科目： 291005
知能類： K1.01 [2.6/2.6]
序號： B229

If a locked rotor occurs on an operating motor-driven pump, motor amps will...
A. decrease due to the decreased pump flow.
B. decrease due to the decreased rotor speed.
C. increase due to the decreased pump flow.
D. increase due to the decreased rotor speed.
ANSWER: D.

若在一運轉中之馬達驅動泵中發生轉子鎖死，則馬達安培數將會
A. 下降，因為泵流量減少
B. 下降，因為轉子速度下降
C. 增加，因為泵流量減少
D. 增加，因為轉子速度下降
答案： D.

科目： 291005
知能類： K1.01 [2.6/2.6]
序號： B1026

A motor-driven centrifugal pump exhibited indications of pump failure while being started. Which one of the following pairs of observations indicate that the pump failure is a sheared impeller shaft?
A. Excessive duration of high starting current and motor breaker trips
B. Excessive duration of high starting current and no change in system flow rate
C. Lower than normal running current and motor breaker trips
D. Lower than normal running current and no change in system flow rate
ANSWER: D.

一馬達驅動之離心泵在啟動時發生故障。下列何組項觀察指出故障原因係因轉子葉片斷裂所造成？
A. 高啟動電流時間維持過長，馬達斷路器(breaker)跳脫
B. 高啟動電流時間維持過長，系統流量無變化
C. 較正常運轉電流為低，馬達斷路器(breaker)跳脫
D. 較正常運轉電流為低，系統流量無變化
答案： D.

科目： 291005
知能類： K1.01 [2.6/2.6]
序號： B1326 (P2127)

A cooling water pump is being driven by an ac induction motor. Which one of the following describes how and why pump motor current will change if the pump shaft seizes?
A. Decreases due to decreased pump flow
B. Decreases due to increased counter electromotive force
C. Increases due to decreased pump flow
D. Increases due to decreased counter electromotive force
ANSWER: D.

一冷卻水泵由一交流感應馬達驅動，若泵轉軸卡住，則泵馬達電流改變的方式及其原因，下列何者敘述正確？
A. 下降，因為泵流體減少
B. 下降，因為逆向電動勢增加
C. 上升，因為泵流體減少
D. 上升，因為逆向電動勢減少
答案： D.

科目： 291005
知能類： K1.01 [2.6/2.6]
序號： B1726

A cooling water pump is being driven by an ac induction motor. Which one of the following describes how and why pump motor current will change if the pump shaft shears?
A. Decreases due to decreased pump work
B. Decreases due to decreased counter electromotive force
C. Increases due to increased pump work
D. Increases due to decreased counter electromotive force
ANSWER: A.

一冷卻水泵由一交流感應馬達驅動，若泵轉軸斷裂(shears)，則泵馬達電流改變的方式及其原因，下列何者敘述正確？
A. 下降，因為泵作功減小
B. 下降，因為逆向電動勢減小
C. 上升，因為泵作功增加
D. 上升，因為反電動勢減小
答案： A.

科目： 291005
知能類： K1.01 [2.6/2.6]
序號： B2626 (P1427)

A typical motor-driven cooling water pump is operating normally when it experiences a locked rotor. How will pump ammeter indication respond?

A. Decreases immediately to zero due to breaker trip
B. Decreases immediately to no-load motor amps
C. Increases immediately to many times running current, then decreases to no-load motor amps
D. Increases immediately to many times running current, then decreases to zero upon breaker trip

ANSWER: D.

一普通由馬達驅動之冷卻水泵於運轉正常時，發生轉子鎖死，則泵安培計將會如何反應？

A. 因為斷路器(breaker)跳脫而立即下降至零
B. 立即下降至空載馬達安培數
C. 立即增加至目前電流的數倍，然後下降至空載馬達安培數
D. 立即增加至目前電流的數倍，然後因為斷路器(breaker)跳脫而立即下降至零

答案： D.

科目： 291005
知能類： K1.01 [2.6/2.6]
序號： B2826 (P3127)

A motor-driven centrifugal pump exhibits indications of pump failure while being started in an idle cooling water system. Assuming the pump motor breaker does not trip, which one of the following pairs of indications would be observed if the pump failure is a locked impeller shaft?

A. Lower than normal running current with zero system flow rate
B. Lower than normal running current with a fraction of normal system flow rate
C. Excessive duration of starting current peak with zero system flow rate
D. Excessive duration of starting current peak with a fraction of normal system flow rate

ANSWER: C.

一用於閒置之冷卻水系統的馬達驅動之離心泵，在啟動時發生故障。假設泵馬達斷路器(breaker)並沒有跳脫，若故障是因葉片轉軸鎖死，則將會觀察到下列何項現象？

A. 低於正常運轉電流，系統流量為零
B. 低於正常運轉電流，流量為正常系統流量的一部份
C. 啟動電流峰值時間過長，系統流量為零
D. 啟動電流峰值時間過長，流量為正常系統流量的一部份

答案： C.

科目： 291005
知能類： K1.02 [2.6/2.7]
序號： B1126 (P1528)

Continuous operation of a motor at rated load with a loss of required cooling to the motor windings will eventually result in...
A. cavitation of the pumped fluid.
B. failure of the motor overcurrent protection devices.
C. breakdown of the motor insulation and electrical grounds.
D. phase current imbalance in the motor and overspeed trip actuation.
ANSWER: C.

連續運轉於額定負載之馬達，於喪失馬達線圈所需要之冷卻時，將會導致
A. 泵流體產生孔蝕現象
B. 馬達過電流保護設備故障
C. 馬達絕緣故障與電氣接地
D. 馬達之相間電流不平衡與超速跳脫動作
答案： C.

科目： 291005
知能類： K1.02 [2.6/2.7]
序號： B1526 (P1028)

Which one of the following will result from prolonged operation of an ac motor with excessively high stator temperatures?
A. Decreased electrical current demand due to reduced counter electromotive force
B. Increased electrical current demand due to reduced counter electromotive force
C. Decreased electrical resistance to ground due to breakdown of winding insulation
D. Increased electrical resistance to ground due to breakdown of winding insulation
ANSWER: C.

一交流馬達在過高定子溫度下長時間運轉，會導致下列何現象產生？
A. 因為反(counter)電動勢減小使電流需求減小
B. 因為反(counter)電動勢減小使電流需求增加
C. 因為線圈絕緣故障使接地電阻減小
D. 因為線圈絕緣故障使接地電阻增加
答案： C.

科目： 291005
知能類： K1.02 [2.6/2.7]
序號： B1927 (P528)

Which one of the following will provide motor protection against electrical damage caused by gradual bearing degradation?
A. Thermal overload device
B. Overcurrent trip relay
C. Underfrequency relay
D. Undervoltage device
ANSWER: A.

將對於因軸承逐漸退化而產生之電力損害，下列何者將可提供馬達保護？
A. 熱過載電驛
B. 過電流跳脫電驛
C. 低頻電驛
D. 低壓電驛
答案： A.

