flow to the main turbine. No operator actions occur and no protective system actuations occur. How will reactor power respond? (Assume the control valves remain in the failed position.)
A. Increase until power level matches the new steam demand.
B. Increase continuously and exceed reactor protection set points.
C. Decrease and stabilize at a lower power level above the point of adding heat.
D. Decrease and stabilize at a critical power level below the point of adding heat.
ANSWER： C.

一核能電廠在85%額定功率下運轉，此時一蒸汽壓力控制系統失效而開啟了汽機控制閥，使得額外10%的蒸汽流入主汽機，無運轉員或保護動作發生。反應爐功率的反應為何？（假設控制閥維持在失效位置。）
A. 增加直到功率與新的蒸汽需求相匹配
B. 連續增加，並超過反應爐保護設定點
C. 減少，並在一高於加熱起始點之較低功率達到穩定
D. 減少，並在一低於加熱起始點之臨界功率達到穩定
答案： C.

科目： 292008
知能類： K1.22 [3.5/3.6]
序號： B1670

A nuclear power plant is operating normally at 50% of rated power when a steam break occurs that releases 5% of rated steam flow. Assume no operator or protective actions occur, automatic pressure control returns reactor pressure to its initial value, and feed water injection temperature remains the same.
How will turbine power respond?
A. Decrease and stabilize at a lower power level.
B. Increase and stabilize at a higher power level.
C. Decrease, then increase and stabilize at the previous power level.
D. Increase, then decrease and stabilize at the previous power level.
ANSWER： A.

一核能電廠在50%額定功率下運轉，此時一蒸汽管線破裂，而釋放出5%的額定蒸汽流量。假設無運轉員或保護動作發生，自動壓力控制將反應爐壓力回復至初始值，飼水注入溫度維持不變。汽機功率的反應為何？
A. 降低，並且在一較低功率達到穩定
B. 增加，並且在一較高功率達到穩定
C. 開始時降低，然後增加並在原本之功率達到穩定
D. 開始時增加，然後降低並在原本之功率達到穩定
答案： A.

科目： 292008
知能類： K1.22 [3.5/3.6]
序號： B2371
A nuclear power plant is operating at 90% of rated power at the end of core life when the turbine control system opens the turbine control valves an additional 5 percent. Reactor power will initially...
A. increase due to positive reactivity addition from the void coefficient only.
B. increase due to positive reactivity addition from the void and moderator temperature coefficients.
C. decrease due to negative reactivity addition from the void coefficient only.
D. decrease due to negative reactivity addition from the void and moderator temperature coefficients.
ANSWER： C.

一核能電廠於燃料循環末期以90%的額定功率運轉，此時汽機控制系統故障，而多開啟汽機控制閥5%。反應爐功率起初將會
A. 增加，因為僅來自於空泡係數的正反應度添加
B. 增加，因為來自於空泡係數與緩和劑溫度係數的正反應度添加
C. 減小，因為僅來自於空泡係數的負反應度添加
D. 減小，因為來自於空泡係數與緩和劑溫度係數的負反應度添加
答案： C.

科目： 292008
知能類： K1.22 [3.5/3.6]
序號： B2571

A nuclear power plant is operating normally at 50% of rated power when a steam break occurs that releases 5% of rated steam flow. Reactor power will initially...
A. increase due to positive reactivity addition from the void coefficient only.
B. increase due to positive reactivity addition from the void and moderator temperature coefficients.
C. decrease due to negative reactivity addition from the void coefficient only.
D. decrease due to negative reactivity addition from the void and moderator temperature coefficients.
ANSWER： C.

一核能電廠在50%額定功率下運轉，此時一蒸汽管線破裂發生，而釋放出5%的額定蒸汽流量。反應爐的功率初始將會
A. 增加，因為僅增加來自於空泡係數的正反應度
B. 增加，因為增加來自於空泡係數與緩和劑溫度係數的正反應度
C. 減小，因為僅增加來自於空泡係數的負反應度
D. 減小，因為增加來自於空泡係數與緩和劑溫度係數的負反應度
答案： C.

科目： 292008
知能類： K1.23 [2.6/3.1]
序號： B368

Which one of the following is the purpose of a rod sequence exchange?
A. Ensures proper rod coupling
B. Prevents rod shadowing
C. Promotes even fuel burnout
D. Minimizes water hole peaking
ANSWER： C.

下列何者是控制棒棒序交換的原因？
A. 確保適當之控制棒耦合
B. 預防控制棒陰影效應
C. 促進燃料均勻燃耗
D. 使水洞尖峰值降至最低
答案： C.

科目： 292008
知能類： K1.23 [2.6/3.1]
序號： B2572

During continuous reactor power operation, rod pattern exchanges are performed periodically to...

A. ensure some control rods remain inserted as deep control rods until late in the fuel cycle.
B. allow the local power range monitoring nuclear instruments to be asymmetrically installed in the core.
C. increase the rod worth of control rods that are nearly fully withdrawn.
D. prevent the development of individual control rods with very high reactivity worths.

ANSWER： D.

在連續反應爐功率運轉中，控制棒佈局需定期進行交換，其目的為

A. 確保某些控制棒維持插入而為深控制棒，直到燃料週期末期
B. 讓局部功率中子偵測儀器能在爐心中以不對稱方式裝設
C. 增加近乎全出控制棒之控制棒本領
D. 預防個別控制棒產生非常高的反應度本領

答案： D.

科目： 292008
知能類： K1.25 [2.8/2.9]
序號： B72 (P71)

Shortly after a reactor trip, reactor power indicates 5 x 10^{-2}% when a stable negative reactor period is attained. Approximately how much additional time is required for reactor power to decrease to 5 x 10^{-3}%?
A. 90 seconds
B. 180 seconds
C. 270 seconds
D. 360 seconds
ANSWER： B.

在反應爐跳脫之後不久，當達到穩定之負反應度週期時，反應爐功率指示5 x 10^{-2}%，其功率要降低至5 x 10^{-3}%所需要的時間約為何？
A. 90秒
B. 180秒
C. 270秒
D. 360秒
答案： B.

科目： 292008
知能類： K1.25 [2.8/2.9]
序號： B771 (P770)

Which one of the following is responsible for the negative 80-second stable reactor period experienced shortly after a reactor scram?
A. The shortest-lived delayed neutron precursors
B. The longest-lived delayed neutron precursors
C. The shutdown margin just prior to the scram
D. The worth of the inserted control rods
ANSWER： B.

在反應爐急停後，下列何者導致其負80秒之穩定週期？
A. 壽命最短之延遲中子之母核
B. 壽命最長之延遲中子之母核
C. 急停前之停機餘裕
D. 已插入控制棒之控制棒本領
答案： B.

科目： 292008
知能類： K1.25 [2.8/2.9]
序號： B1369 (P1965)

Shortly after a reactor scram, reactor power indicates 10^{-3}% where a stable negative period is attained. Reactor power will decrease to 10^{-4}% in approximately _____ seconds.
A. 380
B. 280
C. 180
D. 80
ANSWER： C.

反應爐急停之後不久，當達到穩定之負反應度週期時，其功率指示10^{-3}%，若功率要降低至10^{-4}%所需要的時間約為____秒。
A. 380
B. 280
C. 180
D. 80
答案： C.

科目： 292008
知能類： K1.25 [2.8/2.9]
序號： B1770 (P2171)

Following a reactor trip, reactor power indicates 0.1% when the typical stable post-trip reactor period is observed. Which one of the following is the approximate time required for reactor power to decrease to 0.05%?
A. 24 seconds
B. 55 seconds
C. 173 seconds
D. 240 seconds
ANSWER： B.

在反應爐急停之後不久，當觀察到一般穩定之週期時，其功率指示為0.1%，若功率降至0.05%所需要的時間約為何？
A. 24秒
B. 55秒
C. 173秒
D. 240秒
答案： B.

科目： 292008
知能類： K1.25 [2.8/2.9]
序號： B2071

A nuclear power plant is operating at 100% power at the end of core life when a single main steam isolation valve suddenly closes. Prior to a reactor scram, reactor power will initially...

A. increase due to positive reactivity addition from the void coefficient only.
B. increase due to positive reactivity addition from the void and moderator coefficients.
C. decrease due to negative reactivity addition from the Doppler coefficient only.
D. decrease due to negative reactivity addition from the Doppler and moderator temperature coefficients.

ANSWER： A.

一核能電廠於爐心壽命末期時以100%功率運轉，此時一主蒸汽隔離閥突然關閉。在反應爐急停之前，其功率首先

A. 增加，因為僅增加來自於空泡係數的正反應度
B. 增加，因為增加來自於空泡係數與緩和劑溫度係數的正反應度
C. 減小，因為僅增加來自於都卜勒係數的負反應度
D. 減小，因為增加來自於都卜勒係數與緩和劑溫度係數的負反應度

答案： A.

科目： 292008
知能類： K1.25 [2.8/2.9]
序號： B2769 (P2768)

Reactors A and B are identical and have been operated at 100% power for six months when a reactor scram occurs simultaneously on both reactors. All reactor A control rods fully insert. One reactor B control rod sticks fully withdrawn.
Which reactor, if any, will have the longest reactor period five minutes after the scram?

