科目： 192005
知能類：K1.03
序號： P254 (B2254)

A nuclear reactor is exactly critical below the point of adding heat (POAH) during a reactor startup at the end of core life. Control rods are withdrawn for 20 seconds to establish a 0.5 dpm startup rate.

Reactor power will increase...

A. continuously until control rods are reinserted.

B. and stabilize at a value slightly below the POAH.

C. temporarily, then stabilize at the original value.

D. and stabilize at a value slightly above the POAH.

ANSWER: D.

一部處於爐心壽命末期的核子反應器，於啟動期間在低於加熱起始點(POAH)即達到臨界。控制棒抽出20秒以建立0.5 dpm啟動率。

則反應器功率將……

A. 持續增加，直到控制棒重新插入。

B. 增加，並於略低於加熱起始點處達到穩定。

C. 暫時增加，然後穩定於原先數值。

D. 增加，並於略高於加熱起始點處達到穩定。

答案：D.

科目： 192005
知能類：K1.03 [3.5/3.6]
序號： P354 (B356)

A nuclear reactor is critical below the point of adding heat. If control rods are manually inserted for 5 seconds, reactor power will decrease...

A. to a shutdown power level low in the source (startup) range.

B. temporarily, then return to the original value due to the resulting decrease in moderator temperature.

C. until inherent positive reactivity feedback causes the reactor to become critical at a lower neutron level.

D. temporarily, then return to the original value due to subcritical multiplication.

ANSWER: A.

一部核子反應器低於加熱起始點即達到臨界。如果手動插入控制棒5秒，反應器功率將……

A. 降至停機功率範圍，該功率係位於源階(啟動階)範圍較低處。

B. 暫時降低，然後由於緩和劑溫度降低而回到原先數值。

C. 降低，直到固有正反應度回饋造成反應器於較低中子位階變成臨界為止。

D. 暫時降低，然後基於次臨界增殖而回到原先數值。

答案：A.

科目： 192005
知能類：K1.03 [3.5/3.6]
序號： P754 (B755)

A nuclear reactor is exactly critical below the point of adding heat (POAH) during a normal reactor startup. If a control rod is manually withdrawn for 5 seconds, reactor power will increase...

A. to a stable critical power level below the POAH.

B. temporarily, then decrease and stabilize at the original value.

C. to a stable critical power level at the POAH.

D. temporarily, then decrease and stabilize below the original value.

ANSWER: C.

一部核子反應器在正常啟動中，在低於加熱起始點(POAH)即達到臨界。若一控制棒手動抽出5秒，則反應器功率將……

A. 增加至低於POAH之穩定臨界功率。

B. 暫時增加，其後減少並在原來數值達到穩定。

C. 增加至POAH之穩定臨界功率。

D. 暫時增加，其後減少並在小於原來數值達到穩定。

答案：C.

科目： 192005
知能類：K1.03 [3.5/3.6]
序號： P1054

A nuclear reactor is operating at end of core life with a steady state 50% power level when the operator withdraws a group of control rods for 5 seconds. (Assume turbine load remains constant and the reactor does not scram/trip.)

Actual reactor power will stabilize _____ the initial power and coolant temperature will stabilize _____ the initial temperature.

A. at; at

B. at; above

C. above; at

D. above; above

ANSWER: B.

一部處於爐心壽命末期的核子反應器，以 50%穩態功率運轉，運轉員於此時抽出一組控制棒 5 秒。(假設汽機負載維持不變，反應器沒有急停。)

反應器的實際功率將穩定在_____，冷卻水溫度將穩定在_____。

A. 初始功率處；初始溫度處

B. 初始功率處；初始溫度上方處

C. 初始功率上方處；初始溫度處

D. 初始功率上方處；初始溫度上方處

答案：B.

科目： 192005
知能類：K1.03 [3.5/3.6]
序號： P1254

A nuclear reactor is critical at 50% power. Control rods are inserted a short distance. Assuming that the main turbine-generator load remains constant, actual reactor power will decrease and then...

A. stabilize in the source range.

B. stabilize at a lower value in the power range.

C. increase and stabilize above the original value.

D. increase and stabilize at the original value.

ANSWER: D.

一部核子反應器於 50%功率時臨界，此時控制棒微幅插入。假設主汽輪發電機的負載維持不變，反應器的實際功率將降低，然後……

A. 穩定在源階處。

B. 穩定在功率的較低數值。

C. 增加並穩定在原先數值上方。

D. 增加並穩定在原先數值處。

答案：D.

科目： 192005
知能類：K1.03 [3.5/3.6]
序號： P1654

A nuclear reactor is operating at steady state 50% power near the end of core life when the operator inserts a group of control rods for 5 seconds. Assume turbine load remains constant and the reactor does not scram/trip.

Actual reactor power will stabilize _____ the initial power level and coolant temperature will stabilize _____ the initial temperature.

A. at; at

B. at; below

C. below; at

D. below; below

ANSWER: B.

一部接近爐心壽命末期的核子反應器，以 50%穩態功率運轉，運轉員於此時插入一組控制棒 5 秒。假設汽機負載維持不變，反應器沒有急停。

反應器的實際功率將穩定在_____，冷卻水溫度將穩定在_____。

A. 初始功率處；初始溫度處

B. 初始功率處；低於初始溫度處

C. 初始功率下方處；初始溫度處

D. 初始功率下方處；低於初始溫度處

答案：B.

科目： 192005
知能類：K1.03 [3.5/3.6]
序號： P1754

A nuclear reactor is exactly critical at the point of adding heat (POAH) during a reactor startup at the end of core life. Control rods are manually withdrawn for 5 seconds and then stopped.

Assuming only ambient heat removal from the reactor coolant system (RCS), when plant parameters stabilize, reactor power will be _____ the POAH, and RCS average temperature will be _____.

A. at; higher

B. at; the same

C. greater than; higher

D. greater than; the same

ANSWER: A.

一部處於爐心壽命末期的核子反應器，在啟動時於加熱起始點(POAH)達到臨界。此時，手動抽出控制棒 5 秒後停止。

如果僅考慮反應器冷卻水系統(RCS)散失至環境的熱量，當反應器參數穩定時，其功率將_____POAH，RCS 平均溫度將_____。

A. 等於；變得較高

B. 等於；維持不變

C. 大於；變得較高

D. 大於；維持不變

答案：A.

科目： 192005
知能類：K1.03 [3.5/3.6]
序號： P1854 (B2155)

A nuclear reactor has been shut down for three weeks with all control rods fully inserted. If a center control rod is fully withdrawn from the core, neutron population will: (Assume the reactor remains subcritical.)

A. increase and stabilize at a new higher level.

B. increase, then decrease and stabilize at the original value.

C. increase, then decrease and stabilize above the original value.

D. remain the same.

ANSWER: A.

一部核子反應器停機三週，所有控制棒完全插入。若一位於中心的控制棒，從爐心持續抽至全出位置，則中子數將(假設反應器維持在次臨界)：

A. 增加，並在一高於原中子數處達到穩定。

B. 增加，其後減少並在原中子數處達到穩定。

C. 增加，其後減少並在一高於原中子數處達到穩定。

D. 維持不變。

答案：A.