科目： 291005
知能類： K1.03 [2.6/2.7]
序號： B2228 (P1128)

If the voltage supplied by an ac generator to an isolated electrical system with a power factor of 1.0 is held constant while real load (kW) is increased, the current supplied by the generator will increase in direct proportion to the _____ of the change in real load. (Assume power factor remains constant at 1.0.)
A. square root
B. amount
C. square
D. cube
ANSWER: B.

若由一交流發電機對一獨立電力系統所提供之電壓，在實際負載(kW)增加時維持固定，則由發電機所提供之電流將會正比於實際負載變化的_____而增加。
A. 平方根
B. 量
C. 平方
D. 立方
答案： B.

科目： 291005
知能類： K1.03 [2.6/2.7]
序號： B2327

A main generator that is connected to an infinite power grid has the following generator indications:

100 MWe
0 MVAR
2,900 amps
20,000 volts

If MVAR does not change while real load is increased to 200 MWe, the current supplied by the generator will increase to approximately...
A. 11,600 amps
B. 8,200 amps
C. 5,800 amps
D. 4,100 amps
ANSWER: C.

一主發電機連接於一無窮大電網具有下列發電機參數：

100 MWe
0 MVAR
2,900 amps
20,000 volts

若實際負載增加到 200MWe，但 MVAR沒有變化，則由發電機所提供之電流將增加到約
A. 11,600 安培
B. 8,200 安培
C. 5,800 安培
D. 4,100 安培
答案： C.

科目： 291005
知能類： K1.03 [2.6/2.7]
序號： B3227 (P3229)

A cooling water system is being returned to service following maintenance on the two identical centrifugal cooling water pumps. The two pumps take suction from a common suction header and discharge to a common discharge header. Each pump is driven by a three phase ac induction motor. Cooling water pump A was started five minutes ago to initiate flow in the cooling water system.
Cooling water pump B is about to be started in parallel alignment with pump A.
When pump B is started, which one of the following would cause the ammeter for pump B to remain off-scale high for several seconds longer than usual before returning to normal running current indication?
A. The pump packing was removed and not reinstalled.
B. The pump was initially rotating in the reverse direction.
C. Two phases of the motor windings were electrically switched.
D. The coupling between the motor and the pump was removed and not reinstalled.
ANSWER: B.

一冷卻水系統在維修兩相同之離心冷卻水泵之後恢復使用，此兩泵從一共同的給水集管取水，同時排放至一共同的排水集管。每一泵由一三相交流感應馬達帶動。
冷卻水泵A五分鐘前啟動，開動冷卻水系統水流。
冷卻水泵B與泵A並連，且即將要啟動。當泵B啟動時，下列何者將會導致泵B之安培計，會在回復正常運作電流指示之前，維持好幾秒的超出範圍高值？
A. 泵迫緊(packing)被移除，但並未重新安裝
B. 泵起動時以反向旋轉
C. 馬達線圈的兩相位被電力調換
D. 馬達與泵間的聯結器(coupling)被移除，且並未重新安裝
答案： B.

科目： 291005
知能類： K1.04 [2.7/2.7]
序號： B27

Given the following conditions for a variable-speed motor-driven centrifugal pump:

Flow rate = 2000 gpm

Motor current = 100 amperes

If the flow rate is increased to 4000 gpm, which one of the following motor current values most closely approximates the actual value?

A. 200 amperes
B. 400 amperes
C. 800 amperes
D. 1600 amperes
ANSWER: C.

對一變速馬達驅動離心泵，有下列數據：

流量＝2000 gpm

馬達電流＝100 安培

若流量增加至 4000 gpm ， 下列那一項馬達電流值最接近實際值？

A. 200 安培
B. 400安培
C. 800安培
D. 1600安培
答案： C.

科目： 291005
知能類： K1.04 [2.7/2.7]
序號： B227 (P223)

A centrifugal pump is operating with a flow rate of 3,000 gpm and a current requirement of 200 amps. If the pump speed is reduced such that the flow rate is 2,000 gpm, what is the final current requirement at the new lower speed? (Assume a constant motor voltage.)
A. 59 amperes
B. 89 amperes
C. 133 amperes
D. 150 amperes
ANSWER: A.

一離心泵在流量 3000 gpm 以及電流需求 200安培下運轉。若泵轉速減小使得流量成為 2000 gpm， 則新的較低流量的穩定電流需求為
A. 59 安培
B. 89安培
C. 133安培
D. 150安培
答案： A.

科目： 291005
知能類： K1.04 [2.7/2.7]
序號： B326 (P328)

A centrifugal pump is operating with the following parameters:

Speed = 1,800 rpm
Current = 40 amperes
Pump head = 20 psi
Pump flow rate = 400 gpm

Which one of the following will be the new value of pump head and current if the speed is increased to 2,000 rpm?

A. 22 psi, 44 amps
B. 25 psi, 49 amps
C. 22 psi, 49 amps
D. 25 psi, 55 amps
ANSWER: D.

一離心泵以下列參數運轉

轉速＝1，800 rpm
電流＝40安培
泵水頭＝20psi
泵流量＝400gpm

若轉速增加到2000rpm，則下列何者將會是新的泵水頭值及電流值？

A. 22 psi， 44安培
B. 25 psi， 49安培
C. 22 psi， 49安培
D. 25 psi， 55安培
答案： D.

科目： 291005
知能類： K1.04 [2.7/2.7]
序號： B1228

A centrifugal pump is operating at 600 rpm with the following parameters:

Current = 100 amperes

Pump head = 50 psid

Pump flow rate = 880 gpm

What will be the approximate value of pump head if pump speed is increased such that the pump now draws 640 amperes?

A. 93 psid

B. 126 psid

C. 173 psid

D. 320 psid

ANSWER: C.

一離心泵以轉速600rpm及下列參數運轉：

電流＝100安培

泵水頭＝50 psid

泵流量＝880gpm

如果泵轉速增加使得馬達電流成為640安培，則泵水頭約為

A. 93 psid

B. 126 psid

C. 173 psid

D. 320 psid

答案： C.

科目： 291005
知能類： K1.04 [2.7/2.7]
序號： B1626 (P3129)

A multi-speed motor-driven centrifugal pump is operating with the following parameters:

Motor current = 27 amps
Pump head = 50 psi
Pump flow rate = 880 gpm

Which one of the following will be the approximate new value of pump head if pump speed is increased such that the motor current is now 64 amperes?

A. 89 psi
B. 119 psi
C. 211 psi
D. 281 psi
ANSWER: A.

一多速馬達驅動離心泵以下列參數運轉：

馬達電流＝27安培
泵水頭＝50psi
泵流量＝880gpm

如果泵轉速增加使得馬達電流成為64安培，則泵水頭約為

A. 89 psi
B. 119 psi
C. 211 psi
D. 281 psi
答案： A.

科目： 291005
知能類： K1.04 [2.7/2.7]
序號： B2030 (P428)

A variable-speed centrifugal pump is operating at 600 rpm with the following parameters:

Pump motor current = 10 amperes
Pump head = 50 psi
Pump flow rate = 200 gpm

What will be the new value of pump head if the pump speed is increased such that the current requirements are now 640 amperes?