A. Reactor A due to the greater shutdown reactivity.
B. Reactor B due to the smaller shutdown reactivity.
C. Both reactors will have the same reactor period because, after five minutes, both reactors will be stable at a power level low in the source range.
D. Both reactors will have the same reactor period because, after five minutes, only the longestlived delayed neutron precursors will be releasing fission neutrons.

ANSWER： D.

反應爐A與B相同，同時在100%功率運轉六個月，此時兩反應爐同時發生急停。反應爐A的所有控制棒完全插入，而B的一支控制棒卡在全出位置。在急停後五分鐘，何者所具有的反應爐週期最長？

A. 反應爐A，因為較大之停機反應度
B. 反應爐B，因為較小之停機反應度
C. 兩反應爐將具有相同之反應爐週期，因為在五分鐘後，兩反應爐會在較低的某一源階功率達到穩定
D. 兩反應爐將具有相同之反應爐週期，因為在五分鐘後，只有壽命最長的延遲中子母核將會釋放出分裂中子

答案： D.

科目： 292008
知能類： K1.25 [2.8/2.9]
序號： B3271 (P3271)

Nuclear reactors A and B are identical and have been operated at 100% power for six months when a reactor scram occurs simultaneously on both reactors. All reactor A control rods fully insert. One reactor B control rod sticks fully withdrawn.
After five minutes, when compared to reactor B, the core fission rate in reactor A will be _____, and the reactor period in reactor A will be _____.
A. the same; shorter
B. the same; the same
C. lower; shorter
D. lower; the same
ANSWER： D.

反應爐A與B相同，同時在100%功率運轉六個月，此時兩反應爐同時發生急停。反應爐A的所有控制棒完全插入，而B的一支控制棒卡在全出位置。在急停後五分鐘，與反應爐B相比，反應爐A的爐心分裂率將會_____，而反應爐A之反應爐週期將會_____。
A. 相等；較短
B. 相等；相等
C. 較低；較短
D. 較低；相等
答案： D.

科目： 292008
知能類： K1.25 [2.8/2.9]
序號： B3472 (P3468)

A reactor is critical just below the point of adding heat when an inadvertent reactor scram occurs. All control rods fully insert except for one rod, which remains fully withdrawn. Five minutes after the reactor scram, with reactor period stable at approximately negative (-) 80 seconds, the remaining withdrawn control rod suddenly and rapidly fully inserts. Which one of the following describes the reactor response to the insertion of the last control rod?

A. The negative period will remain stable at approximately -80 seconds.
B. The negative period will immediately become shorter, and then lengthen and stabilize at approximately -80 seconds.
C. The negative period will immediately become shorter, and then lengthen and stabilize at a value more negative than -80 seconds.
D. The negative period will immediately become shorter, and then lengthen and stabilize at a value less negative than -80 seconds.

ANSWER： B.

一反應爐在加熱起始點之下達到臨界，此時一意外之反應爐急停發生。除了一支控制棒維持完全抽出外，其他所有控制棒均完全插入。在急停五分鐘後週期在負80秒達到穩定，維持抽出之控制棒突然快速完全插入。下列何者描述最後一根控制棒插入的反應爐反應？

A. 負週期將會在約負80秒維持穩定
B. 負週期將會立刻縮短，然後增長，且在約負80秒處維持穩定
C. 負週期將會立刻縮短，然後增長，且在一較負80秒負更多處維持穩定
D. 負週期將會立刻縮短，然後增長，且在一較負80秒負更少處維持穩定

答案： B.

科目： 292008
知能類： K1.25 [2.8/2.9]
序號： B3771 (P3772)

A nuclear plower plant that has been operating at rated power for two months experiences a reactor scram. Five minutes after the scram, with all control rods still fully inserted, a count rate of 5,000 cps is indicated on the source range nuclear instruments with a reactor period of negative 80 seconds.
The majority of the source range detector output is currently being caused by the interaction of _____ with the detector.
A. intrinsic source neutrons
B. fission gammas from previous power operation
C. fission neutrons from subcritical multiplication
D. delayed fission neutrons from previous power operation
ANSWER： D.

一核能電廠在額定功率運轉兩個月，此時發生反應爐急停。急停後五分鐘，在所有控制棒完全插入情況下，源階中子偵測儀器指示計數率為5,000cps，其週期為負80秒。此時，源階中子偵測器大部分輸出是因_____與偵測器的交互作用所致。
A. 自發中子源
B. 來自之前功率運轉之分裂伽瑪
C. 來自次臨界增殖之分裂中子
D. 來自之前功率運轉之延遲分裂中子
答案： D.

科目： 292008
知能類： K1.26 [3.4/3.7]
序號： B471

A nuclear power plant is operating at 100% power when one recirculation pump trips. Reactor power decreases and stabilizes at a lower power level. Which one of the following reactivity coefficients caused the initial decrease in reactor power?
A. Void
B. Pressure
C. Moderator temperature
D. Fuel temperature (Doppler)
ANSWER： A.

一核能電廠在100%功率運轉，此時一再循環泵跳脫。反應爐功率降低並在一較低功率達到穩定。下列那一反應度係數導致了反應爐功率降低？
A. 空泡
B. 壓力
C. 緩和劑溫度
D. 燃料溫度（都卜勒）
答案： A.

科目： 292008
知能類： K1.26 [3.4/3.7]
序號： B672

A nuclear power plant is operating at 70% of rated power when one recirculation pump trips. Reactor power will initially _____ because of the effects of the _____ coefficient.
A. decrease; void
B. increase; moderator temperature
C. decrease; moderator temperature
D. increase; void
ANSWER： A.

一核能電廠在70%功率運轉，此時一再循環泵跳脫。反應爐功率將會開始_____，因為_____係數的影響所致。
A. 降低；空泡
B. 增加；緩和劑溫度
C. 降低；緩和劑溫度
D. 增加；空泡
答案： A.

科目： 292008
知能類： K1.27 [3.4/3.5]
序號： B126

A reactor is exactly critical in the source range when a fully withdrawn control rod fully inserts into the core. If no operator or automatic actions occur, how will the source range count rate respond?
A. Decrease to zero.
B. Decrease to the value of the source neutron strength.
C. Decrease to a value above the source neutron strength.
D. Decrease initially and then slowly increase and stabilize at the initial value.
ANSWER： C.

一反應爐在源階中恰好臨界，此時一全出之控制棒完全插入爐心。若無運轉員或自動動作發生，源階計數率將如何反應？
A. 降低至零
B. 降低至中子源強度值
C. 降低至大於中子源強度之值
D. 初始降低，然後緩慢增加，並在初始值達到穩定
答案： C.

科目： 292008
知能類： K1.27 [3.4/3.5]
序號： B1472 (N/A)

A nuclear power plant is initially operating at 100% power when a control rod fully inserts into the core. Assuming no operator action, reactor power will initially decrease and then...
A. return to the original power level with the void boundary lower in the core.
B. stabilize at a lower power level with the void boundary lower in the core.
C. return to the original power level with the void boundary higher in the core.
D. stabilize at a lower power level with the void boundary higher in the core.
ANSWER： D.

一反應爐初始在100%功率運轉，此時一控制棒完全插入爐心。若無運轉員操作，反應爐功率將初始減小，然後
A. 回復至原功率且其爐心空泡邊界位置較低
B. 在一較低之功率達到穩定且其爐心空泡邊界位置較低
C. 回復至原功率且其爐心空泡邊界位置較高
D. 在一較低之功率達到穩定且其爐心空泡邊界位置較高
答案： D.

科目： 292008
知能類： K1.27 [3.4/3.5]
序號： B1969 (P672)

A reactor is exactly critical below the point of adding heat when a single control rod is fully inserted into the core. Assuming no operator or automatic action, reactor power will slowly decrease to...
A. zero.
B. an equilibrium value less than the source neutron strength.
C. an equilibrium value greater than the source neutron strength.
D. a slightly lower value, then slowly return to the initial value.
ANSWER： C.

一反應爐在加熱起始點之下恰好達到臨界，此時一控制棒完全插入爐心。假設無運轉員操作，反應爐功率將會緩慢降低至
A. 零
B. 一較源中子(source neutron)強度為小的平衡值
C. 一較源中子強度為大的平衡值
D. 一稍微較低之值，然後緩慢回復至初始值
答案： C.

科目： 292008
知能類： K1.30 [3.2/3.5]
序號： B131 (P2672)

Which one of the following percentages most closely approximates the decay heat produced in
the reactor at 1 second and at 1 hour, respectively, following a scram from extended operation at
100% power?

	ONE SECOND	ONE HOUR
A.	15.0%	1.0%
B.	7.0%	1.0%
C.	1.0%	0.1%
D.	0.5%	0.1%

ANSWER： B.

一反應爐長期於100%功率運轉，發生急停後，於時間一秒與一小時處，下列何者最接近其各別的衰變熱百分率值？

	一秒	一小時
A.	15.0%	1.0%
B.	7.0%	1.0%
C.	1.0%	0.1%
D.	0.5%	0.1%

答案： B.

科目： 292008
知能類： K1.30 [3.2/3.5]
序號： B372 (P370)

After one month of operation at 100% reactor power, the fraction of thermal power being produced from the decay of fission products in the operating reactor is:
A. greater than 10%.
B. greater than 5% but less than 10%.
C. greater than 1% but less than 5%.
D. less than 1%.
ANSWER： B.