科目： 192005
知能類：K1.03 [3.5/3.6]
序號： P1955 (B954)

A nuclear reactor has been shut down for three weeks with all control rods fully inserted. If a center control rod is fully withdrawn from the core, neutron population will: (Assume the reactor remains subcritical.)

A. increase and stabilize at a new higher level.

B. increase temporarily then return to the original value.

C. increase exponentially until the operator inserts the control rod.

D. remain the same.

ANSWER: A.

一部核子反應器停機三週，所有控制棒完全插入。若一位於中心的控制棒，從爐心完全抽出，則中子數將(假設反應器維持在次臨界)：

A. 增加，並在一較高中子數達到穩定。

B. 暫時增加，其後回復原來中子數。

C. 呈指數增加，直到運轉員插入控制棒為止。

D. 維持不變。

答案：A.

科目： 192005
知能類：K1.03 [3.5/3.6]
序號： P3854

Criticality has been achieved during a xenon-free nuclear reactor startup. The core neutron flux level is low in the intermediate range and a stable 0.5 dpm startup rate (SUR) has been established. The operator begins inserting control rods in an effort to stabilize the core neutron flux level near its current value. The operator stops inserting control rods exactly when the SUR indicates 0.0 dpm.

Immediately after the operator stops inserting the control rods, the SUR will become _____ ; then the core neutron flux level will _____.

A. positive; increase exponentially

B. positive; increase linearly

C. negative; decrease exponentially

D. negative; decrease linearly

ANSWER: A.

一部無氙核子反應器於啟動期間達到臨界。爐心中子通率位於中程階(intermediate range)指示低處，並建立 0.5 dpm 的穩定啟動率(SUR)。運轉員於此時開始插入控制棒，讓中子通率靠近現有數值。當 SUR 指著 0.0 dpm 時，運轉員停止插入控制棒。

運轉員停止插入控制棒後，SUR 將隨即變成_____；然後，爐心中子通率將_____。

A. 正值；呈指數增加

B. 正值；呈線性增加

C. 負值；呈指數降低

D. 負值；呈線性降低

答案：A.

科目： 192005
知能類：K1.05 [2.8/3.1]
序號： P555 (B856)

The total amount of reactivity added by a control rod position change from a reference height to any other rod height is called...

A. differential rod worth.

B. shutdown reactivity.

C. integral rod worth.

D. reference reactivity.

ANSWER: C.

因控制棒位置從一參考高度移動至任何其他高度，進而加入的反應度總量稱為……

A. 微分控制棒本領。

B. 停機反應度。

C. 積分控制棒本領。

D. 參考反應度。

答案：C.

科目： 192005
知能類：K1.05 [2.8/3.1]
序號： P654

Integral control rod worth is the change in _____ per _____ change in rod position.

A. reactor power; total

B. reactivity; unit

C. reactor power; unit

D. reactivity; total

ANSWER: D.

積分控制棒本領意指棒位_____變化而產生的_____變化。

A. 總；反應器功率

B. 單位；反應度

C. 單位；反應器功率

D. 總；反應度

答案：D.

科目： 192005
知能類：K1.05 [2.8/3.1]
序號： P755 (B756)

A control rod is positioned in a nuclear reactor with the following neutron flux parameters:

Core average thermal neutron flux = $10^{12}$ neutrons/$cm^2$-sec
Control rod tip neutron flux = 5 x $10^{12}$ neutrons/$cm^2$-sec

If the control rod is slightly withdrawn such that the tip of the control rod is located in a neutron flux of $10^{13}$ neutrons/$cm^2$-sec, then the differential control rod worth will increase by a factor of _____. (Assume the average flux is constant.)

A. 0.5

B. 1.4

C. 2.0

D. 4.0

ANSWER: D.

核子反應器中一控制棒位置的相關中子通率參數如下：

爐心平均熱中子通率 = $10^{12}$ n/$cm^2$-sec
控制棒前端中子通率 = 5 x $10^{12}$ n/$cm^2$-sec

若控制棒稍微抽出，使得控制棒前端的中子通率為$10^{13}$ n/$cm^2$-sec，則微分控制棒本領將增加_____倍(假設平均通率維持固定）。

A. 0.5

B. 1.4

C. 2.0

D. 4.0

答案：D.

科目： 192005
知能類：K1.05 [2.8/3.1]
序號： P1354

Integral rod worth is the...

A. change in reactivity per unit change in rod position.

B. reactivity inserted by moving a control rod from a reference point to another point.

C. change in worth of a control rod per unit change in reactor power.

D. rod worth associated with the most reactive control rod.

ANSWER: B.

積分控制棒本領意指……

A. 棒位的單位變化所產生的反應度變化。

B. 將控制棒從參考點移至另一點時加入的反應度。

C. 反應器功率的單位變化所產生的控制棒本領變化。

D. 反應度最大的控制棒相關本領值。

答案：B.

科目： 192005
知能類：K1.05 [2.8/3.1]
序號： P1471

Reactor power was ramped from 80% power to 100% power over 4 hours. The 80% conditions were as follows:

Reactor coolant system (RCS) boron concentration: 600 ppm
Control rod position: 110 inches
RCS average temperature: 575°F

The 100% conditions are as follows:

RCS boron concentration: 580 ppm
Control rod position: 130 inches
RCS average temperature: 580°F

Given the following reactivity coefficient/worth values, and neglecting changes in fission product poison reactivity, what is the differential control rod worth?

Power coefficient: -0.03% ΔK/K/%
Moderator temperature coefficient: -0.02% ΔK/K/°F
Differential boron worth: -0.01% ΔK/K/ppm

A. -0.02% ΔK/K/inch

B. -0.025% ΔK/K/inch

C. -0.04% ΔK/K/inch

D. -0.05% ΔK/K/inch

ANSWER: A.

核子反應器的功率於 4 小時內從 80%攀升至 100%。80%功率時的條件如下：

反應器冷卻水系統(RCS)硼濃度：600 ppm
控制棒位置： 110 inch
RCS 平均溫度： 575°F

100%功率時的條件如下：

RCS 硼濃度： 580 ppm
控制棒位置： 130 inch
RCS 平均溫度： 580°F

已知下列反應度係數/本領值，並忽略分裂產物毒素的反應度變化，請問微分控制棒本領為多少？

功率係數：　　-0.03% ΔK/K/%
緩和劑溫度係數：-0.02% ΔK/K/°F
微分硼本領：　　-0.01% ΔK/K/ppm

A. -0.02% ΔK/K/inch

B. -0.025% ΔK/K/inch

C. -0.04% ΔK/K/inch

D. -0.05% ΔK/K/inch

答案：A.