A. 400 psi
B. 600 psi
C. 800 psi
D. 1,200 psi
ANSWER: C.

一變速離心泵在轉速600rpm下以下列參數運轉：

泵馬達電流＝10安培
泵水頭＝50psi
泵流量＝200gpm

如果泵轉速增加使得所需電流成為640安培，則泵水頭約為

A. 400 psi
B. 600 psi
C. 800 psi
D. 1，200 psi
答案： C.

科目： 291005
知能類： K1.04 [2.7/2.7]
序號： B2126 (P1530)

A variable-speed centrifugal pump is operating with the following parameters:

Speed = 1,200 rpm
Current = 40 amperes
Pump head = 20 psi
Pump flow rate = 400 gpm

Which one of the following contains the approximate values of pump head and current if pump speed is increased to 1,600 rpm?

A. 25 psi, 55 amps
B. 25 psi, 95 amps
C. 36 psi, 55 amps
D. 36 psi, 95 amps
ANSWER: D.

一變速離心泵以下列參數運轉：

轉速＝1，200 rpm
電流＝40安培
泵水頭＝20psi
泵流量＝400gpm

若轉速增加到1，600rpm，則下列何者將會是新的泵水頭值及電流值？

A. 25 psi， 55 安培
B. 25 psi， 95安培
C. 36 psi， 55安培
D. 36 psi， 95安培
答案： D.

科目： 291005
知能類： K1.04 [2.7/2.7]
序號： B2229 (P2130)

A centrifugal pump is operating at 600 rpm with the following parameters:

Motor current = 100 amperes

Pump head = 50 psid

Pump flow rate = 880 gpm

Which one of the following will be the approximate value of pump head if pump speed is increased to 1200 rpm?

A. 71 psid

B. 100 psid

C. 141 psid

D. 200 psid

ANSWER: D.

一離心泵在轉速600rpm下以下列參數運轉：

馬達電流＝100安培

泵水頭＝50psi

泵流量＝880gpm

若轉速增加到1，200rpm，則下列何者將會是泵水頭的新值？

A. 71 psid

B. 100 psid

C. 141 psid

D. 200 psid

答案： D.

科目： 291005
知能類： K1.04 [2.7/2.7]
序號： B2527 (P2529)

A multispeed centrifugal pump is operating with a flow rate of 1800 gpm at a speed of 3600 rpm. Which one of the following approximates the new flow rate if the pump speed is decreased to 2400 rpm?
A. 900 gpm
B. 1050 gpm
C. 1200 gpm
D. 1350 gpm
ANSWER: C.

一多速離心泵在流量 1800 gpm 以及轉速 3600 rpm 下運轉。若泵速度減小至 2400rpm，則新的流速約為
A. 900 gpm
B. 1050 gpm
C. 1200 gpm
D. 1350 gpm
答案： C.

科目： 291005
知能類： K1.04 [2.7/2.7]
序號： B2627 (P1828)

An ac motor-driven centrifugal pump is operating with a flow rate of 3,000 gpm and a motor current of 150 amps. If the pump speed is reduced such that the flow rate is 2,000 gpm, what is the approximate final motor current at the new lower speed? (Assume a constant motor voltage.)
A. 44 amperes
B. 59 amperes
C. 67 amperes
D. 100 amperes
ANSWER: A.

一交流馬達驅動之離心泵於流量3,000gpm與馬達電流150安培下運轉。若馬達轉速下降，使得流量為2,000gpm，則在此較低的新轉速下，最終之馬達電流約為（假設馬達電壓固定。）
A. 44安培
B. 59安培
C. 67安培
D. 100安培
答案： A.

科目： 291005
知能類： K1.04 [2.7/2.7]
序號： B3127 (P3130)

Which one of the following describes the relationship between the current supplied to an ac induction motor and the amount of heat generated (kW) in the motor windings?
A. Heat generation is directly proportional to the current.
B. Heat generation is proportional to the cube of the current.
C. Heat generation is proportional to the square of the current.
D. Heat generation is proportional to the square root of the current.
ANSWER: C.

下列何者為對一交流感應馬達的供應電流與馬達線圈所產生之熱量(kW)關係之描述？
A. 所生熱量正比於電流
B. 所生熱量正比於電流立方
C. 所生熱量正比於電流平方
D. 所生熱量正比於電流平方根
答案： C.

科目： 291005
知能類： K1.05 [2.6/2.7]
序號： B28 (P2229)

Which one of the following describes the motor current indications that would be observed during the start of a large ac motor-driven centrifugal pump with a closed discharge valve?

A. Current immediately increases to the full-load value and gradually decreases to the no-load value over several minutes.
B. Current rapidly increases to the no-load value over several seconds and stabilizes.
C. Current immediately increases to many times the no-load value and then rapidly decreases to the no-load value after several seconds.
D. Current immediately increases to many times the no-load value and then gradually decreases to the no-load value after several minutes.

ANSWER: C.

當出口閥關閉時，啟動一大型交流馬達驅動離心泵，下列何者為所觀察到馬達電流指示之描述？

A. 電流立即增加至全負載值，然後在數分鐘內漸漸減少至無負載值
B. 電流迅速在數秒增加至無負載值，並達到穩定
C. 電流立即增加至無負載值的數倍，然後在數秒內快速減少至無負載值
D. 電流立即增加至無負載值的數倍，然後在數分鐘內漸漸減少至無負載值

答案： C.

科目： 291005
知能類： K1.05 [2.6/2.7]
序號： B105 (P108)

The average starting current for a typical ac motor is approximately...
A. ten to fifteen times its normal running current.
B. five to seven times its normal running current.
C. two to three times its normal running current.
D. the same as its normal running current.
ANSWER: B.

一普通交流馬達之平均啟動電流約為
A. 其正常運作電流的十到十五倍
B. 其正常運作電流的五到七倍
C. 其正常運作電流的二到三倍
D. 與其正常運作電流相同
答案： B.

科目： 291005
知能類： K1.05 [2.6/2.7]
序號： B1227

Which one of the following ac motor events is characterized by maximum rotor slip and a motor current five to six times full-load current?
A. Starting of the motor
B. Ground in motor windings
C. Motor overloaded by 50%
D. Motor operating at breakdown torque
ANSWER: A.

下列何項交流馬達事件, 備具發生最大轉子滑動及5至6倍全負載電流之馬達電流等特徵現象？
A. 馬達起動
B. 馬達線圈接地
C. 馬達過載 50%
D. 馬達以崩潰(breakdown)轉矩運轉
答案： A.

科目： 291005
知能類： K1.05 [2.6/2.7]
序號： B1327 (P1827)

Which one of the following describes the motor current during the start of a typical ac motordriven centrifugal pump with a closed discharge valve?

A. Current immediately increases to the full-load value and then gradually decreases to the noload value.
B. Current immediately increases to the full-load value and then stabilizes at the full-load value.
C. Current immediately increases to many times the full-load value and then rapidly decreases to the no-load value after several seconds and then stabilizes.
D. Current immediately increases to many times the full-load value and then rapidly decreases to the full-load value after several seconds and then stabilizes.