一反應爐在100%功率運轉一個月後，此反應爐中由分裂產物衰變而產生之熱功率比率
A. 大於10%
B. 大於5%但小於10%
C. 大於1%但小於5%
D. 小於1%
答案： B.

科目： 292008
知能類： K1.30 [3.2/3.5]
序號： B2272 (P572)

A nuclear power plant has been operating at 100% power for several weeks when a reactor scram occurs. How much time will be required for core heat production to decrease to 1% following
the scram?
A. 1 to 8 days
B. 1 to 8 hours
C. 1 to 8 minutes
D. 1 to 8 seconds
ANSWER： B.

一核能電廠在100%功率運轉數週，此時發生急停。急停後爐心熱量產生降低至1%所需時間為何？
A. 1至8天
B. 1至8小時
C. 1至8分
D. 1至8秒
答案： B.

科目： 292008
知能類： K1.30 [3.2/3.5]
序號： B2872 (P2872)

A reactor has been shutdown for several weeks when a loss of all ac power results in a loss of forced decay heat removal flow.
Given the following information, what will be the average reactor coolant heatup rate during the 20 minutes immediately after decay heat removal flow is lost? Assume that only ambient losses are removing heat from the reactor coolant system (RCS).
Reactor rated thermal power: 2,800 MWt
Decay heat rate: 0.2% rated thermal power
RCS ambient heat loss rate: 2.4 MWt
RCS c_p: 1.1 Btu/lbm-EF
Reactor vessel coolant inventory: 325,000 lbm
A. Less than 25^{o}F/hour
B. 26 to 50^{o}F/hour
C. 51 to 75F/hour
D. More than 76^{o}F/hour
ANSWER： B.

一反應爐停機數週後，因所有直流電源喪失導致強制衰變熱移除流量喪失。根據以下數據，緊接在強制衰變熱移除流量喪失後20分鐘，下列何者是反應爐冷卻水加熱率？假設只有散失至環境的熱量會從反應爐冷卻水系統（RCS）移除熱量。
反應爐額定熱功率：2,800 MWt
衰變熱功率：0.2%額定熱功率
RCS散失至環境的熱損失率：2.4 MWt
RCS c_p: 1.1 Btu/lbm-EF
反應槽冷卻水總量：325,000 lbm
A. 小於25^{o}F/hour
B. 26至50 ^{o}F/hour
C. 51至75^{o}F/hour
D. 大於76^{o}F/hour
答案： B.

科目： 292008
知能類： K1.30 [3.2/3.5]
序號： B2972 (P2972)

A nuclear power plant has been operating for one hour at 50% of rated power following six months of operation at steady-state 100% power. Which one of the following is the percentage of rated thermal power currently being generated by decay heat?
A. 1% to 2%
B. 3% to 5%
C. 6% to 8%
D. 9% to 11%
ANSWER： B.

一核能電廠在100%功率穩定運轉六個月後，並於50%額定功率運轉一小時。衰變熱(decay heat)產生了多少百分比之額定熱功率？
A. 1%至2%
B. 3%至5%
C. 6%至8%
D. 9%至11%
答案： B.

科目/題號：292008/1 (2016 新增)
知能類：k1.03〔4.1/4.0〕
序號：B1449(P1348)

A reactor is shut down by 1.8 %ΔK/K. Positive reactivity is added that increases the stable source range count rate from 15 cps to 300 cps.
What is the current value of K_{eff}?
A. 0.982
B. 0.990
C. 0.995
D. 0.999
ANSWER: D.

一反應器以1.8%ΔK/K停機。加入正反應度使穩定的源階中子計數率由15 cps增加至300 cps。目前的有效增殖因數為何？
A.0.982
B.0.990
C.0.995
D.0.999

答案： D

科目/題號：292008/2 (2016 新增)
知能類：k1.03〔4.1/4.0〕
序號：B1849(P1448)

A subcritical reactor has a stable source range count rate of 150 cps with a shutdown reactivity of -2.0 %ΔK/K. Approximately how much positive reactivity must be added to establish a stable count rate of 600 cps?
A. 0.5 %ΔK/K
B. 1.0 %ΔK/K
C. 1.5 %ΔK/K
D. 2.0 %ΔK/K
ANSWER: C.

一次臨界反應器具有穩定的源階中子計數率150 cps及停機反應度-2.0%ΔK/K。如要建立穩定600 cps 計數率大約必須加入多少正反應度？
A.0.5%ΔK/K
B.1.0%ΔK/K
C.1.5%ΔK/K
D.2.0%ΔK/K

答案： C

科目/題號：292008/3 (2016 新增)
知能類：k1.03〔4.1/4.0〕
序號：B1949(P448)

A subcritical reactor has a stable source range count rate of 150 cps with a shutdown reactivity of -2.0 %ΔK/K. How much positive reactivity must be added to establish a stable count rate of 300 cps?
A. 0.5 %ΔK/K
B. 1.0 %ΔK/K
C. 1.5 %ΔK/K
D. 2.0 %ΔK/K
ANSWER: B.

一次臨界反應器具有穩定的源階中子計數率150 cps及停機反應度-2.0%ΔK/K。如要建立穩定300 cps 計數率，大約必須加入多少正反應度？
A.0.5%ΔK/K
B.1.0%ΔK/K
C.1.5%ΔK/K
D.2.0%ΔK/K

答案： B

科目/題號：292008/4 (2016 新增)
知能類：k1.03〔4.1/4.0〕
序號：B2149(P848)

A subcritical reactor has an initial Keff of 0.8 with a stable source range count rate of 100 cps. If positive reactivity is added until Keff equals 0.95, at what value will the count rate stabilize?
A. 150 cps
B. 200 cps
C. 300 cps
D. 400 cps
ANSWER: D.

一次臨界反應器起初具有有效增殖因數0.8和穩定的源階中子計數率100 cps。假如加入正反應度直到有效增殖因數等於0.95，則此時計數率將穩定在多少？
A.150 cps
B.200 cps
C.300 cps
D.400 cps

答案： D

科目/題號：292008/5 (2016 新增)
知能類：k1.03〔4.1/4.0〕
序號：B2649(P2448)

A reactor startup is being performed with xenon-free conditions. Control rod withdrawal is stopped when Keff equals 0.995 and source range count rate stabilizes at 1,000 cps. No additional operator actions are taken.
Which one of the following describes the count rate 20 minutes after rod withdrawal is stopped?
A. Less than 1,000 cps and decreasing toward the prestartup count rate.
B. Less than 1,000 cps and stable above the prestartup count rate.
C. Greater than 1,000 cps and increasing toward criticality.
D. 1,000 cps and constant.
ANSWER: D.

一反應器在無氙毒狀況下執行啟動。當有效增殖因數等於0.995時控制棒停止抽出，且源階中子計數率穩定在1,000 cps。運轉員未採取任何行動。下列何者敘述係停止抽棒20分鐘後之計數率？
A.小於1,000 cps，且朝向啟動前計數率減少
B.小於1,000 cps，且穩定高於啟動前計數率
C.大於1,000 cps，且增加朝向臨界
D.1,000 cps，且維持固定值

答案： D

科目/題號：292008/6 (2016 新增)
知能類：k1.03〔4.1/4.0〕
序號：B2949

A nuclear power plant is being cooled down from 400°F to 250°F. Just prior to commencing the cooldown, the stable source range count rate was 32 cps. After two hours, with reactor coolant temperature at 300°F, the stable count rate is 64 cps. Assuming that the moderator temperature coefficient remains constant throughout the cooldown, what will be the status of the reactor when reactor coolant temperature reaches 250°F?
A. Subcritical, with source range count rate below 150 cps.
B. Subcritical, with source range count rate above 150 cps.
C. Critical, with source range count rate below 150 cps.
D. Critical, with source range count rate above 150 cps.
ANSWER: A.

一核能電廠從 400°F降溫至 250 °F。剛開始降溫前源階中子計數率穩定在 32 cps。2 小時後反應器冷卻水溫度 300 °F，穩定中子計數率為 64 cps 。假設緩和劑溫度係數在整個降溫過程中保持不變，當反應器冷卻水溫度到達 250°F時反應器之狀況為何？
A.次臨界，且源階中子計數率小於 150 cps
B.次臨界，且源階中子計數率大於 150 cps
C.臨界，且源階中子計數率小於 150 cps
D.臨界，且源階中子計數率大於 150 cps

答案： A

科目/題號：292008/7 (2016 新增)
知能類：k1.03〔4.1/4.0〕
序號：B3049(P3048)

A reactor startup is being commenced with initial source range count rate stable at 20 cps. After a period of control rod withdrawal, count rate stabilizes at 80 cps.
If the total reactivity added by the above control rod withdrawal is 4.5 %ΔK/K, how much additional positive reactivity must be inserted to make the reactor critical?
A. 1.5 %ΔK/K
B. 2.0 %ΔK/K
C. 2.5 %ΔK/K
D. 3.0 %ΔK/K
ANSWER: A.