科目： 192005
知能類：K1.05 [2.8/3.1]
序號： P1554 (B1057)

A control rod is positioned in a nuclear reactor with the following neutron flux parameters:

Core average thermal neutron flux = 1 x $10^{12}$ n/$cm^2$-sec
Control rod tip thermal neutron flux = 5 x $10^{12}$ n/$cm^2$-sec

If the control rod is slightly withdrawn such that the control rod tip is located in a thermal neutron flux of 1 x $10^{13}$ n/$cm^2$-sec, then the differential control rod worth will increase by a factor of _____. (Assume the core average thermal neutron flux is constant.)

A. 2

B. 4

C. 10

D. 100

ANSWER: B.

在核子反應器中，一控制棒位置的相關中子通率參數如下：

爐心平均熱中子通率 = 1 x $10^{12}$ n/$cm^2$-sec
控制棒前端熱中子通率 = 5 x $10^{12}$ n/$cm^2$-sec

若控制棒稍微抽出，使得控制棒前端的熱中子通率為1 x $10^{13}$ n/$cm^2$-sec，則微分控制棒本領將增加_____倍(假設爐心平均熱中子通率維持固定)。

A. 2

B. 4

C. 10

D. 100

答案：B.

科目： 192005
知能類：K1.05 [2.8/3.1]
序號： P1755 (B1855)

A control rod is positioned in a nuclear reactor with the following neutron flux parameters:

Core average thermal neutron flux = $1.0 \times 10^{12}$ n/cm$^2$-sec
Control rod tip thermal neutron flux = $4.0 \times 10^{12}$ n/cm$^2$-sec

If the control rod is slightly inserted such that the control rod tip is located in a thermal neutron flux of $1.2 \times 10^{13}$ n/cm$^2$-sec, then the differential control rod worth will be increased by a factor of _____. (Assume the core average thermal neutron flux is constant.)

A. 1/3

B. 3

C. 9

D. 27

ANSWER: C.

在核子反應器中，一控制棒位置的相關中子通率參數如下：

爐心平均熱中子通率 = $1.0 \times 10^{12}$n/cm$^2$-sec
控制棒前端熱中子通率 = $4.0 \times 10^{12}$n/cm$^2$-sec

若控制棒稍微插入，使控制棒前端的熱中子通率為$1.2 \times 10^{13}$n/cm$^2$-sec，則微分控制棒本領將增加_____倍(假設爐心平均熱中子通率維持固定)。

A. 1/3

B. 3

C. 9

D. 27

答案：C.

科目： 192005
知能類：K1.05 [2.8/3.1]
序號： P2255

A nuclear reactor is operating at steady state 70% power with the following conditions:

RCS boron concentration: 600 ppm
Control rod position: 110 inches
RCS average temperature: 575°F

Reactor power is increased to 100% over the next four hours. The 100% reactor power conditions are as follows:

RCS boron concentration: 590 ppm
Control rod position: 130 inches
RCS average temperature: 580°F

Given the following reactivity coefficient/worth values, and neglecting fission product poison reactivity changes, what is the differential control rod worth?

Power coefficient: -0.3% ΔK/K/%
Moderator temperature coefficient: -0.2% ΔK/K/°F
Differential boron worth: -0.1% ΔK/K/ppm

A. 0.2% ΔK/K/inch

B. 0.25% ΔK/K/inch

C. 0.4% ΔK/K/inch

D. 0.5% ΔK/K/inch

ANSWER: C.

一部核子反應器以 70%功率穩態運轉，此時條件如下：

RCS 硼濃度： 600 ppm
控制棒位置： 110 inch
RCS 平均溫度： 575°F

之後，反應器功率於四小時內增至 100%。100%反應器功率時的條件如下：

RCS 硼濃度： 590 ppm
控制棒位置： 130 inch
RCS 平均溫度： 580°F

已知下列反應度係數/本領值，並忽略分裂產物毒素的反應度變化，請問微分控制棒本領為多少？

功率係數： -0.3% ΔK/K/%
緩和劑溫度係數： -0.2% ΔK/K/°F
微分硼本領： -0.1% ΔK/K/ppm

A. 0.2% ΔK/K/inch

B. 0.25% ΔK/K/inch

C. 0.4% ΔK/K/inch

D. 0.5% ΔK/K/inch

答案：C.

科目： 192005
知能類：K1.05 [2.8/3.1]
序號： P2554 (B2655)

A control rod is positioned in a nuclear reactor with the following neutron flux parameters:

Core average thermal neutron flux = $1.0 \times 10^{12}$ n/cm$^2$-sec
Control rod tip thermal neutron flux = $4.0 \times 10^{12}$ n/cm$^2$-sec

If the control rod is slightly inserted such that the control rod tip is located in a thermal neutron flux of $1.6 \times 10^{13}$ n/cm$^2$-sec, then the differential control rod worth will increase by a factor of _____. (Assume the core average thermal neutron flux is constant.)

A. 2

B. 4

C. 8

D. 16

ANSWER: D.

在核子反應器中，一控制棒位置的相關中子通率參數如下：

爐心平均熱中子通率 = $1.0 \times 10^{12}$n/cm$^2$-sec
控制棒前端熱中子通率 = $4.0 \times 10^{12}$n/cm$^2$-sec

若控制棒稍微插入，使得控制棒前端的熱中子通率為$1.6 \times 10^{13}$n/cm$^2$-sec，則微分控制棒本領將增加_____倍(假設爐心平均熱中子通率維持固定)。

A. 2

B. 4

C. 8

D. 16

答案：D.

科目： 192005
知能類：K1.06 [2.6/2.9]
序號： P134 (B1755)

Which one of the following expresses the relationship between differential rod worth (DRW) and integral rod worth (IRW)?

A. DRW is the IRW at a specific rod position.

B. DRW is the square root of the IRW at a specific rod position.

C. DRW is the slope of the IRW curve at a specific rod position.

D. DRW is the area under the IRW curve at a specific rod position.

ANSWER: C.

下列何者表示微分控制棒本領(DRW)與積分控制棒本領(IRW)的關係？

A. DRW是任一控制棒位置的IRW。

B. DRW是任一控制棒位置的IRW平方根。

C. DRW是任一控制棒位置的IRW曲線斜率。

D. DRW是任一控制棒位置的IRW曲線下方面積。

答案：C.

科目： 192005
知能類：K1.06 [2.6/2.9]
序號： P655 (B2255)

Which one of the following parameters typically has the greatest effect on the shape of a differential rod worth curve?

A. Core radial neutron flux distribution

B. Core axial neutron flux distribution

C. Core xenon distribution

D. Burnable poison distribution

ANSWER: B.

下列那項參數通常對微分控制棒本領曲線形狀具有最大影響？

A. 爐心徑向中子通率分佈。

B. 爐心軸向中子通率分佈。

C. 爐心氙毒分佈。

D. 可燃性毒物分佈。

答案：B.

科目： 192005
知能類：K1.06 [2.6/2.9]
序號： P856

During normal full power operation, the differential control rod worth is less negative at the top and bottom of the core compared to the center regions due to the effects of...

A. boron concentration.

B. neutron flux distribution.

C. xenon concentration.

D. fuel temperature distribution.

ANSWER: B.