ANSWER: C.

當出口閥關閉時，啟動一典型交流馬達驅動離心泵，下列何者為所觀察到馬達電流指示之描述？

A. 電流立即增加至全負載值，然後在數分鐘內漸漸減少至無負載值
B. 電流立即增加至全負載值，並達到穩定
C. 電流立即增加至全負載值的數倍，然後在數秒內快速減少至無負載值，並達到穩定
D. 電流立即增加至全負載值的數倍，然後在數秒內快速減少至全負載值，並達到穩定

答案： C.

科目： 291005
知能類： K1.05 [2.6/2.7]
序號： B1428 (P1929)

Which one of the following describes the typical ammeter response during a normal start of a large ac motor-driven centrifugal pump with a closed discharge valve?
A. Indication will go off scale high and then return to the no-load value.
B. Indication will go off scale high and then return to the full-load value.
C. Indication will approach full scale and then return to the no-load value.
D. Indication will approach full scale and then return to the full-load value.
ANSWER: A.

當出口閥關閉時，正常啟動一典型交流馬達驅動離心泵，下列何者為一般安培計反應之描述？
A. 指示數值將會顯示超出範圍之高值，然後回到無負載值
B. 指示數值將會顯示超出範圍之高值，然後回到全負載值
C. 指示數值將會接近最大值，然後回到無負載值
D. 指示數值將會接近最大值，然後回到全負載值
答案： A.

科目： 291005
知能類： K1.05 [2.6/2.7]
序號： B2127 (P29)

The starting current in a typical ac induction motor is much higher than the full-load running current because...

A. starting torque is much lower than running torque.
B. starting torque is much higher than running torque.
C. rotor current during start is too low to generate significant counter electromotive force (CEMF) in the stator.
D. rotor speed during start is too low to generate significant CEMF in the stator.

ANSWER: D.

一普通直流感應馬達起動電流比全負載運轉電流高許多，乃因為

A. 起動轉矩較運轉轉矩低
B. 起動轉矩較運轉轉矩高
C. 起動時之轉子電流太低，以致於無法在定子產生顯著的反電動勢(counter electromotive force)
D. 起動時之轉子轉速太低，以致於無法在定子產生顯著的反電動勢

答案： D.

科目： 291005
知能類： K1.05 [2.6/2.7]
序號： B2227 (P2230)

Two identical 4160 Vac induction motors are connectd to identical centrifugal pumps being used to provide cooling water flow in separate systems in a power plant. Each motor is rated at 1000 hp. The discharge valve for pump A is fully open and the discharge valve for pump B is fully
shut. If each motor is then started, the longest time period required to stabilize motor current will be experienced by motor _____ and the higher stable motor current will be experienced by motor _____.
A. A; A
B. A; B
C. B; A
D. B; B
ANSWER: A.

提供電廠不同系統冷卻水之兩相同4.16KV感應馬達離心泵，每具馬達額定馬力為 1000 hp，泵A之出口閥(discharge valve)為全開，而泵B之出口閥(discharge valve)為全關。若該兩馬達起動時，則須經歷較長時間方能使馬達電流穩定的是馬達_____，而能達到較高穩定馬達電流的是馬達_____。
A. A; A
B. A; B
C. B; A
D. B; B
答案： A.

科目： 291005
知能類： K1.05 [2.6/2.7]
序號： B2428 (P2430)

Which one of the following describes when the highest stator current will be experienced by an ac induction motor?
A. During motor operation at full load
B During motor operation at zero load
C. Immediately after energizing the motor
D Immediately after deenergizing the motor
ANSWER: C.

對於一交流感應馬達，其最高定子電流將會發生在何時？
A. 在馬達全負載運轉時
B. 在馬達全零載運轉時
C. 在馬達通電之後立即發生
D. 在馬達斷電之後立即發生
答案： C.

科目： 291005
知能類： K1.05 [2.6/2.7]
序號： B2528 (P2531)

Frequent starts of large motors will result in overheating of the motor windings due to high current flow caused by...
A. low electrical resistance of the motor windings.
B. an electrical short circuit between the rotor and stator.
C. high counter electromotive force at low rotor speeds.
D. windage losses between the rotor and stator.
ANSWER: A.

大型馬達頻繁起動通常會導致馬達線圈過熱，係因何者所產生的高電流所致？
A. 馬達線圈的低電阻
B. 轉子與定子間的電流短路
C. 低轉子轉速的高反電動勢(counter electromotive force)
D. 在轉子與定子間的繞組損失(windage loss)
答案： A.

科目： 291005
知能類： K1.05 [2.6/2.7]
序號： B2727 (P2730)

Two identical 4160 Vac induction motors are connected to identical centrifugal pumps in identical but separate cooling water systems. Each motor is rated at 200 hp. The discharge valve for pump A is fully shut and the discharge valve for pump B is fully open. If each motor is then started, the longest time period required to stabilize motor current will be experienced by motor _____ and the higher stable motor current will be experienced by motor _____.
A. A; A
B. A; B
C. B; A
D. B; B
ANSWER: D.

於相同但分離之冷卻水系統中之兩相同4.16KV交流感應馬達離心泵，每具馬達之馬力為 200hp，泵A之出口閥(discharge valve)為全關，而泵B之出口閥(discharge valve)為全開。若該兩具馬達起動時，則需要較長時間方能使馬達電流穩定的是馬達_____，而馬達_____將具有較高的穩定馬達電流。
A. A; A
B. A; B
C. B; A
D. B; B
答案： D.

科目： 291005
知能類： K1.05 [2.6/2.7]
序號： B2828 (P2830)

Two identical 4160 Vac induction motors are connected to identical centrifugal pumps being used to provide cooling water flow in separate identical systems in a power plant. Each motor is rated at 1000 hp. The discharge valve for pump A is fully shut and the discharge valve for pump B is fully open.
If each motor is then started, the longer time period required to stabilize motor current will be experienced by motor _____ and the higher stable motor current will be experienced by motor _____.
A. A; A
B. A; B
C. B; A
D. B; B
ANSWER: D.

提供電廠相同但分離之冷卻水系統中之兩相同4.16KV交流感應馬達離心泵，每具馬達之馬力為 1000hp，泵A之出口閥(discharge valve)為全關，而泵B之出口閥(discharge valve)為全開。若該兩具馬達起動時，則需要較長時間方能使馬達電流穩定的是馬達_____，而馬達_____將具有較高的穩定馬達電流。
A. A; A
B. A; B
C. B; A
D. B; B
答案： D.

科目： 291005
知能類： K1.05 [2.6/2.7]
序號： B2928 (P930)

Which one of the following causes starting current to be greater than running current for a typical ac induction motor?

A. The rotor does not develop maximum induced current flow until it has achieved synchronous speed.
B. After the motor starts, resistors are added to the electrical circuit to limit the running current.
C. A large amount of starting current is required to initially establish the rotating magnetic field.
D. The rotor field induces an opposing voltage in the stator that is proportional to rotor speed.

ANSWER: D.