一反應器開始啟動時之起始源階中子計數率穩定在20 cps 。在抽出控制棒一段期間後，中子計數率穩定在80 cps。假設以上所抽控制棒之總反應度為4.5%ΔK/K，則要再加入多少正反應度，反應器才會達臨界？
A. 1.5%ΔK/K
B. 2.0%ΔK/K
C. 2.5%ΔK/K
D. 3.0%ΔK/K

答案： A

科目/題號：292008/8 (2016 新增)
知能類：k1.03〔4.1/4.0〕
序號：B3925(P3925)

A reactor startup is in progress with Keff initially equal to 0.90. By what factor will the core neutron level increase if the reactor is stabilized when Keff equals 0.99?
A. 10
B. 100
C. 1,000
D. 10,000
ANSWER: A.

一反應器啟動時，有效增殖因數等於0.90。當反應器穩定在有效增殖因數等於0.99時，爐心中子數增加之因數為何？
A.10
B.100
C.1,000
D.10,000

答案： A

科目/題號：292008/9 (2016 新增)
知能類：k1.03〔4.1/4.0〕
序號：B4225(P4225)

A reactor is shutdown with a K_{eff} of 0.96 and a stable source range count rate of 50 cps when a reactor startup is commenced. Which one of the following will be the stable count rate when K_{eff} reaches 0.995?
A. 400 cps
B. 800 cps
C. 4,000 cps
D. 8,000 cps
ANSWER: A.

一反應器停機時，有效增殖因數為 0.96。當開始啟動反應器時穩定源階中子計數率為50 cps。當有效增殖因數為 0.995時下列何者是其穩定計數率？
A.400 cps
B.800 cps
C.4,000 cps
D.8,000 cps

答案： A

科目/題號：292008/10 (2016 新增)
知能類：k1.03〔4.1/4.0〕
序號：B4525(P4525)

A nuclear power plant is being cooled down from 500°F to 190°F. Just prior to commencing the cooldown, the source range count rate was stable at 32 cps. After two hours, with reactor water temperature at 350°F, the source range count rate is stable at 64 cps.
Assume the moderator temperature coefficient remains constant throughout the cooldown and reactor power remains below the point of adding heat.
Without additional operator action, what will the status of the reactor be when reactor water temperature reaches 190°F?
A. Subcritical, with source range count rate below 150 cps.
B. Subcritical, with source range count rate above 150 cps.
C. Exactly critical.
D. Supercritical.
ANSWER: D.

一座核能電廠正從500°F降溫至190°F。剛開始降溫時，源階中子計數率穩定在32 cps。2小時後，反應器水溫為350°F，源階中子計數率穩定在64 cps。假設在整個降溫過程中緩和劑溫度係數維持不變，而且反應器功率維持在加熱點以下。若運轉員未採取額外行動，當溫度降至190°F時反應器的狀況為何？
A.次臨界，且源階中子計數率小於150 cps
B.次臨界，且源階中子計數率大於150 cps
C.剛好臨界
D.超臨界

答案： D

科目/題號：292008/11 (2016 新增)
知能類：k1.03〔4.1/4.0〕
序號：B4533

A reactor is critical in the source range during a reactor startup with a core effective delayed neutron fraction of 0.007. The operator then adds positive reactivity to establish a stable 60-second reactor period.
If the core effective delayed neutron fraction had been 0.005, what would the approximate stable reactor period be after the addition of the same amount of positive reactivity?
A. 28 seconds
B. 32 seconds
C. 36 seconds
D. 40 seconds
ANSWER: D.

當一反應器以爐心有效遲延中子分數0.007啟動在源階達臨界。然後運轉員加入正反應度以建立穩定60秒的反應器週期。假若爐心有效遲延中子分數為0.005，則當運轉員加入相同量的正反應度，穩定的反應器週期大約會是多少秒？
A.28秒
B.32秒
C.36秒
D.40秒

答案： D

科目/題號：292008/12 (2016 新增)
知能類：k1.03〔4.1/4.0〕
序號：B5225(P5225)

A nuclear power plant was initially shutdown with a stable source range count rate of 30 cps. Using many small additions of positive reactivity, a total of 0.1 %ΔK/K was added to the core and the stable source range count rate is currently 60 cps.
What was the stable source range count rate after only 0.05 %ΔK/K had been added during the above process?
A. 40 cps
B. 45 cps
C. 50 cps
D. 55 cps
ANSWER: A.

一核能電廠停機中且穩定的源階中子計數率為30 cps。利用加入許多小量正反應度，總共加入0.1%ΔK/K，而目前穩定的源階中子計數率為60 cps。在此過程中若只加入0.05%ΔK/K，則穩定的源階中子計數率為多少？
A.40 cps
B.45 cps
C.50 cps
D.55 cps

答案： A

科目/題號：292008/13 (2016 新增)
知能類：k1.03〔4.1/4.0〕
序號：B5625

A reactor startup is in progress at a BWR nuclear power plant. The following stable conditions currently exist:

Reactor coolant temperature = 180°F
Control rod density = 50 percent
Source range count rate = 32 cps

Control rods are withdrawn to a control rod density of 45 percent, where the source range count rate stabilizes at 48 cps.
Assume that control rod differential reactivity worth remains constant during the withdrawal, reactor coolant temperature remains constant, and no reactor protection actuations occur.
If control rods are withdrawn further to a control rod density of 40 percent, what will be the status of the reactor?
A. Subcritical, with a stable source range count rate of approximately 64 cps.
B. Subcritical, with a stable source range count rate of approximately 96 cps.
C. Critical, with a stable source range count rate of approximately 64 cps.
D. Critical, with a stable source range count rate of approximately 96 cps.
ANSWER: B.

一座沸水式核能電廠的反應器正進行啟動。目前存在下列穩定條件：

反應器冷卻水溫度 = 180℉
控制棒密度 = 50%
源階中子計數率 =32 cps

控制棒抽出到45%控制棒密度時，源階中子計數率穩定在48 cps。
假設控制棒的微分反應度本領在抽出過程中維持不變，反應器冷卻水溫度維持不變，且反應器保護系統未動作。
假若控制棒再進一步的抽出至控制棒密度為40%，則反應器會發生何種狀況？
A.次臨界，且穩定源階中子計數率約64 cps
B.次臨界，且穩定源階中子計數率約96 cps
C.臨界，且穩定源階中子計數率約64 cps
D.臨界，且穩定源階中子計數率約96 cps

答案： B

科目/題號：292008/14 (2016 新增)
知能類：k1.03〔4.1/4.0〕
序號：B7433(P5025)

A nuclear power plant is initially shutdown with a Keff of 0.92 and a stable source range count rate of 200 cps. Then a reactor startup is initiated. All control rod motion is stopped when Keff equals 0.995. The instant that rod motion stops, source range count rate is 1,800 cps.
When source range count rate stabilizes, count rate will be approximately...
A. 1,800 cps
B. 2,400 cps
C. 3,200 cps
D. 3,600 cps
ANSWER: C.

一核能電廠停機中有效增殖因數為 0.92，且穩定源階中子計數率為 200 cps。隨後反應器啟動。當有效增殖因數等於 0.995 時停止所有控制棒移動。當停止控制棒移動的瞬間源階中子計數率為 1800 cps。當源階中子計數率穩定時計數率約為多少？
A.1,800 cps
B.2,400 cps
C.3,200 cps
D.3,600 cps

答案： C

科目/題號：292008/15 (2016 新增)
知能類：k1.03〔4.1/4.0〕
序號：B7627(P7627)

Refer to the drawing that shows a graph of fission rate versus time (see figure below). Both axes have linear scales.
Which one of the following events, initiated at 0 seconds, could cause the reactor response shown on the graph?

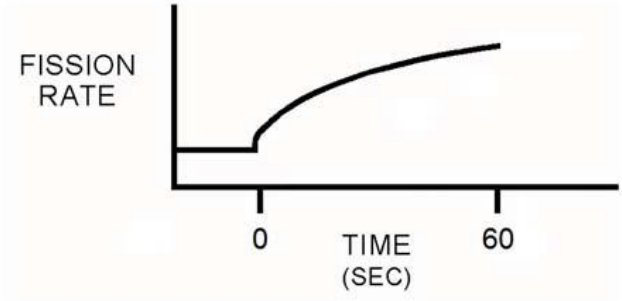
A. A step addition of positive reactivity to a reactor that is initially subcritical in the source range and remains subcritical for the duration of the 60-second interval shown.
B. A step addition of positive reactivity to a reactor that is initially critical in the source range and remains below the point of adding heat for the duration of the 60-second interval shown.
C. A continuous addition of positive reactivity at a constant rate to a reactor that is initially subcritical in the source range and remains subcritical for the duration of the 60-second interval shown.
D. A continuous addition of positive reactivity at a constant rate to a reactor that is initially critical in the source range and remains below the point of adding heat for the duration of the 60-second interval shown.

ANSWER: A.

參考顯示分裂率與時間關係圖(見下圖)兩軸均為線性刻度。下列何者發生在圖中 0 秒時可能引起反應器如圖的反應？

A. 反應器起初為次臨界且在源階，加入一正的反應度，在所示 60 秒期間內維持次臨界
B. 反應器起初為臨界且在源階，加入一正的反應度，在所示 60 秒期間內維持在加熱點之下
C. 反應器起初為次臨界且在源階，以固定速率持續加入正的反應度，在所示 60 秒期間內維持次臨界
D. 反應器起初為臨界且在源階，以固定速率持續加入正的反應度，在所示 60 秒期間內維持在加熱點之下

答案： A



科目/題號：292008/16 (2016 新增)

知能類：k1.03〔4.1/4.0〕

序號：B7668(P7668)

At the beginning of a reactor startup, Keff was 0.97 and the stable source range count rate was 40 cps. After several incremental control rod withdrawals, the stable source range count rate was 400 cps. The next incremental control rod withdrawal resulted in a stable source range count rate of 600 cps. What is the current Keff?
A. 0.98
B. 0.988
C. 0.998
D. There is not enough information given to calculate the current Keff.
ANSWER: C.