一部核子反應器以全功率正常運轉時，相較於爐心中央區域，微分控制棒本領在爐心頂部與底部的負值較小(less negative)，這是下列何者的影響？

A. 硼濃度。

B. 中子通率分佈。

C. 氙毒濃度。

D. 燃料溫度分佈。

答案：B.

科目： 192005
知能類：K1.06 [2.6/2.9]
序號： P1555 (B1657)

Which one of the following expresses the relationship between differential rod worth (DRW) and integral rod worth (IRW)?

A. IRW is the slope of the DRW curve.

B. IRW is the inverse of the DRW curve.

C. IRW is the sum of the DRWs between the initial and final control rod positions.

D. IRW is the sum of the DRWs of all control rods at any specific control rod position.

ANSWER: C.

下列何者表示微分控制棒本領(DRW)與積分控制棒本領(IRW)的關係？

A. IRW是DRW曲線的斜率。

B. IRW是DRW曲線的倒數。

C. IRW是控制棒從起始位置至最終位置的DRW總和。

D. IRW是所有控制棒在任何特定棒位時的DRW總和。

答案：C.

科目： 192005
知能類：K1.07 [2.5/2.8]
序號： P54

As moderator temperature increases, the differential rod worth becomes more negative because...

A. decreased moderator density causes more neutron leakage out of the core.

B. moderator temperature coefficient decreases, causing decrease competition.

C. fuel temperature increases, decreasing neutron absorption in fuel.

D. decreased moderator density increases neutron migration length.

ANSWER: D .

隨著緩和劑溫度上升，微分控制棒本領基於下列哪項因素而變成較大負值(more negative)？

A. 緩和劑密度降低，造成爐心中子洩漏量增加。

B. 緩和劑溫度係數降低，造成競爭力(competition)下降。

C. 燃料溫度上升，造成燃料的中子吸收量下降。

D. 緩和劑密度降低，造成中子遷移長度增加。

答案：D.

科目： 192005
知能類：K1.07 [2.5/2.8]
序號： P454

Differential rod worth will become most negative if reactor coolant system (RCS) temperature is _____ and RCS boron concentration is _____.

A. increased; decreased

B. decreased; decreased

C. increased; increased

D. decreased; increased

ANSWER: A.

如果反應器冷卻水系統(RCS)的溫度_____且硼濃度_____，微分控制棒本領將變成最大負值(most negative)。

A. 增加；降低

B. 降低；降低

C. 增加；增加

D. 降低；增加

答案：A.

科目： 192005
知能類：K1.07 [2.5/2.8]
序號： P955

As moderator temperature decreases, the differential rod worth will become...

A. more negative due to better moderation of neutrons.

B. less negative due to shorter neutron migration length.

C. more negative due to increased neutron absorption in moderator.

D. less negative due to increased resonance absorption of neutrons.

ANSWER: B.

隨著緩和劑溫度下降，微分控制棒本領將變成……

A. 較大負值(more negative)，因為中子緩和性較佳。

B. 較小負值(less negative)，因為中子遷移長度縮短。

C. 較大負值(more negative)，因為緩和劑的中子吸收量增加。

D. 較小負值(less negative)，因為中子共振吸收量增加。

答案：B.

科目： 192005
知能類：K1.07 [2.5/2.8]
序號： P1556 (B2656)

As moderator temperature increases, the differential rod worth will become...

A. more negative due to longer neutron migration length.

B. less negative due to reduced moderation of neutrons.

C. more negative due to decreased resonance absorption of neutrons.

D. less negative due to decreased moderator absorption of neutrons.

ANSWER: A.

當緩和劑溫度增加時，微分控制棒本領將變成……

A. 較大負值(more negative)，因為中子遷移長度較長。

B. 較小負值(less negative)，因為中子的緩和減小。

C. 較大負值(more negative)，因為中子的共振吸收減小。

D. 較小負值(less negative)，因為緩和劑的中子吸收量減小。

答案：A.

科目： 192005
知能類：K1.07 [2.5/2.8]
序號： P2156

A nuclear reactor is operating at 80% power near the end of a fuel cycle with the controlling group of control rods inserted 5% into the core. Which one of the following will cause group differential rod worth to become less negative? (Consider only the direct effect of the indicated change.)

A. Burnable poison rods become increasingly depleted.

B. Core Xe-135 concentration decreases toward an equilibrium value.

C. Reactor coolant temperature is allowed to decrease from 575°F to 570°F.

D. Reactor power is decreased to 70% using control rods for control of RCS temperature.

ANSWER: C.

一部接近燃料週期末期的核子反應器以 80%功率運轉，此時將控制棒組(controlling group)插入爐心 5%。下列何者將造成該組的微分控制棒本領變成較小負值(less negative)？(僅考慮下列變化的直接效應)

A. 可燃性毒物棒的耗竭度增加。

B. 爐心的 Xe-135 濃度降至平衡值。

C. 反應器冷卻水系統得以從 575°F 降至 570°F。

D. 利用控制棒控制 RCS 溫度，讓反應器功率降至 70%。

答案：C.

科目： 192005
知能類：K1.07 [2.5/2.8]
序號： P2254

For stationary control rods in an operating nuclear reactor, which one of the following events will cause differential control rod worth to become less negative?

A. Fuel temperature decreases as the fuel pellets come into contact with the fuel clad.

B. RCS boron concentration increases by 5 ppm at 80% power.

C. Reactor power is decreased from 100% to 90%.

D. Early in core life, the concentration of burnable poison decreases.

ANSWER: B.

對於運轉中核子反應器的靜止控制棒而言，下列哪項事件將造成微分控制棒本領變成較小負值(less negative)？

A. 於燃料丸接觸燃料護套時燃料溫度降低。

B. RCS 硼濃度於 80%功率時增加 5 ppm。

C. 反應器功率從 100%降至 90%。

D. 在爐心壽命初期，可燃性毒物濃度降低。

答案：B.

科目： 192005
知能類：K1.07 [2.5/2.8]
序號： P2356

A nuclear reactor startup is in progress from a cold shutdown condition. During the RCS heatup phase of the startup, control rod differential reactivity worth (ΔK/K per inch insertion) becomes _____ negative; and during the complete withdrawal of the initial bank of control rods, control rod differential reactivity worth becomes _____.

A. more; more negative and then less negative

B. more; less negative and then more negative

C. less; more negative during the entire withdrawal

D. less; less negative during the entire withdrawal

ANSWER: A.

一部核子反應器從冷停機狀態進行啟動中。RCS 於啟動後的升溫期間，微分控制棒本領(每插入 1 吋的ΔK/K 值)變成_____；首組控制棒組(initial bank of control rods)完全抽出時，微分控制棒本領變成_____。

A. 較大負值(more negative)；較大負值，再成為較小負值

B. 較大負值(more negative)；較小負值，再成為較大負值

C. 較小負值(less negative)；在整個抽出期間都維持較大負值

D. 較小負值(less negative)：在整個抽出期間都維持較小負值

答案：A.

科目： 192005
知能類：K1.07 [2.5/2.8]
序號： P2655

Which one of the following will cause group differential control rod worth to become less negative? (Assume the affected group of control rods remains 10% inserted for each case.)