對於一普通交流感應馬達，下列何者會導致起動電流較運轉電流為大？

A. 轉子並未產生出最大感應電流，直到達成同步速度為止。
B. 在馬達起動後，電阻被加入電路中以限制運轉電流
C. 起動電流大乃為初期建立一旋轉磁場所需
D. 轉子場在定子中感應出一與轉子轉速成正比之反相電壓

答案： D.

科目： 291005
知能類： K1.05 [2.6/2.7]
序號： B3529 (P2931)

Two identical 4160 Vac induction motors are connected to identical centrifugal pumps in identical but separate cooling water systems. Each motor is rated at 200 hp. The discharge valve for pump A is fully shut and the discharge valve for pump B is fully open. When the motors are started under these conditions, the shorter time period required to reach a stable running current will be experienced by motor _____, and the higher stable running current will be experienced by motor _____.
A. A; A
B. A; B
C. B; A
D. B; B
ANSWER: B.

於相同但分離之冷卻水系統中之兩相同4.16KV交流感應馬達離心泵，每具馬達之馬力為 200hp，泵A之出口閥(discharge valve)為全關，而泵B之出口閥(discharge valve)為全開。若該兩具馬達在上述條件下起動時，則達到穩定運轉電流需時較短的是馬達_____，而馬達_____將具有較高的穩定運轉電流。
A. A; A
B. A; B
C. B; A
D. B; B
答案： B.

科目： 291005
知能類： K1.06 [2.9/3.1]
序號： B26

For large electric motors, why must the number of starts over a period of time be limited?

A. Protect the power supply cables from insulation breakdown due to high starting current
B. Protect the motor windings from overheating
C. Prevent motor thrust-bearing damage due to lack of lubrication
D. Prevent rotor seizure due to thermal expansion of the windings

ANSWER: B.

對於大型的電動馬達，為何在一段時間內的起動次數要受到限制？

A. 保護電源供應線路不要因為高起動電流而發生絕緣故障
B. 保護馬達線圈不要過熱
C. 預防馬達止推軸承因為缺乏潤滑而受損
D. 預防轉子因為線圈的熱膨脹而鎖死

答案： B.

科目： 291005
知能類： K1.06 [2.9/3.1]
序號： B228 (P2631)

Which one of the following is the reason for limiting the number of motor starts in a given time period?
A. Minimizes pitting of contacts in the motor breaker
B. Prevents excessive torsional stresses on motor shaft
C. Prevents overheating of motor windings
D. Minimizes axial stresses on motor bearings
ANSWER: C.

下列何者是限制某段時間內馬達起動次數的原因？
A. 使馬達斷路器(breaker)之接點蝕孔(pitting)降至最低
B. 預防在馬達轉軸承受過高的扭力
C. 預防馬達線圈過熱
D. 使馬達軸承上的軸向壓力降至最低
答案： C.

科目： 291005
知能類： K1.06 [2.9/3.1]
序號： B328 (P231)

The frequency of large ac motor starts should be limited to prevent excessive...
A. torsional stresses on the motor shaft.
B. wear of pump thrust bearings.
C. arcing and degradation of motor breaker contacts.
D. heat buildup within the motor.
ANSWER: D.

大型交流馬達的起動頻率應該加以限制，乃為預防過量之
A. 馬達轉軸上之扭力
B. 泵止推軸承之磨蝕
C. 馬達斷路器(breaker)接點之電弧(arcing)及劣化(degradation)
D. 馬達內之熱量累積
答案： D.

科目： 291005
知能類： K1.06 [2.9/3.1]
序號： B928

Motor winding temperature will be reduced by...
A. increasing the reactive current flow in the stator windings.
B. limiting the number of motor starts allowed in a given time period.
C. decreasing the voltage supplied to the motor during full-load operation.
D. decreasing the number of stator poles during the start sequence.
ANSWER: B.

馬達線圈溫度應該以何種方式降低
A. 增加在定子線圈中之無效(reactive)電流
B. 限制在某段時間內馬達起動的次數
C. 在全負載運轉時，降低對於馬達之電壓供應
D. 在起動程序中，降低定子極數
答案： B.

科目： 291005
知能類： K1.06 [2.9/3.1]
序號： B1128 (P1131)

The frequency of start/stop cycles for an electrical motor is limited to prevent...
A. overheating the motor windings.
B. excessive shaft torsional stresses.
C. overheating the motor supply bus.
D. excessive cycling of the motor breaker.
ANSWER: A.

對於一電力馬達限制其起動／停止循環之頻率乃為限制
A. 馬達線圈的過熱
B. 轉軸的扭力過大
C. 馬達供應之匯流排(supply bus)過熱
D. 馬達斷路器(breaker)的過度開關
答案： A.

科目： 291005
知能類： K1.06 [2.9/3.1]
序號： B1826 (P30)

What is the primary reason for limiting the number of starts for an electric motor in a given
period of time?
A. Prevent overheating of the windings due to high starting currents.
B. Prevent overheating of the windings due to shorting within the stator.
C. Prevent rotor damage due to excessive cyclic stresses on the shaft.
D. Prevent rotor damage due to excessive axial displacement of the shaft.
ANSWER: A.

在某段時間內限制一電動馬達起動次數之主要原因為何？
A. 預防因為高起動電流而導致線圈過熱
B. 預防因為定子內的短路而導致線圈過熱
C. 預防因為轉軸承受過度循環應力而導致轉子損害
D. 預防因為轉軸過度軸向位移而導致轉子損害
答案： A.

科目： 291005
知能類： K1.06 [2.9/3.1]
序號： B1928 (P1031)

TOPIC: 291005
KNOWLEDGE: K1.06 [2.9/3.1]
QID: B1928 (P1031)
The number of starts for an electric motor in a given period of time should be limited because overheating of the _____ can occur due to the _____ counter electromotive force produced at low rotor speeds.
A. windings; high
B. windings; low
C. commutator and/or slip rings; high
D. commutator and/or slip rings; low
ANSWER: B.

對一電力馬達應限制其在某段時間內起動次數，乃因為_____的過熱導因於在低轉子轉速時所產生之_____負電動勢
A. 線圈；高
B. 線圈；低
C. 整流器與／或集電環；高
D. 整流器與／或集電環；低
答案： B.

科目： 291005
知能類： K1.06 [2.9/3.1]
序號： B3327 (P3331)

A large centrifugal pump is driven by a 200 horsepower 4.16 kV ac motor. The motor breaker control circuit contains the following protection devices: instantaneous overcurrent relay, motor thermal overload relay, control power fuses, and an anti-pumping device.
The pump had been manually started and stopped several times during a 5-minute period when the motor breaker unexpectedly tripped. In this situation, which one of the following is the most likely cause of the breaker trip?
A. Instantaneous overcurrent
B. Motor thermal overload
C. Blown control power fuse
D. Anti-pumping device actuation
ANSWER: B.