反應器開始啟動時有效增殖因數為0.97，而源階中子計數率為40 cps。在抽出數節控制棒後，穩定的源階中子計數率為400 cps。再抽出數節控制棒之後，穩定的源階中子計數率為600 cps。目前之有效增殖因數為何？

A. 0.98

B. 0.988

C. 0.998

D.未提供足夠資訊以供計算目前之有效增殖因數

答案： C

科目/題號：292008/17 (2016 新增)
知能類：k1.04〔3.3/3.4〕
序號：B2249(P2248)

Two reactors are currently shut down with reactor startups in progress. The reactors are identical except that reactor A has a source neutron strength of 100 neutrons per second and reactor B has a source neutron strength of 200 neutrons per second. The control rods are stationary and K_{eff} is 0.98 in both reactors. Core neutron levels have stabilized in both reactors.
Which one of the following lists the core neutron levels (neutrons per second) in reactors A and B?

	Reactor A (n/sec)	Reactor B (n/sec)
A.	5,000	10,000
B.	10,000	20,000
C.	10,000	40,000
D.	20,000	40,000

ANSWER: A.

兩座反應器目前均停機並進行反應器啟動。兩座反應器均相同，除了A反應器的中子源強度為100中子/秒，而B反應器的中子源強度為200中子/秒。控制棒均未抽動且兩座反應器之有效增殖因數均為0.98。兩座反應器之爐心中子位階均為穩定。
下列所列何者為反應器A和B之爐心中子位階(中子/秒)？

	反應器 A (中子/秒)	反應器 B (中子/秒)
A.	5,000	10,000
B.	10,000	20,000
C.	10,000	40,000
D.	20,000	40,000

答案： A

科目/題號：292008/18 (2016 新增)
知能類：k1.04〔3.3/3.4〕
序號：B2249

Two reactors are currently shut down with reactor startups in progress. The reactors are identical except that reactor A has a source neutron strength of 100 neutrons per second and reactor B has a source neutron strength of 80 neutrons per second. The control rods are stationary and K_{eff} is 0.98 in both reactors. Core neutron level has stabilized in both reactors.
Which one of the following lists the core neutron levels (neutrons per second) in reactors A and B?

	Reactor A (n/sec)	Reactor B (n/sec)
A.	5,000	4,000
B.	5,000	1,600
C.	2,000	1,600
D.	2,000	400

ANSWER: A.

兩座反應器目前均停機並進行反應器啟動。兩座反應器均相同，除了A反應器的中子源強度為100中子/秒，而B反應器的中子源強度為80中子/秒。控制棒均未抽動且兩座反應器之有效增殖因數均為0.98。兩座反應器之爐心中子位階均為穩定。
下列所列何者為反應器A和B之爐心中子位階(中子/秒)？

	反應器 A (中子/秒)	反應器 B (中子/秒)
A.	5,000	4,000
B.	5,000	1,600
C.	2,000	1,600
D.	2,000	400

答案： A

科目/題號：292008/19 (2016 新增)
知能類：k1.04〔3.3/3.4〕
序號：B3849(3848)

A reactor is shutdown with a K_{eff} of 0.8. The source range count rate is stable at 800 cps. What percentage of the core neutron population is being contributed directly by neutron sources other than neutron-induced fission?
A. 10 percent
B. 20 percent
C. 80 percent
D. 100 percent
ANSWER: B.

一反應器停機且有效增殖因數為0.8。源階中子計數率為800 cps 。爐內中子數有多少百分比是直接由中子源而非中子誘發分裂產生的？
A.10%
B.20%
C.80%
D.100%

答案： B

科目/題號：292008/20 (2016 新增)
知能類：k1.04〔3.3/3.4〕
序號：B6134(P6133)

A subcritical reactor has a stable source range count rate of 2.0 x 105 cps with a K_{eff} of 0.98. Positive reactivity is added to the core until a stable count rate of 5.0 x 105 cps is achieved. What is the current value of K_{eff}?
A. 0.984
B. 0.988
C. 0.992
D. 0.996
ANSWER: C.

一次臨界反應器具有穩定源階中子計數率2.0×10^5 cps，且有效增殖因數為0.98。在爐心加入正反應度直到穩定中子計數率達到5.0×10^5 cps。目前之有效增殖因數為多少？
A. 0.984
B. 0.988
C. 0.992
D. 0.996

答案： C

科目/題號：292008/21 (2016 新增)
知能類：k1.04〔3.3/3.4〕
序號：B7233

A nuclear power plant is shutdown with the following stable initial conditions:
Reactor coolant temperature: 200°F
Reactor vessel pressure: 300 psia
Source range count rate: 140 cps
Control rods are withdrawn to commence a reactor startup. After 50 units of control rod withdrawal, the equilibrium source range count rate is 280 cps.
Assume that each unit of control rod withdrawal has the same reactivity worth. Also assume that the reactor coolant temperature remains constant, reactor power remains below the point of adding heat, and no reactor protection actuations occur.
What will be the status of the reactor after the control rods are withdrawn a total of 75 units?
A. Subcritical, with equilibrium source range count rate less than 600 cps.
B. Subcritical, with equilibrium source range count rate greater than 600 cps.
C. Critical, with equilibrium source range count rate less than 600 cps.
D. Critical, with equilibrium source range count rate greater than 600 cps.
ANSWER: A.

一核能電廠停機並穩定在下列初始條件：
反應器冷卻水溫度 ：200℉
反應器爐槽壓力 ：300 psia
源階中子計數率 ：140 cps
反應器以抽控制棒開始啟動運轉。當抽出控制棒50個單位後，平衡的源階中子計數率為280 cps。假設每一單位抽出控制棒均有相同反應度本領。同時假設反應器冷卻水溫度維持不變，反應器功率維持在加熱點以下，且無反應器自動保護動作發生。控制棒抽出達75單位時，反應器的狀況為何？
A.次臨界，平衡的源階中子計數率小於600 cps
B.次臨界，平衡的源階中子計數率大於600 cps
C.臨界，平衡的源階中子計數率小於600 cps
D.臨界，平衡的源階中子計數率大於600 cps

答案： A

科目/題號：292008/22 (2016 新增)
知能類：k1.04〔3.3/3.4〕
序號：B7628(P7628)

A reactor is shutdown with a K_{eff} of 0.8. The source range count rate is stable at 800 cps. What percentage of the core neutron population is being contributed directly by neutron-induced fission?

A. 10 percent

B. 20 percent

C. 80 percent

D. 100 percent

ANSWER: C.

一反應器停機且有效增殖因數為0.8。源階中子計數率為800 cps。多少百分比的爐心中子係由中子誘發分裂直接提供的？

A. 10%
B. 20%
C. 80%
D. 100%

答案： C

科目/題號：292008/23 (2016 新增)
知能類：k1.04〔3.3/3.4〕
序號：B7638(P4734)

During a reactor startup, positive reactivity addition X caused the stable source range count rate to increase from 20 cps to 40 cps. Later in the startup, after several other additions of positive reactivity, positive reactivity addition Y caused the stable source range count rate to increase from 320 cps to 640 cps.
Which one of the following statements describes how the magnitudes of the two positive reactivity additions (X and Y) compare?
A. Reactivity addition X was several times greater in magnitude than reactivity addition Y.
B. Reactivity addition X was several times smaller in magnitude than reactivity addition Y.
C. Reactivity additions X and Y were about equal in magnitude.
D. There is not enough information given to determine the relationship between the reactivity additions.
ANSWER: A.

當反應器啟動時，加入X正反應度引起穩定源階中子計數率由20 cps 增加至40 cps。後續啟動過程，在加入其它數個正反應度後，加入Y正反應度引起穩定源階中子計數率由320 cps 增加至640 cps。
下列何者為量化描述兩個正反應度(X和Y)的比較？
A.所加入X反應度比Y反應度大數倍
B.所加入X反應度比Y反應度小數倍
C.所加入X和Y反應度兩者大小大約相同
D.所提供資訊不足以決定加入反應度之關聯性

答案： A

科目/題號：292008/24 (2016 新增)
知能類：k1.05〔4.3/4.3〕
序號：B5733(P5733)

During an initial fuel load, the subcritical multiplication factor increases from 1.0 to 8.0. What is the current value of K_{eff}?
A. 0.125
B. 0.5
C. 0.75
D. 0.875
ANSWER: D.