A. During long-term full power operation, fuel temperature decreases as the fuel pellets come into contact with the fuel clad.

B. The reactor coolant system is cooled from 170°F to 120°F in preparation for a core refueling.

C. Core Xe-135 builds up in the lower half of the core.

D. Early in core life, the concentration of burnable poison decreases.

ANSWER: B.

下列何者將造成微分控制棒組本領變成較小負值(less negative)？(假設在各種情況下，受到影響的控制棒組仍插入 10%)

A. 在長期全功率運轉期間，燃料丸接觸燃料護套而導致燃料溫度下降。

B. 準備更換爐心燃料時，反應器冷卻水系統從 170°F 降至 120°F。

C. 爐心的 Xe-135 累積於爐心下半部。

D. 在爐心壽命初期，可燃性毒物濃度降低。

答案：B.

科目： 192005
知能類：K1.07 [2.5/2.8]
序號： P2854

A nuclear reactor is operating at 85% power with the controlling group of control rods inserted 10%. Which one of the following will cause the differential rod worth of the controlling group to become more negative? (Assume reactor power and control rod position remain constant for each case.)

A. Fuel temperature increases as fission product gasses accumulate in a fuel rod.

B. RCS average temperature drifts from 580°F to 575°F.

C. Core Xe-135 builds up in the lower half of the core.

D. RCS boron concentration is increased by 5 ppm.

ANSWER: C.

一部核子反應器以 80%功率運轉，此時將控制棒組(controlling group)插入爐心 10%。下列何者將造成該組的微分控制棒本領變成較大負值(more negative)？(假設在各種情況下，反應器功率與控制棒位置維持不變)

A. 燃料溫度在分裂產生氣體累積於燃料棒時上升。

B. RCS 平均溫度從 580°F 飄移(drift)至 575°F。

C. 爐心的 Xe-135 累積於爐心下半部。

D. RCS 硼濃度增加 5 ppm。

答案：C.

科目： 192005
知能類：K1.08 [2.7/2.9]
序號： P556

A nuclear power plant is operating at 80% power with manual rod control. It has been determined that power distribution is excessive in the lower half of the core.

Which one of the following will shift power distribution toward the upper half of the core? (Assume no additional operator actions.)

A. Increasing power to 90%.

B. Withdrawing control rods.

C. Borating the reactor coolant system.

D. Diluting the reactor coolant system.

ANSWER: B.

核能電廠以 80%功率運轉中，控制棒處於手動模式。此時判斷出爐心下半部的功率較高。

下列何者將使功率分佈朝爐心上半部移動？(假設運轉員沒有採取額外行動)

A. 增加功率至 90%。

B. 抽出控制棒。

C. 調高反應器冷卻水系統的硼濃度。

D. 稀釋反應器冷卻水系統的硼濃度。

答案：B.

科目： 192005
知能類：K1.08 [2.7/2.9]
序號： P857 (B3356)

The main reason for designing and operating a nuclear reactor with a flattened neutron flux distribution is to...

A. provide even burnup of control rods.

B. reduce neutron leakage from the core.

C. allow a higher average power density.

D. provide more accurate nuclear power indication.

ANSWER: C.

設計扁平(flattened)中子通率分佈、並讓核子反應器據此運轉的主要原因為何？

A. 讓控制棒均勻燃燒。

B. 減少爐心洩漏的中子數。

C. 提高平均功率密度。

D. 提供更精確的核能功率指示值。

答案：C.

科目： 192005
知能類：K1.08 [2.7/2.9]
序號： P2456 (B2457)

Which one of the following is a reason for neutron flux shaping in a nuclear reactor core?

A. To minimize local power peaking by more evenly distributing the core thermal neutron flux

B. To reduce thermal neutron leakage by decreasing the neutron flux at the edge of the reactor core

C. To reduce the size and number of control rods needed to ensure the reactor remains subcritical following a reactor trip

D. To increase control rod worth by peaking the thermal neutron flux at the top of the reactor core

ANSWER: A.

下列何者是控制反應器爐心中子通率分佈(flux shaping)的原因？

A. 藉由分佈更均勻的爐心熱中子通率，減小區域功率尖峰。

B. 藉由降低爐心邊緣的中子通率，減少熱中子洩漏。

C. 減少反應器在急停後維持次臨界所需的控制棒數量。

D. 藉由將熱中子通率峰值移往爐心頂部以增加控制棒本領。

答案：A.

科目： 192005
知能類：K1.09 [2.8/3.0]
序號： P55

What is a purpose of control rod bank overlap?

A. Provides a more uniform differential rod worth and axial flux distribution.

B. Provides a more uniform differential rod worth and allows dampening of xenon-induced flux oscillations.

C. Ensures that all rods remain within the allowable tolerance between their individual position indicators and their group counters, and ensures rod insertion limits are not exceeded.

D. Ensures that all rods remain within their allowable tolerance between individual position indicators and their group counters, and provides a more uniform axial flux distribution.

ANSWER: A.

下列何者為重疊控制棒組的目的？

A. 提供較為均勻的微分控制棒本領與軸向通率分佈。

B. 提供較為均勻的微分控制棒本領，並抑制(dampen)氙毒引發的通率振盪。

C. 確保所有控制棒都在個別棒位指示及棒組計數值之間的容許誤差(allowable tolerance)內，而且不超出控制棒插入限值。

D. 確保所有控制棒均在個別棒位指示及棒組計數值之間的容許誤差(allowable tolerance)內，並提供較為均勻的軸向通率分佈。

答案：A.

科目： 192005
知能類：K1.09 [2.8/3.0]
序號： P656

The purposes of using control rod bank overlap are to...

A. provide a more uniform axial power distribution and to provide a more uniform differential rod worth.

B. provide a more uniform differential rod worth and to provide a more uniform radial power distribution.

C. provide a more uniform radial power distribution and to maintain individual and group rod position indicators within allowable tolerances.

D. maintain individual and group rod position indicators within allowable tolerances and to provide a more uniform axial power distribution.

ANSWER: A.

重疊控制棒組的目的為……

A. 提供較為均勻的軸向功率分佈與微分控制棒本領。

B. 提供較為均勻的微分控制棒本領與徑向功率分佈。

C. 提供較為均勻的徑向功率分佈，而且讓單一及整組控制棒的棒位指示維持在容許誤差內。

D. 讓單一及整組控制棒的棒位指示維持在容許誤差內，而且提供較為均勻的軸向功率分佈。

答案：A.

科目： 192005
知能類：K1.09 [2.8/3.0]
序號： P1156

One purpose of using control rod bank/group overlap is to...

A. ensure adequate shutdown margin.

B. provide a more uniform differential rod worth.

C. allow dampening of xenon-induced flux oscillation.

D. ensure control rod insertion limits are not exceeded.

ANSWER: B.

重疊控制棒組的目的之一為……

A. 確保足夠的停機餘裕。

B. 提供較為均勻的微分控制棒本領。

C. 得以抑制(dampen)氙毒引發的通率振盪。

D. 確保不超出控制棒插入限值。

答案：B.