一大型之離心泵由一200hp馬力之4.16kV交流馬達驅動，此馬達斷路器(breaker)控制電路包含如下的保護設備：瞬間過電流電驛(instantaneous overcurrent relay)，馬達熱過載電驛(motor thermal overload relay)，控制電力保險絲(control power fuses)，以及反唧取設備(anti-pumping devices)。在五分鐘內此泵以手動起動，但因為馬達斷路器(breaker)意外跳脫而停止數次。於此情況下，下列何者是斷路器(breaker)跳脫的最可能原因？
A. 瞬間電流過量
B. 馬達熱超載
C. 控制電力保險絲燒斷
D. 反唧取設備起動
答案： B.

科目： 291005
知能類： K1.07 [2.6/2.6]
序號： B528

What unit of measurement is used to describe the rate of electron flow?
A. Volt-amp reactive (VAR)
B. Ohm
C. Volt
D. Ampere
ANSWER: D.

用以測量電子流動速率的單位是
A. 無效功率 (VAR)
B. 歐姆
C. 伏特
D. 安培
答案： D.

科目： 291005
知能類： K1.07 [2.6/2.6]
序號： B628

A difference in electrical potential is measured in...
A. amps.
B. volts.
C. ohms.
D. volt-amps reactive.
ANSWER: B.

電位差量測單位為
A. 安培
B. 伏特
C. 歐姆
D. 無效功率
答案： B.

科目： 291005
知能類： K1.07 [2.6/2.6]
序號： B828

The force that causes electrons to flow in an electrical circuit is called...
A. power.
B. current.
C. voltage.
D. resistance.
ANSWER: C.

使電子在一電路中流動的力為
A. 電力
B. 電流
C. 電壓
D. 電阻
答案： C.

科目： 291005
知能類： K1.07 [2.6/2.6]
序號： B929

What is the significance of a power factor of 0.8 when describing the output of a generator?
A. The relationship between generator output voltage and current can be described as purely resistive.
B. 80% of the energy input to the generator produces useful output.
C. 80% of the generator output will be converted to useful power.
D. This information characterizes the generator as a dc generator.
ANSWER: C.

當描述一發電機的輸出時，功率因數 0.8 的意義為何？
A. 發電機輸出電壓與電流間的關係可以描述為純粹的阻抗
B. 80%輸入發電機的能量轉換成有用的輸出
C. 80%的發電機輸出能夠轉換成有用的電力
D. 用以描述此發電機作為一直流發電機的資訊
答案： C.

科目： 291005
知能類： K1.07 [2.6/2.6]
序號： B1129

The term "volt" describes...
A. a rate of electron flow.
B. the resistance to current flow.
C. an electrical potential difference.
D. the transfer of circulating currents.
ANSWER: C.

「伏特」一詞用以描述
A. 電子流流速
B. 電流的阻力
C. 電位差
D. 循環電流的轉換
答案： C.

科目： 291005
知能類： K1.07
序號： B3328

A 120 VDC battery is rated at 800 amp-hours for a continuous 50 kW load. Approximately how long will the fully charged battery be able to supply a continuous 50 kW load before the battery rating is exceeded?
A. 115 minutes
B. 90 minutes
C. 75 minutes
D. 60 minutes
ANSWER: A.

一120V 直流電池額定800安培—小時，持續負載50kW。則此完全充電之電池在額定值超過之前，能夠供應持續50kW負載多少時間？
A. 115 分鐘
B. 90 分鐘
C. 75 分鐘
D. 60 分鐘
答案： A.

科目： 291005
知能類： K1.08 [2.5/2.6]
序號： B29

Which one of the following describes the effects on generator excitation and power factor with the generator connected to an infinite power grid?

A. Increasing field current increases excitation and shifts power factor from lagging toward leading.
B. Increasing field current increases excitation and shifts power factor from leading toward lagging.
C. Decreasing field current increases excitation and shifts power factor from leading toward lagging.
D. Decreasing field current increases excitation and shifts power factor from leading toward lagging.

ANSWER: B.

對一連接於無限電力網之發電機，下列何者為發電機激磁(excitation)對功率因子影響之描述？

A. 增加場電流增加激磁，同時將功率因子從落後轉為領先
B. 增加場電流增加激磁，同時將功率因子從領先轉為落後
C. 降低場電流增加激磁，同時將功率因子從領先轉為領先
D. 降低場電流增加激磁，同時將功率因子從領先轉為落後

答案： B.

科目： 291005
知能類： K1.08 [2.5/2.6]
序號： B120 (P115)

A main generator that is connected to an infinite power grid has the following indications:

100 MWe
0 MVAR
2,900 amps
20,000 Vac

If main generator excitation is reduced, amps will _____ and MWe will _____.

A. decrease; decrease
B. increase; decrease
C. decrease; remain the same
D. increase; remain the same
ANSWER: D.

一主發電機連接於一無限電力網上，指示讀數如下

100 MWe
0 MVAR
2,900 安培
20,000 V交流電

若主發電機激磁下降，則安培數將會_____，而 MWe將會_____

A. 減小；減小
B. 增加；減小
C. 減小；維持不變
D. 增加；維持不變
答案： D.

科目： 291005
知能類： K1.08 [2.5/2.6]
序號： B226 (P1928)

A main generator is connected to an infinite power grid. Which one of the following conditions will exist if the generator is operating underexcited?
A. Negative MVARs (VARs in) and a leading power factor
B. Positive MVARs (VARs out) and a leading power factor
C. Positive MVARs (VARs out) and a lagging power factor
D. Negative MVARs (VARs in) and a lagging power factor
ANSWER: A.

一主發電機連接於一無限電力網上，若此發電機在欠激磁(excitation)下運轉，則下列何種狀況會存在？
A. 負的 MVARs與領先的功率因子
B. 正的 MVARs與領先的功率因子
C. 正的 MVARs與落後的功率因子
D. 負的 MVARs與落後的功率因子
答案： A.

科目： 291005
知能類： K1.08 [2.5/2.6]
序號： B428

A main generator is connected to an infinite power grid with VARs out (positive VARs).
Increasing main generator excitation will cause main generator current to _____ and
main generator VARs to _____.
A. increase; decrease
B. increase; increase
C. decrease; decrease
D. decrease; increase
ANSWER: B.

一主發電機連接於一具有正的VARs之無限電力網上。增加主發電機之激磁，將會導致主發電機電流_____，同時主發電機VARs會_____。
A. 增加；減小
B. 增加；增加
C. 減小；減小
D. 減小；增加
答案： B.

科目： 291005
知能類： K1.08 [2.5/2.6]
序號： B529

A main generator that is connected to an infinite power grid has the following indications:

100 MWe
100 MVAR (VARs out)
2,800 amps

If main generator excitation is reduced slightly, amps will _____ and MWe will _____.

A. decrease; decrease
B. increase; decrease
C. decrease; remain the same
D. increase; remain the same
ANSWER: C.

一主發電機連接於一無限電力網上，指示讀數如下

100 MWe
100 MVAR (正的VARs)
2,800 安培

若主發電機激磁(excitation)稍微下降，則安培數將會_____，而 MWe將會_____

A. 減小；減小
B. 增加；減小
C. 減小；維持不變
D. 增加；維持不變
答案： C.

科目： 291005
知能類： K1.08 [2.5/2.6]
序號： B729

A main generator that is connected to an infinite power grid has the following indications:

100 MWe
100 MVAR (VARs out)
2,800 amps

If main generator excitation is increased slightly, amps will _____ and MWe will _____.