當初始燃料裝填，次臨界增殖因數從1.0增加至8.0時，有效增殖因數為多少？
A. 0.125
B. 0.5
C. 0.75
D. 0.875

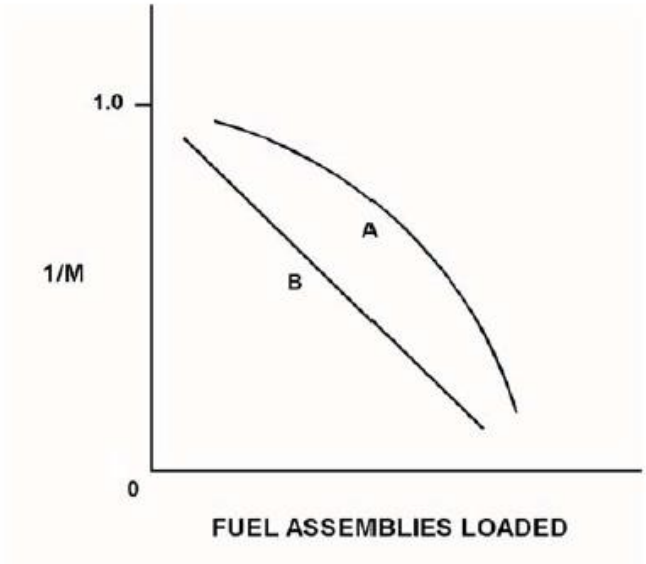
答案： D

科目/題號：292008/25 (2016 新增)
知能類：k1.05〔4.3/4.3〕
序號：B6033(P6034)

Refer to the drawing of a 1/M plot with curves A and B (see figure below). Each axis has linear units.
Curve A would result if each fuel assembly loaded during the early stages of core refueling caused a relatively _____ fractional change in stable source range count rate compared to the later stages of the refueling; curve B would result if each fuel assembly contained equal _____.
A. small; fuel enrichment
B. small; reactivity
C. large; fuel enrichment
D. large; reactivity
ANSWER: B.

參考增殖因素倒數(1/M)曲線A和B(見下圖)。每一軸均為線性刻度。曲線A係假設每一燃料元件在裝填燃料初期階段裝填，相較於在裝填燃料後期階段裝填，對穩定源階計數率的改變比例相對____；曲線B係由於每一燃料元件包含相同___。
A.較小；燃料濃縮度
B.較小；反應度
C.較大；燃料濃縮度
D.較大；反應度

答案： B



科目/題號：292008/26 (2016 新增)
知能類：k1.08〔4.1/4.1〕
序號：B5334(P5334)

Given:
- Reactors A and B are identical except that reactor A has an effective delayed neutron fraction of 0.0068 and reactor B has an effective delayed neutron fraction of 0.0052.
- Reactor A has a stable period of 45 seconds and reactor B has a stable period of 42 seconds.
- Both reactors are initially operating at 1.0 x 10^{-8} percent power.

The reactor that is supercritical by the greater amount of positive reactivity is reactor _____; and the first reactor to reach 1.0 x 10-1 percent power will be reactor _____.
A A; A
B. A; B
C. B; A
D. B; B
ANSWER: B.

已知：
- ●反應器A和B相同，除了反應器A之有效遲延中子分數為0.0068，而反應器B之有效遲延中子分數為0.0052
- ●反應器A的穩定週期為45秒，反應器B的穩定週期為42秒
- ●兩座反應器起初運轉在1.0×10^{-8}%功率

需要較大量正反應度造成超臨界的反應器是____；先達到1.0×10^{-1}%功率的反應器是___。
A. A；A
B. A；B
C. B；A
D. B；B

答案： B

科目/題號：292008/27 (2016 新增)
知能類：k1.08〔4.1/4.1〕
序號：B5334(P5335)

A reactor is currently operating in the source range with a stable positive 90-second period. The core effective delayed neutron fraction $(\bar{\beta}_{eff})$ is 0.006. How much additional positive reactivity is needed to establish a stable positive 60-second period?
A. 0.026 %ΔK/K
B. 0.033 %ΔK/K
C. 0.067 %ΔK/K
D. 0.086 %ΔK/K
ANSWER: A.

一反應器運轉在源階，其週期穩定在正90秒。爐心有效遲延中子分數是0.006。需要加入多少正反應度才能建立穩定正60秒週期？
A. 0.026% ΔK/K
B. 0.033%ΔK/K
C. 0.067%ΔK/K
D. 0.086%ΔK/K

答案： A

科目/題號：292008/28 (2016 新增)
知能類：k1.08〔4.1/4.1〕
序號：B6434(P6435)

A reactor is critical near the end of a fuel cycle with power level stable at 1.0 x 10-10 percent. Which one of the following is the smallest listed amount of positive reactivity that is capable of increasing reactor power level to the point of adding heat?
A. 0.001 %ΔK/K
B. 0.003 %ΔK/K
C. 0.005 %ΔK/K
D. 0.007 %ΔK/K
ANSWER: A.

一反應器在接近燃料週期末期以1.0×10^{-10}%功率達到臨界。下列何者為增加反應器功率到加熱點的最小正反應度？
A. 0.001 %ΔK/K
B. 0.003 %ΔK/K
C. 0.005 %ΔK/K
D. 0.007 %ΔK/K

答案： A

科目/題號：292008/29 (2016 新增)
知能類：k1.08〔4.1/4.1〕
序號：B6734(P6734)

Reactors A and B are identical except that reactor A has an effective delayed neutron fraction of 0.007 and reactor B has an effective delayed neutron fraction of 0.006. Both reactors are initially critical at 1.0×10^{-8} percent of rated thermal power when +0.1 %ΔK/K is simultaneously added to both reactors.
Five minutes after the reactivity additions, reactor _____ will be at the higher power level; and reactor _____ will have the shorter period.
A. A; A
B. A; B
C. B; A
D. B; B
ANSWER: D.

反應器A和B相同，除了反應器A之有效遲延中子分數為0.007，而反應器B之有效遲延中子分數為0.006。兩座反應器臨界在1.0×10^{-8}%額定熱功率時，再同時將+0.1%ΔK/K加入兩座反應器。在反應度加入5分鐘後，反應器____將有較高功率；而反應器____將有較短週期。
A. A；A
B. A；B
C. B；A
D. B；B

答案： D

科目/題號：292008/30 (2016 新增)
知能類：k1.08〔4.1/4.1〕
序號：B7688(P7688)

Given:
- Reactors A and B are identical except that reactor A has an effective delayed neutron fraction of 0.0055 and reactor B has an effective delayed neutron fraction of 0.0052.
- Reactor A has a stable period of 42 seconds and reactor B has a stable period of 45 seconds.
- Both reactors are initially operating at 1.0×10^{-8} percent power.

The reactor that is supercritical by the greater amount of positive reactivity is reactor _____; and the first reactor to reach 1.0×10^{-1} percent power will be reactor _____.
A. A; A
B. A; B
C. B; A
D. B; B
ANSWER: A.

已知：
- 反應器A和B相同，除了反應器A之有效遲延中子分數為0.0055，而反應器B之有效遲延中子分數為0.0052
- 反應器A的穩定週期為42秒，反應器B的穩定週期為45秒
- 兩座反應器起初運轉在1.0×10^{-8}%功率

需要較大量正反應度造成超臨界的反應器是____；先達到1.0×10^{-1}%功率的反應器是___。
A. A；A
B. A；B
C. B；A
D. B；B

答案： A

科目/題號：292008/31 (2016 新增)
知能類：k1.12〔3.6/3.7〕
序號：B5833(P5834)

Refer to the drawing that shows a graph of fission rate versus time (see figure below). Both axes have linear scales.
Which one of the following events, initiated at 0 seconds, would cause the reactor response shown on the graph?

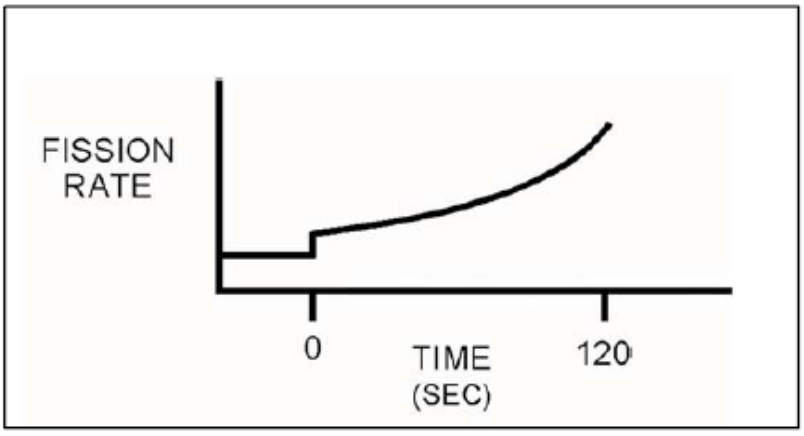
A. A step addition of positive reactivity to a reactor that is initially subcritical in the source range and remains subcritical for the duration of the 120-second interval shown.
B. A step addition of positive reactivity to a reactor that is initially critical in the source range and remains below the point of adding heat for the duration of the 120-second interval shown.
C. A step addition of positive reactivity to a reactor that is initially critical in the power range and remains in the power range for the duration of the 120-second interval shown.
D. A constant rate of positive reactivity addition to a reactor that is initially critical in the power range and remains in the power range for the duration of the 120-second interval shown.

ANSWER: B.