科目： 192005
知能類：K1.10 [3.0/3.3]
序號： P455

Which one of the following describes why most of the power is produced in the lower half of a nuclear reactor core that has been operating at 100% power for several weeks with all control rods withdrawn at the beginning of core life?

A. Xenon concentration is lower in the lower half of the core.

B. The moderator to fuel ratio is lower in the lower half of the core.

C. The fuel loading in the lower half of the core contains a higher U-235 enrichment.

D. The moderator temperature coefficient of reactivity is adding less negative reactivity in the lower half of the core.

ANSWER: D.

一部核子反應器以 100%功率運轉數週，所有控制棒於爐心壽命初期抽出。請問大部分功率都從爐心下半部產生的原因為何？

A. 爐心下半部的氙毒濃度較低。

B. 爐心下半部的緩和劑-燃料比較低。

C. 爐心下半部所裝的燃料含有較濃的 U-235。

D. 緩和劑溫度係數加入爐心下半部的負反應度較小。

答案：D.

科目： 192005
知能類：K1.10 [3.0/3.3]
序號： P1357

A nuclear reactor is operating at 75% power at the middle of core life. Which one of the following actions will cause the greatest shift in reactor power distribution toward the top of the core? (Assume control rods remain fully withdrawn.)

A. Decrease reactor power by 25%.

B. Decrease reactor coolant boron concentration by 10 ppm.

C. Decrease average reactor coolant temperature by 5°F.

D. Decrease reactor coolant system operating pressure by 15 psia.

ANSWER: A.

一部處於爐心壽命中期的核子反應器以 75%功率運轉。下列哪項動作將導致反應器功率分佈移向爐心頂部的情況最嚴重？(假設控制棒維持在完全抽出的狀態)

A. 反應器功率降低 25%。

B. 反應器冷卻水硼濃度降低 10 ppm。

C. 反應器冷卻水平均溫度降低 5°F。

D. 反應器冷卻水系統的運轉壓力降低 15 psia。

答案：A.

科目： 192005
知能類：K1.10 [3.0/3.3]
序號： P2656

A nuclear reactor has been operating at 100% power for 3 weeks, with all control rods fully withdrawn, shortly after a refueling outage. Which one of the following describes why most of the power is being produced in the lower half of the core?

A. The fuel loading in the lower half of the core contains a higher U-235 enrichment.

B. Reactor coolant boron is adding more negative reactivity in the upper half of the core.

C. There is a greater concentration of Xe-135 in the upper half of the core.

D. The moderator temperature coefficient of reactivity is adding more negative reactivity in the upper half of the core.

ANSWER: D.

一部核子反應器以 100%功率運轉三週，所有控制棒在剛完成更換燃料大修後完全抽出。下列何者說明了大部分功率都在爐心下半部產生的原因？

A. 爐心下半部所裝的燃料含有較濃的 U-235。

B. 反應器冷卻水所含的硼在爐心上半部加入較大的負反應度(more negative reactivity)。

C. 爐心上半部的 Xe-135 濃度較高。

D. 緩和劑溫度係數在爐心上半部加入較大的負反應度(more negative reactivity)。

答案：D.

科目： 192005
知能類：K1.11 [2.8/3.2]
序號： P1157

If core quadrant power distribution (sometimes referred as quadrant power tilt or azimuthal tilt) is maintained within design limits, which one of the following conditions is most likely?

A. Axial power distribution is within design limits.

B. Radial power distribution is within design limits.

C. Nuclear instrumentation is indicating within design accuracy.

D. Departure from nucleate boiling ratio is within design limits.

ANSWER: B.

如果爐心的象限功率分佈(有時稱為象限功率傾斜或方位傾斜)維持在設計限值內，下列哪項情況最有可能發生？

A. 軸向功率分佈位於設計限值內。

B. 徑向功率分佈位於設計限值內。

C. 核能儀器指示值位於設計精度內。

D. 偏離核沸騰比位於設計限值內。

答案：B.

科目： 192005
知能類：K1.12 [2.9/3.1]
序號： P255

A comparison of the heat flux in the hottest coolant channel to the average heat flux in the core describes...

A. a core correction calibration factor.

B. a hot channel/peaking factor.

C. a heat flux normalizing factor.

D. an axial/radial flux deviation factor.

ANSWER: B.

最熱冷卻水通道的熱通率，與爐心平均熱通率的比值為……

A. 爐心修校因數(core correction calibration factor)。

B. 高熱通道/尖峰因數。

C. 熱通率歸一化因數(normalizing factor)。

D. 軸向/徑向通率偏差因數。

答案：B.

科目： 192005
知能類：K1.12 [2.9/3.1]
序號： P256

A nuclear reactor has been taken critical following a refueling outage and is currently at the point of adding heat during a normal reactor startup. Which one of the following describes the axial power distribution in the core as power is increased to 10% by control rod withdrawal? (Neglect reactivity effects of reactor coolant temperature change.)

A. Shifts toward the bottom of the core

B. Shifts toward the top of the core

C. Shifts away from the center toward the top and bottom of the core

D. Shifts away from the top and bottom toward the center of the core

ANSWER: B.

一部核子反應器於更換燃料大修後達到臨界，目前處於正常啟動期間的加熱起始點。下列何者說明了抽出控制棒而提高功率至 10%時，爐心的軸向功率分佈為何？(忽略反應器冷卻水溫度變化的反應度效應)

A. 朝爐心底部移動。

B. 朝爐心頂部移動。

C. 離開爐心中間部分，朝爐心頂部與底部移動。

D. 離開爐心頂部與底部，朝爐心中央移動。

答案：B.

科目： 192005
知能類：K1.12 [2.9/3.1]
序號： P355

By maintaining the radial and axial core power distribution within prescribed limits, the operator is assured that _____ will remain within acceptable limits.

A. power density (kW/foot) and departure from nucleate boiling ratio (DNBR)

B. DNBR and shutdown margin

C core delta-T and power density (kW/foot)

D. shutdown margin and core delta-T

ANSWER: A.

運轉員將徑向與軸向爐心功率分佈維持在指定限值內，就能確保_____亦將維持在可接受的限值內。

A. 功率密度(kW/foot)與偏離核沸騰比(DNBR)。

B. DNBR 與停機餘裕。

C. 爐心 ΔT 與功率密度(kW/foot)。

D. 停機餘裕與爐心 ΔT。

答案：A.

科目： 192005
知能類：K1.13 [2.8/3.2]
序號： P3156

Consider a nuclear reactor core with four quadrants: A, B, C, and D. The reactor is operating at steady state 90% power when a fully withdrawn control rod in quadrant C drops to the bottom of the core. Assume that no operator actions are taken and reactor power stabilizes at 88%.

How are the maximum upper and lower core power tilt values (sometimes called quadrant power tilt ratio or azimuthal power tilt) affected?

A. Upper core value decreases while lower core value increases.

B. Upper core value increases while lower core value decreases.

C. Both upper and lower core values decrease.

D. Both upper and lower core values increase.

ANSWER: D.