A. decrease; increase
B. increase; increase
C. decrease; remain the same
D. increase; remain the same
ANSWER: D.

一主發電機連接於一無限電力網上，指示讀數如下

100 MWe
100 MVAR(正的VARs)
2,800 安培

若主發電機激磁(excitation)稍微增加，則安培數將會_____，而 MWe將會_____

A. 減小；增加
B. 增加；增加
C. 減小；維持不變
D. 增加；維持不變
答案： D.

科目： 291005
知能類： K1.08 [2.5/2.6]
序號： B1030

A main generator is operating in parallel with an infinite power grid with generator VARs currently at zero. If generator field excitation increases, generator VARs will become _____ and generator power factor will become _____.
A. positive (VARs out); leading
B. negative (VARs in); leading
C. positive (VARs out); lagging
D. negative (VARs in); lagging
ANSWER: C.

一無效功率為零之主發電機與一無限電力網併聯運轉，若發電機的場激磁(excitation)增加，則發電機之無效功率將會變成_____，而發電機的功率因子將會變成_____？
A. 正值；領先
B. 負值；領先
C. 正值；落後
D. 負值；落後
答案： C.

科目： 291005
知能類： K1.08 [2.5/2.6]
序號： B1229

A main generator is operating in parallel with an infinite power grid and is supplying 0 MVAR.If generator field current is increased, the generator will become _____ and will attain a _____ power factor.
A. overexcited; leading
B. underexcited; lagging
C. underexcited; leading
D. overexcited; lagging
ANSWER: D.

一供應0MVAR之主發電機與一無限電力網併聯運轉，若發電機的場電流增加，則發電機將會變成_____，並且會得到一_____的功率因子。
A. 激磁過度(overexcited)；領先
B. 欠激磁(underexcited)；落後
C. 欠激磁(underexcited)；領先
D. 激磁過度(overexcited)；落後
答案： D.

科目： 291005
知能類： K1.08 [2.5/2.6]
序號： B1532 (P2628)

A main generator that is connected to an infinite power grid has the following indications:

100 MWe
0 MVAR
2,900 amps
20,000 volts

If main generator excitation is increased, amps will _____ and MWe will _____.

A. remain the same; increase
B. remain the same; remain the same
C. increase; increase
D. increase; remain the same
ANSWER: D.

一主發電機連接於一無限電力網上，指示讀數如下

100 MWe
0 MVAR
2,900 安培
20,000 V交流電

若主發電機激磁(excitation)增加，則安培數將會_____，而 MWe將會_____

A. 維持不變；增加
B. 維持不變；維持不變
C. 增加；增加
D. 增加；維持不變
答案： D.

科目： 291005
知能類： K1.08 [2.5/2.6]
序號： B1729 (P1728)

A main generator that is connected to an infinite power grid has the following indications:

600 MWe
100 MVAR (VARs in)
13,800 amps
25,000 volts

If main generator excitation is decreased slightly, amps will _____ and MVAR will _____.

A. decrease; increase
B. increase; increase
C. decrease; decrease
D. increase; decrease

ANSWER: B.

一主發電機連接於一無限電力網上，指示讀數如下

600 MWe
100 MVAR (負的VARs)
13,800 安培
25,000 伏特

若主發電機激磁(excitation)稍微減小，則安培數將會_____，而 MVAR將會_____

A. 減小；增加
B. 增加；增加
C. 減小；減小
D. 增加；減小

答案： B.

科目： 291005
知能類： K1.08 [2.5/2.6]
序號： B1830 (P1428)

A main generator that is connected to an infinite power grid has the following indications:

600 MWe
100 MVAR (VARs in)
13,800 amps
25,000 volts

If main generator excitation is increased slightly, amps will _____ and MWe will _____.
A. decrease; increase
B. increase; increase
C. decrease; remain the same
D. increase; remain the same
ANSWER: C.

一主發電機連接於一無限電力網上，指示讀數如下

600 MWe
100 MVAR (負的VARs)
13,800 安培
25,000 伏特

若主發電機激磁(excitation)稍微增加，則安培數將會_____，而 MWe將會_____
A. 減小；增加
B. 增加；增加
C. 減小；維持不變
D. 增加；維持不變
答案： C.

科目： 291005
知能類： K1.08 [2.5/2.6]
序號： B2028 (P2027)

A diesel generator (D/G) is supplying both kW and kVAR to an electrical bus that is connected
to an infinite power grid. Assuming D/G and bus voltage do not change, if the D/G voltage
regulator setpoint is increased slightly, then D/G kW will _____ and D/G amps will
_____.
A. remain the same; increase
B. remain the same; remain the same
C. increase; increase
D. increase; remain the same
ANSWER: A.

一柴油發電機正供應有效功率與無效功率給一連接於一無限電力網的電力匯流排，假設此柴油發電機與匯流排電壓不變，若此柴油發電機電壓調節器設定點稍微增加，則柴油發電機之有效功率將會_____，而柴油發電機之安培數將會_____。
A. 維持不變；增加
B. 維持不變；維持不變
C. 增加；增加
D. 增加；維持不變
答案： A.

科目： 291005
知能類： K1.08 [2.5/2.6]
序號： B2128 (P928)

A main generator is operating in parallel with an infinite power grid. If the voltage supplied to the generator field is slowly and continuously decreased, the generator will experience high current due to: (Assume no generator protective actuations occur.)
A. excessive generator MWe.
B. excessive generator KVAR (VARs out).
C. excessive generator KVAR (VARs in).
D. generator reverse power.
ANSWER: C.

一主發電機與一無限電力網併聯使用，若供應給此發電機的場電壓緩慢且持續下降，此發電機將會發生高電流，因為（假設沒有發電機保護動作發生。）
A. 發電機 MWe過高
B. 發電機KVAR(正的VARs，過激overexcitation)過高
C. 發電機KVAR(負的VARs，欠激underexcitation)過高
D. 發電機反向電力
答案： C.

科目： 291005
知能類： K1.08 [2.5/2.6]
序號： B2330 (P2328)

A main generator that is connected to an infinite power grid has the following indications:

600 MWe
100 MVAR (VARs out)
13,800 amps
25,000 volts

If main generator excitation is decreased, amps will initially _____ and MVAR will initially _____.
A. decrease; increase
B. increase; increase
C. decrease; decrease
D. increase; decrease
ANSWER: C.

一主發電機連接於一無限電力網上，指示讀數如下

600 MWe
100 MVAR (正的VARs)
13,800 安培
25,000 伏特

若主發電機激磁(excitation)減小，則安培數最初將會_____，而 MWe最初將會_____
A. 減小；增加
B. 增加；增加
C. 減小；減小
D. 增加；減小
答案： C.