參考顯示分裂率與時間關係圖(見下圖)，兩軸均為線性刻度。下列何者發生於 0 秒時可能引起反應器如圖的反應？

A.反應器起初為次臨界且在源階，加入一正反應度，在所示 120 秒期間內維持次臨界
B.反應器起初為臨界且在源階，加入一正反應度，在所示 120 秒期間內維持在加熱點之下
C.反應器起初為臨界且在功率階，加入一正反應度，在所示 120 秒期間內維持在功率階
D.反應器起初為臨界且在功率階，以固定速率加入正反應度，在所示 120 秒期間內維持在功率階

答案： B



科目/題號：292008/32 (2016新增)
知能類：k1.14〔3.5/3.5〕
序號：B6335

A nuclear power plant is undergoing a startup with the reactor water initially saturated at 508°F. The main steam isolation valves are closed and reactor criticality has been achieved. The reactor currently has a stable positive 100-second reactor period with reactor power well below the point of adding heat (POAH).
Which one of the following will occur first when reactor power reaches the POAH?
A. Reactor power will decrease.
B. Reactor period will lengthen.
C. Reactor pressure will increase.
D. Reactor water temperature will increase.
ANSWER: B.

一核能電廠啟動中，反應爐達臨界。週期為100秒，功率遠在加熱點之下。爐水飽和溫度為508°F，且主蒸氣隔離閥關閉。當反應器到達加熱點時，下列何者最先發生？
A.反應器功率將下降
B.反應器週期將變長
C.反應器壓力將增加
D.反應器水溫將增加

答案： B

科目/題號：292008/33 (2016 新增)
知能類：k1.15〔3.7/3.7〕
序號：B3051(P3050)

A reactor startup is in progress with the reactor at normal operating temperature and pressure. With reactor power stable at the point of adding heat, a control rod malfunction causes an inadvertent rod withdrawal that results in adding 0.3 %ΔK/K reactivity.
Given:
- All control rod motion has been stopped.
- No automatic system or operator actions occur to inhibit the power increase.
- Power coefficient equals -0.04 %ΔK/K/percent.
- The effective delayed neutron fraction equals 0.006.

What is the approximate power level increase required to offset the reactivity added by the inadvertent control rod withdrawal? (Ignore any reactivity effects from changes in fission product poisons.)
A. 3.0 percent
B. 5.0 percent
C. 6.7 percent
D. 7.5 percent
ANSWER: D.

一反應器以正常運轉溫度和壓力進行啟動。在反應器穩定在加熱點時，一支控制棒發生故障，引起該控制棒不預期的抽出加入0.3%ΔK/K。
已知：
●所有控制棒的移動均已停止
●無自動系統或運轉員採取行動以阻止功率上升
●功率係數為 -0.04%ΔK/K/percent
●有效遲延中子分數等於0.006
大約需要增加多少功率，以抵銷因為不預期的控制棒抽出所加入的反應度？(不考慮任何分裂產物毒素改變的反應度效應)
A.3.0%
B.5.0%
C.6.7%
D.7.5%

答案： D

科目/題號：292008/34 (2016 新增)
知能類：k1.15〔3.7/3.7〕
序號：B4325(P4327)

A reactor startup is in progress with the reactor at normal operating temperature and pressure. With reactor power stable at the point of adding heat, a control rod malfunction causes an inadvertent rod withdrawal that results in adding 0.2 %ΔK/K reactivity.
Given:
- All control rod motion has been stopped.
- No automatic system or operator actions occur to inhibit the power increase.
- Power coefficient equals -0.04 %ΔK/K/percent.
- The effective delayed neutron fraction equals 0.006.

What is the approximate reactor power level increase required to offset the reactivity added by the inadvertent control rod withdrawal? (Ignore any reactivity effects from changes in fission product poisons.)
A. 3.3 percent
B. 5.0 percent
C. 6.7 percent
D. 7.5 percent
ANSWER: B.

一反應器以正常運轉溫度和壓力進行啟動。在反應器穩定在加熱點時，一支控制棒發生故障，引起該控制棒不預期的抽出加入0.2%ΔK/K。
已知：
●所有控制棒的移動均已停止
●無自動系統或運轉員採取行動以阻止功率上升
●功率係數為 -0.04%ΔK/K/percent.
●有效遲延中子分數等於0.006
大約需要增加多少功率，以抵銷因為不預期的控制棒抽出所加入的反應度？(不考慮任何分裂產物毒素改變的反應度效應)
A.3.3%
B.5.0%
C.6.7%
D.7.5%

答案： B

科目/題號：292008/35 (2016 新增)
知能類：k1.15〔3.7/3.7〕
序號：B6736(P6727)

A reactor startup is in progress with the reactor at normal operating temperature and pressure. With reactor power stable at the point of adding heat, a control rod malfunction causes a short rod withdrawal that increases reactivity by 0.14 %ΔK/K.
Given:
- All control rod motion has stopped.
- No automatic system or operator actions occur to inhibit the power increase.
- Power coefficient equals -0.028 %ΔK/K/percent.
- The effective delayed neutron fraction equals 0.006.

What is the approximate power level increase required to offset the reactivity added by the control rod withdrawal? (Ignore any reactivity effects from changes in fission product poisons.)
A. 2.0 percent
B. 5.0 percent
C. 20 percent
D. 50 percent
ANSWER: B.

一反應器以正常運轉溫度和壓力進行啟動。在反應器穩定在加熱點時，一支控制棒發生故障，引起該控制棒不預期的抽出加入0.14%ΔK/K。
已知：
●所有控制棒的移動均已停止
●無自動系統或運轉員採取行動以阻止功率上升
●功率係數為 -0.028%ΔK/K/percent
●有效遲延中子分數等於0.006
大約需要增加多少功率，以抵銷因為不預期的控制棒抽出所加入的反應度？(不考慮任何分裂產物毒素改變的反應度效應)
A.2.0%
B.5.0%
C.20%
D.50%

答案： B

科目/題號：292008/36 (2016 新增)
知能類：k1.18〔3.8/3.8〕
序號：B1671(P1672)

A refueling outage has just been completed, during which one-third of the core was replaced with new fuel assemblies. A reactor startup has been performed to begin the sixth fuel cycle, and reactor power is being increased to 100 percent.
Which one of the following pairs of reactor fuels will provide the greatest contribution to core heat production when the reactor reaches 100 percent power?
A. U-235 and U-238
B. U-238 and Pu-239
C. U-235 and Pu-239
D. U-235 and Pu-241
ANSWER: C.

剛完成更換燃料大修，此次共有三分之一的爐心更換為新燃料元件。反應器已完成啟動開始第六個燃料週期，且反應器功率正提升至100%。
當反應器到達100%功率時，下列何組反應器燃料提供產生最大量的爐心熱量？
A.鈾-235和鈾-238
B.鈾-238和鈽-239
C.鈾-235和鈽-239
D.鈾-235和鈽-241

答案： C

科目/題號：292008/37 (2016 新增)
知能類：k1.18〔3.8/3.8〕
序號：B5034(P2953)

Ignoring the effects of changes in fission product poisons, which one of the following reactor power changes requires the greatest amount of positive reactivity addition?
A. 3 percent to 10 percent
B. 10 percent to 25 percent
C. 25 percent to 65 percent
D. 65 percent to 100 percent
ANSWER: C.

不考慮分裂產物毒素改變的影響，下列何階段反應器功率的改變需要加入最大量的正反應度？
A. 3%至10%
B. 10%至25%
C. 25%至65%
D. 65%至100%

答案： C

科目/題號：292008/38 (2016 新增)
知能類：k1.19〔3.1/3.2〕
序號：B2354

A reactor is initially operating at steady-state 20 percent power when power is increased to 40 percent. In comparison to the operating conditions at 20 percent power, when the plant stabilizes at 40 percent power, reactor vessel pressure will be _____, and reactor vessel water temperature will be _____.
A. the same; the same
B. the same; higher
C. higher; the same
D. higher; higher
ANSWER: D.

一反應器起初穩定運轉於20%功率，當增加至40%功率時，與功率運轉於20%相比較，反應器壓力將_____，且反應器水溫將_____。
A.相同；相同
B.相同；較高
C.較高；相同
D.較高；較高

答案： D

科目/題號：292008/39 (2016 新增)
知能類：k1.21〔2.9/3.0〕
序號：B4735

A nuclear power plant is initially operating at steady-state 60 percent power when a main steamline break occurs that releases a constant 5 percent of rated main steam flow. The plant stabilizes as follows:
- No operator or automatic protective actions occur.
- Automatic pressure control returns reactor pressure to its initial value.
- Feedwater injection temperature remains the same.

Compared to the initial operating conditions, current reactor power is approximately _____; and current turbine power is approximately _____.
A. the same; 5 percent lower
B. the same; the same
C. 5 percent higher; 5 percent lower
D. 5 percent higher; the same
ANSWER: A.

一核能電廠穩定運轉於60%功率，當其一條主蒸汽管路發生破管釋放一固定5%額定主蒸汽流量。此電廠穩定在下列狀況：
●無運轉員或自動保護動作發生
●自動壓力控制將反應器壓力維持在破管前壓力
●飼水溫度維持不變
與破管前運轉條件比較，目前反應器功率大約為_____；且目前汽機功率大約為_____。
A.相同；降低5%
B.相同；相同
C.增加5%；降低5%
D.增加5%；相同

答案： A

科目/題號：292008/40 (2016 新增)
知能類：k1.25〔2.8/2.9〕
序號：B4736

Reactors A and B are identical and have operated at 100 percent power for six months when a reactor scram occurs simultaneously on both reactors. All reactor A control rods fully insert. One reactor B control rod remains fully withdrawn, but all others fully insert.
When compared to reactor A at 10 minutes after the scram, the fission rate in reactor B will be _____; and the reactor period in reactor B will be _____.
A. higher; longer
B. higher; the same
C. the same; longer
D. the same; the same
ANSWER: B.