設想核子反應器爐心有四象限：分別為 A、B、C 與 D。該反應器以 90%功率穩態運轉時，象限 C 有一完全抽出的控制棒掉至爐心底部。假設運轉員沒有採取行動，反應器功率則穩定在 88%。

請問爐心上下的最大功率傾斜值(有時稱為象限功率傾斜比或方位功率傾斜)受到何種影響？

A. 爐心上方數值降低，下方數值則增加。

B. 爐心上方數值增加，下方數值則降低。

C. 爐心上下數值都降低。

D. 爐心上下數值都增加。

答案：D.

科目： 192005
知能類：K1.14 [3.2/3.5]
序號： P356 (B358)

A nuclear reactor is operating at equilibrium full power when a single control rod fully inserts (from the fully withdrawn position). Reactor power is returned to full power with the control rod still fully inserted.

Compared to the initial axial neutron flux shape, the current flux shape will have a...

A. minor distortion, because a fully inserted control rod has zero reactivity worth.

B. minor distortion, because the fully inserted control rod is an axially uniform poison.

C. major distortion, because the upper and lower core halves are loosely coupled.

D. major distortion, because power production along the length of the rod drastically decreases.

ANSWER: B.

一部核子反應器在平衡全功率下運轉時，一控制棒(從完全抽出位置)被完全插入。反應器功率在該控制棒仍完全插入下，回復到全功率。

與初期軸向中子通率分佈相比，目前的通率分佈將……

A. 輕微扭曲，因為完全插入控制棒的本領為零。

B. 輕微扭曲，因為完全插入控制棒是一軸向均勻毒素。

C. 嚴重扭曲，因為爐心上下兩部分鬆散耦合。

D. 嚴重扭曲，因為沿著控制棒長度的功率產生大幅減少。

答案：B.

科目： 192005
知能類：K1.14 [3.2/3.5]
序號： P956

After a control rod is fully inserted (from the fully withdrawn position), the effect on the axial flux shape is minimal. This is because...

A. the differential rod worth is constant along the length of the control rod.

B. the fully inserted control rod is an axially uniform poison.

C. a control rod only has reactivity worth if it is moving.

D. a variable poison distribution exists throughout the length of the control rod.

ANSWER: B.

將原本完全抽出的控制棒完全插入後，軸向通率分佈受到的影響最低。這是因為……

A. 沿著控制棒全長的微分控制棒本領均相同。

B. 完全插入的控制棒為軸向均勻毒素。

C. 控制棒唯有在移動時才具反應度本領。

D. 控制棒全長都有不等的毒素分佈。

答案：B.

科目： 192005
知能類：K1.15 [3.4/3.9]
序號： P57

Why are the control rod insertion limits power dependent?

A. Power defect increases as power increases.

B. Control rod worth decreases as power increases.

C. Doppler (fuel temperature) coefficient decreases as power increases.

D. Moderator temperature coefficient increases as power increases.

ANSWER: A.

控制棒插入限值為何隨著功率而異？

A. 功率欠缺(power defect)隨著功率增加而增加。

B. 控制棒本領隨著功率增加而減少。

C. 都卜勒(燃料溫度)係數隨著功率增加而降低。

D. 緩和劑溫度係數隨著功率增加而增加。

答案：A.

科目： 192005
知能類：K1.15 [3.4/3.9]
序號： P1055

Control rod insertion limits are established for power operation because excessive rod insertion will...

A. adversely affect core power distribution.

B. generate excessive liquid waste due to dilution.

C. cause reduced control rod lifetime.

D. cause unacceptable fast and thermal neutron leakage.

ANSWER: A.

在功率運轉時建立控制棒插入限值，其用意在於控制棒若插入過深……

A. 將對爐心功率分佈造成負面影響。

B. 將因稀釋而產生過多液態廢料。

C. 將造成控制棒使用壽命縮短。

D. 將造成快中子與熱中子的洩漏量不符要求。

答案：A.

科目： 192005
知能類：K1.15 [3.4/3.9]
序號： P1456

Control rod insertion limits ensure that control rods will be more withdrawn as reactor power _____ to compensate for the change in _____.

A. increases; xenon reactivity

B. decreases; xenon reactivity

C. increases; power defect

D. decreases; power defect

ANSWER: C.

建立控制棒插入限值，能確保在反應器功率_____時，將進一步抽出控制棒以彌補_____的變化。

A. 增加；氙毒反應度

B. 降低；氙毒反應度

C. 增加；功率欠缺(power defect)

D. 降低；功率欠缺

答案：C.

科目： 192005
知能類：K1.15 [3.4/3.9]
序號： P1757

Why are control rod insertion limits established for power operation?

A. To minimize the worth of a postulated dropped control rod.

B. To maintain a negative moderator temperature coefficient in the reactor.

C. To provide adequate shutdown margin after a reactor trip.

D. To ensure sufficient positive reactivity is available to compensate for the remaining power defect.

ANSWER: C.

在功率運轉時建立控制棒插入限值的原因何在？

A. 將假定(postulated)掉落的控制棒本領降至最低。

B. 維持反應器的緩和劑溫度係數為負值。

C. 在反應器急停後，提供足夠的停機餘裕。

D. 確保有足夠的正反應度以彌補剩餘的功率欠缺量。

答案：C.

科目： 192005
知能類：K1.16 [2.8/3.1]
序號： P557

A nuclear reactor has been operating at 80% power for four weeks with the controlling rod group inserted 10% from the fully withdrawn position.

Which one of the following will be most significantly affected by inserting the controlling group an additional 5%? (Assume reactor power does not change.)

A. Total xenon reactivity

B. Radial power distribution

C. Quadrant (azimuthal) power distribution

D. Axial power distribution

ANSWER: D.

一部核子反應器以 80%功率運轉 4 週，此時的控制棒組從完全抽出位置插入 10%。

若將控制棒組再插入 5%，下列何者受到的影響最顯著？(假設反應器功率沒有改變)

A. 氙毒的總反應度。

B. 徑向功率分佈。

C. 象限(方位)功率分佈。

D. 軸向功率分佈。

答案：D.

科目： 192005
知能類：K1.16 [2.8/3.1]
序號： P657

A nuclear reactor is operating at 80% power during a load decrease to 60% when a control rod becomes stuck during insertion of the rest of its group. If group control rod insertion continues, which of the following will be adversely affected? (Assume the stuck control rod is trippable.)

A. Power distribution and shutdown margin

B. Shutdown margin and power defect

C. Power defect and critical heat flux

D. Critical heat flux and power distribution

ANSWER: D.

一部核子反應器以 80%功率運轉降載至 60%的過程中，有一控制棒於插入同組的其他控制棒時卡住。如果繼續插入控制棒組，下列哪一選項將受到不良影響？(假設卡住的控制棒仍可跳脫)

A. 功率分佈與停機餘裕。

B. 停機餘裕與功率欠缺。

C. 功率欠缺與臨界熱通率(critical heat flux)。

D. 臨界熱通率與功率分佈。

答案：D.

科目： 192005
知能類：K1.16 [2.8/3.1]
序號： P1457

A nuclear reactor is operating at 75% power. Assuming reactor power does not change, which one of the following compares the effects of dropping a center control rod to the effects of partially inserting (50%) the same control rod?

A. A dropped rod causes a greater change in shutdown margin.

B. A dropped rod causes a smaller change in shutdown margin.

C. A dropped rod causes a greater change in axial power distribution.

D. A dropped rod causes a greater change in radial power distribution.

ANSWER: D.

一部核子反應器以 75%功率運轉。假設反應器功率沒有改變，比較一中央控制棒掉落與同一控制棒插入一半(50%)的效應時，下列何者為真？

A. 控制棒掉落造成的停機餘裕變化較大。

B. 控制棒掉落造成的停機餘裕變化較小。

C. 控制棒掉落造成的軸向功率分佈變化較大。

D. 控制棒掉落造成的徑向功率分佈變化較大。

答案：D.

科目： 192005
知能類：K1.16 [2.8/3.1]
序號： P1657

A nuclear reactor is operating at 75% power with all control rods fully withdrawn. Assuming reactor power does not change, which one of the following compares the effects of dropping (full insertion) a single center control rod to the effects of partially inserting (50%) the same control rod?

A. A partially inserted rod causes a greater change in axial power distribution.

B. A partially inserted rod causes a greater change in radial power distribution.

C. A partially inserted rod causes a greater change in shutdown margin.

D. A partially inserted rod causes a smaller change in shutdown margin.

ANSWER: A.

一部核子反應器以 75%功率運轉，所有控制棒都完全抽出。假設反應器功率沒有改變，比較一中央控制棒掉落(完全插入)與同一控制棒插入一半(50%)的效應時，下列何者為真？

A. 控制棒插入一半造成的軸向功率分佈變化較大。

B. 控制棒插入一半造成的徑向功率分佈變化較大。

C. 控制棒插入一半造成的停機餘裕變化較大。

D. 控制棒插入一半造成的停機餘裕變化較小。

答案：A.

科目： 192005
知能類：K1.16 [2.8/3.1]
序號： P2157

A nuclear reactor is operating at 75% power with all control rods fully withdrawn. Assuming reactor power does not change, which one of the following compares the effects of dropping (full insertion) a single center control rod to the effects of partially inserting (50%) the same control rod?

A. A dropped rod causes a smaller change in axial power distribution.

B. A dropped rod causes a smaller change in radial power distribution.

C. A dropped rod causes a smaller change in shutdown margin.

D. A dropped rod causes a greater change in shutdown margin.

ANSWER: A.

一部核子反應器以 75%功率運轉，所有控制棒都完全抽出。假設反應器功率沒有改變，比較一中央控制棒掉落(完全插入)與同一控制棒插入一半(50%)的效應時，下列何者為真？

A. 控制棒掉落造成的軸向功率分佈變化較小。

B. 控制棒掉落造成的徑向功率分佈變化較小。

C. 控制棒掉落造成的停機餘裕變化較小。

D. 控制棒掉落造成的停機餘裕變化較大。

答案：A.

科目： 192005
知能類：K1.16 [2.8/3.1]
序號： P2257

A nuclear reactor is operating at 85% power with all control rods fully withdrawn. Assuming reactor power does not change, which one of the following compares the effects of partially inserting (50%) a single center control rod to the effects of dropping (full insertion) the same control rod?

A. A partially inserted rod causes a smaller change in axial power distribution.

B. A partially inserted rod causes a smaller change in radial power distribution.

C. A partially inserted rod causes a greater change in shutdown margin.

D. A partially inserted rod causes a smaller change in shutdown margin.

ANSWER: B.

一部核子反應器以 75%功率運轉，所有控制棒都完全抽出。假設反應器功率沒有改變，比較一中央控制棒插入一半(50%)與同一控制棒(完全插入)掉落的效應時，下列何者為真？

A. 控制棒插入一半造成的軸向功率分佈變化較小。

B. 控制棒插入一半造成的徑向功率分佈變化較小。

C. 控制棒插入一半造成的停機餘裕變化較大。

D. 控制棒插入一半造成的停機餘裕變化較小。

答案：B.

科目： 192005
知能類：K1.16 [2.8/3.1]
序號： P2457

A nuclear reactor is operating at 100% power at the beginning of a fuel cycle with all control rods fully withdrawn. Assuming the reactor does not trip, which one of the following compares the effects of dropping a control rod in the center of the core to dropping an identical control rod at the periphery of the core?

A. Dropping a center control rod rod causes a greater change in shutdown margin.

B. Dropping a center control rod causes a smaller change in shutdown margin.

C. Dropping a center control rod causes a greater change in axial power distribution.

D. Dropping a center control rod causes a greater change in radial power distribution.

ANSWER: D.

一部核子反應器以 100%功率運轉，該反應器處於燃料週期初期，所有控制棒都完全抽出。假設反應器沒有急停，比較控制棒從爐心中央掉落與相同控制棒從爐心周圍掉落的效應時，下列何者為真？

A. 從中央掉落的控制棒造成的停機餘裕變化較大。

B. 從中央掉落的控制棒造成的停機餘裕變化較小。

C. 從中央掉落的控制棒造成的軸向功率分佈變化較大。

D. 從中央掉落的控制棒造成的徑向功率分佈變化較小。

答案：D.

科目： 192005
知能類：K1.16 [2.8/3.1]
序號： P2556

A nuclear reactor has been operating at 80% power for four weeks with the controlling rod group inserted 15% from the fully withdrawn position.

Which one of the following will be significantly affected by withdrawing the controlling rod group an additional 5%? (Assume reactor power does not change.)

A. Total xenon reactivity

B. Axial power distribution

C. Radial power distribution

D. Quadrant (azimuthal) power distribution

ANSWER: B.

一部核子反應器以 80%功率運轉 4 週，此時將全出的控制棒組插入 15%。

若續將控制棒組抽出 5%，下列何者將受到顯著影響？(假設反應器功率維持不變)

A. 氙毒的總反應度。

B. 軸向功率分佈。

C. 徑向功率分佈。

D. 象限(方位)功率分佈。

答案：B.

科目： 192005
知能類：K1.16 [2.8/3.1]
序號： P2857

A nuclear reactor is operating at steady state full power with all control rods fully withdrawn when one control rod at the core periphery falls completely into the core. Assuming no reactor trip and no operator action, which one of the following will have changed significantly as a result of the dropped rod?

A. Axial power distribution only

B. Axial power distribution and shutdown margin

C. Radial power distribution only

D. Radial power distribution and shutdown margin

ANSWER: C.

一部核子反應器以全功率穩態運轉，所有控制棒均完全抽出，此時，一位於爐心周圍的控制棒完全掉入爐心。假設反應器沒有急停，運轉員也沒有採取行動，控制棒掉落將對下列何者造成顯著變化？

A. 僅有軸向功率分佈。

B. 軸向功率分佈與停機餘裕。

C. 僅有徑向功率分佈。

D. 徑向功率分佈與停機餘裕。

答案：C.