反應器A和反應器B完全相同，且已在100%功率運轉六個月。當兩座反應器同時發生急停時，反應器A的所有控制棒全部插入，而反應器B有一支控制棒維持全出，但其它控制棒全部插入。
當急停後10分鐘，與反應器A比較，反應器B的分裂率將_____；且反應器B的週期將____。
A.較高；較長
B.較高；相同
C.相同；較長
D.相同；相同

答案： B

科目/題號：292008/41 (2016 新增)
知能類：k1.25〔2.8/2.9〕
序號：B7036

A nuclear power plant is operating at steady-state 100 percent power when a reactor scram occurs. As a result of the scram, the core neutron flux will initially decrease on a period that is much _____ than -80 seconds; and the period will become approximately -80 seconds about _____ minutes after the scram.
A. longer; 3
B. longer; 30
C. shorter; 3
D. shorter; 30
ANSWER: C.

一核能電廠穩定運轉於100%功率時發生反應器急停。由於急停導致爐心中子通量起初減少將比週期 -80秒_____；而在急停後約_____分鐘後週期將變為 -80秒。
A.更長；3
B.更長；30
C.更短；3
D.更短；30

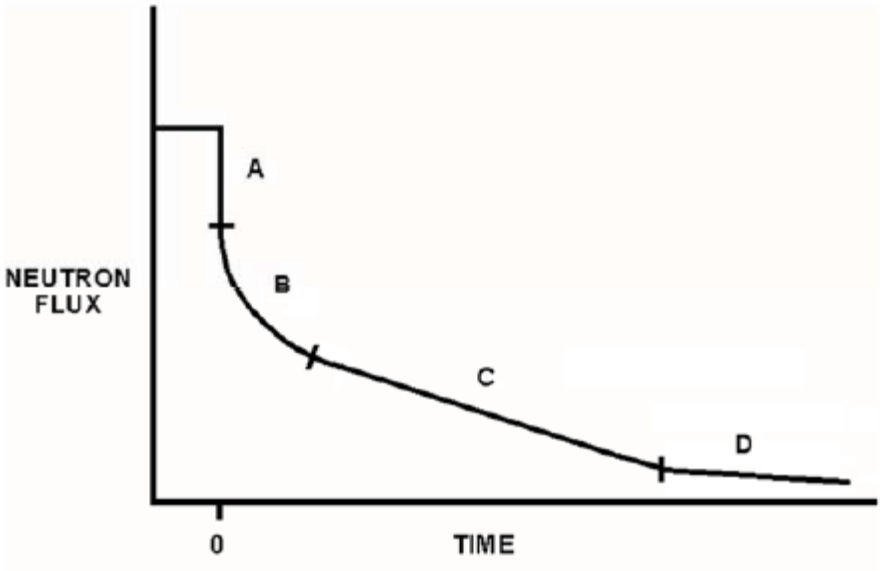
答案： C

科目/題號：292008/42 (2016 新增)
知能類：k1.25〔2.8/2.9〕
序號：B7618(P7618)

Refer to the graph of neutron flux versus time (see figure below) for a nuclear power plant reactor that experienced a reactor scram from extended full power operation at time = 0 seconds. The neutron flux axis has a logarithmic scale while the time axis has a linear scale.
Which section(s) of the curve has/have a slope that is primarily determined by the production rate of delayed neutrons?
A. B only
B. B and C
C. C only
D. C and D
ANSWER: B

參考一座核能電廠曾在延長滿載運轉，時間點為零時，反應器發生急停所繪中子通量與時間關係圖(見下圖)。中子通量軸係對數尺度而時間軸為線性尺度。何段曲線的斜率主要係由遲延中子產生率所決定？
A.只有B
B. B和C
C.只有C
D.C和D

答案： B

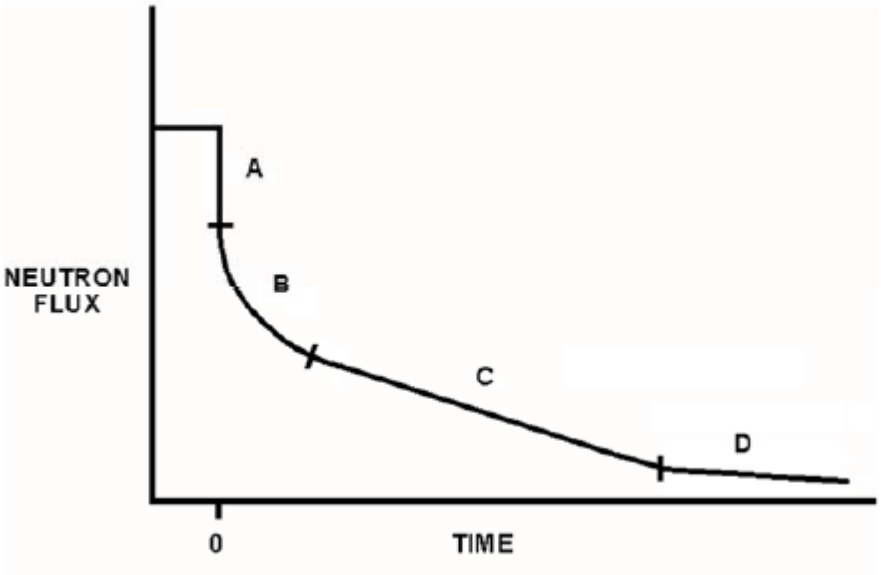


科目/題號：292008/43 (2016 新增)
知能類：k1.25〔2.8/2.9〕
序號：B7658(P7658)

Refer to the graph of neutron flux versus time (see figure below) for a nuclear power plant that experienced a reactor trip from extended full power operation at time = 0 seconds. The neutron flux axis has a logarithmic scale while the time axis has a linear scale.
In which section of the curve does the production rate of source neutrons primarily determine the slope of the curve?
A. A
B. B
C. C
D. D
ANSWER: D.

參考一座核能電廠曾在延長滿載運轉，時間點為零時，反應器發生急停所繪中子通量與時間關係圖(見下圖)。中子通量軸係對數刻度而時間軸為線性刻度。何段曲線的斜率主要係由中子源產生率所決定？
A. A
B. B
C. C
D. D

答案： D



科目/題號：292008/44 (2016 新增)
知能類：k1.27〔3.4/3.5〕
序號：B7336

A nuclear reactor initially has a Keff of 0.999 and a stable source range count rate. Control rods are inserted until Keff decreases to 0.998, resulting in a negative reactor period. After the control rod insertion stops, reactor period will...
A. gradually lengthen until the neutron population reaches equilibrium, then stabilize at infinity.
B. gradually lengthen until the neutron population reaches equilibrium, then stabilize at an unknown negative value.
C. quickly stabilize at approximately negative 80 seconds until the neutron population approaches equilibrium, then gradually lengthen and stabilize at infinity.
D. quickly stabilize at an unknown negative value until the neutron population approaches equilibrium, then gradually lengthen and stabilize at an unknown negative value.
ANSWER: A.

一反應器起初所具有效增殖因數為0.999及穩定源階中子計數率。控制棒一直插入直到有效增殖因數為0.998，並導致負的反應器週期。在控制棒停止插入後，反應器週期將會_____。
A.逐漸變長直到中子數達到平衡，然後穩定在無限大
B.逐漸變長直到中子數達到平衡，然後穩定在一未知的負值
C.快速穩定在約負80秒直到中子數達到平衡，然後逐漸變長並穩定在無限大
D.快速穩定在一未知的負值直到中子數達到平衡，然後逐漸變長並穩定在一未知的負值

答案： A

科目/題號：292008/45 (2016 新增)
知能類：k1.30〔3.2/3.5〕
序號：B4336(P4336)

A nuclear power plant has been operating at 100 percent power for six months when a reactor scram occurs. Which one of the following describes the source(s) of core heat generation 30 minutes after the reactor scram?
A. Fission product decay is the only significant source of core heat generation.
B. Delayed neutron-induced fission is the only significant source of core heat generation.
C. Fission product decay and delayed neutron-induced fission are both significant sources and produce approximately equal rates of core heat generation.
D. Fission product decay and delayed neutron-induced fission are both insignificant sources and generate core heat at rates that are less than the rate of ambient heat loss from the core.
ANSWER: A.

當核能電廠已在100%功率運轉 6個月時發生反應器急停。下列何者係反應器急停後30分鐘爐心熱量產生的來源？
A.分裂產物衰變是爐心熱量產生唯一重要來源
B.遲延中子誘發分裂是爐心熱量產生唯一重要來源
C.分裂產物衰變和遲延中子誘發分裂是兩種重要來源，且爐心熱量產生率大約相同
D.分裂產物衰變和遲延中子誘發分裂皆非重要來源，且其產生爐心熱量率比爐心周圍熱散失率小

答案： A