科目： 291005
知能類： K1.08 [3.4/3.5]
序號： B2444 (P2439)

Two identical 1000 MW ac electrical generators are operating in parallel supplying all the loads on a common electrical bus. The generator output breakers also provide identical protection for the generators. Generator A and B output indications are as follows:

Generator A	Generator B
28,000 KV	28,000 KV
60 Hertz	60 Hertz
150 MW	100 MW
25 MVAR (out)	50 MVAR (out)

A malfunction causes the voltage regulator set point for generator B to slowly and continuously decrease. If no operator action is taken, the current indication for generator B will...

A. initially decrease, and then increase until the output breaker for generator A trips on overcurrent.
B. initially decrease, and then increase until the output breaker for generator B trips on overcurrent.
C. decrease continuously until the output breaker for generator A trips on overcurrent.
D. decrease continuously until the output breaker for generator B trips on reverse power.

ANSWER: A.

兩相同之1000MW 交流電力發電機以併聯方式運轉，提供一共同電力匯流排的所有負載，發電機斷路器(breaker)對此二發電機提供相同之保護，發電機A與B輸出數值如下：

發電機A	發電機B
8，000 KV	28，000 KV
60 Hertz	60 Hertz
150 MW	100 MW
25 MVAR (正值)	50 MVAR (正值)

一故障導致發電機B之電壓調節器設定點緩慢且持續下降。若沒有採取運轉員作業，則發電機B的現有指示數值將會

A. 一開始減少，其後增加直到發電機A的輸出斷路器(breaker)因為過電流而跳脫

B. 一開始減少，其後增加直到發電機B的輸出斷路器(breaker)因為過電流而跳脫
C. 持續減少，直到發電機A的輸出斷路器(breaker)因為過電流而跳脫
D. 持續減少，直到發電機B的輸出斷路器(breaker)因為反相功率而跳脫
答案： A.

科目： 291005
知能類： K1.08 [2.5/2.6]
序號： B2530 (P2528)

A diesel generator (D/G) is supplying both KW and KVAR to an electrical bus that is connected to an infinite power grid. Assuming bus voltage does not change, if the D/G voltage regulator set point is decreased slightly, then D/G KW will _____ and D/G amps will _____.
A. remain the same; decrease
B. remain the same; remain the same
C. decrease; decrease
D. decrease; remain the same
ANSWER: A.

一柴油發電機正供應有效功率與無效功率給一連接於一無限電力網的電力匯流排。假設匯流排電壓不變，若此柴油發電機電壓調節器(voltage regulator)設定點稍微下降，則柴油發電機之有效功率將會_____，而柴油發電機之安培數將會_____。
A. 維持不變；減小
B. 維持不變；維持不變
C. 減小；減小
D. 減小；維持不變
答案： A.

科目： 291005
知能類： K1.08 [3.4/3.5]
序號： B2543 (P2540)

Two identical 1000 MW electrical generators are operating in parallel supplying the same isolated electrical bus. The generator output breakers also provide identical protection for the generators. Generator A and B output indications are as follows:

Generator A	Generator B
22 KV	22 KV
60.2 Hertz	60.2 Hertz
200 MW	200 MW
25 MVAR (out)	50 MVAR (out)

A malfunction causes the voltage regulator setpoint for generator A to slowly increase continuously toward a maximum of 25 KV. If no operator action is taken, generator B output current will...

A. initially decrease, and then increase until the output breaker for generator A trips on overcurrent.
B. initially decrease, and then increase until the output breaker for generator B trips on overcurrent.
C. increase continuously until the output breaker for generator A trips on overcurrent.
D. increase continuously until the output breaker for generator B trips on overcurrent.

ANSWER: A.

兩相同之1000MW 交流電力發電機以併聯方式運轉，提供相同獨立之電力匯流排(supply bus)。發電機輸出斷路器(breaker)對此二發電機提供相同之保護，發電機A與B輸出數值如下：

發電機A	發電機B
22 KV	22 KV
60.2 Hertz	60.2 Hertz
200 MW	200 MW
25 MVAR (正值)	50 MVAR (正值)

一故障導致發電機A之電壓調節器設定點緩慢增加，持續朝向最高值25KV變化。若沒有採取運轉員作業，則發電機B的輸出電流將會

A. 一開始減少，其後增加直到發電機A的輸出斷路器(breaker)因為電流過量而跳脫
B. 一開始減少，其後增加直到發電機B的輸出斷路器(breaker)因為過電流而跳脫
C. 持續增加，直到發電機A的輸出斷路器(breaker)因為過電流而跳脫

D. 持續增加，直到發電機B的輸出斷路器(breaker)因為過電流而跳脫
答案： A.

科目： 291005
知能類： K1.08 [2.5/2.6]
序號： B2729 (P2728)

A main generator is operating in parallel with an infinite power grid. If the voltage supplied to the generator field is slowly and continuously increased, the generator will experience high current due to: (Assume no generator protective actuations occur.)
A. generator reverse power.
B. excessive generator MWe.
C. excessive generator KVAR (VARs in).
D. excessive generator KVAR (VARs out).
ANSWER: D.

一主發電機與一無限電力網併聯運轉, 若供應給此發電機的場電壓緩慢且持續增加，此發電機將會發生高電流，因為（假設沒有發電機保護動作發生。）
A. 發電機逆電力
B. 發電機 MWe過高
C. 發電機 KVAR (負的VARs)過高
D. 發電機 KVAR (正的VARs)過高
答案： D.

科目： 291005
知能類： K1.08 [3.4/3.5]
序號： B3344 (P2041)

Two identical 1000 Mw electrical generators are operating in parallel, supplying the same isolated electrical bus. The generator output breakers also provide identical protection for the generators. Generator A and B output indications are as follows:

Generator A	Generator B
22.5 Kv	22.5 Kv
60.2 Hertz	60.2 Hertz
750 Mw	750 Mw
25 MVAR (VARs out)	50 MVAR (VARs out)

A malfunction causes the voltage regulator for generator B to slowly and continuously increase the terminal voltage for generator B. If no operator action is taken, which one of the following describes the electrical current indications for generator A?

A. Current will decrease continuously until the output breaker for generator A trips on reverse power.
B. Current will decrease continuously until the output breaker for generator B trips on reverse power .
C. Current will initially decrease, and then increase until the output breaker for generator A trips on overcurrent.
D. Current will initially decrease, and then increase until the output breaker for generator B trips on overcurrent.

ANSWER: D.

兩相同之1000MW 交流電力發電機以併聯方式運轉，提供相同獨立之電力匯流排，發電機輸出斷路器(breaker)對此二發電機提供相同之保護。發電機A與B輸出數值如下：

發電機A	發電機B
22.5 KV	22.5 KV
60.2 Hertz	60.2 Hertz
750 MW	750 MW
25 MVAR (正值VARs)	50 MVAR (正值VARs)

一故障導致發電機B之電壓調節器緩慢持續增加發電機B之終端電壓。若沒有採取運轉員作業，則下列何者描述了發電機A的電流指示？

A. 電流會持續下降，直到發電機A的輸出斷路器(breaker)因為逆電力而跳機
B. 電流會持續下降，直到發電機B的輸出斷路器(breaker)因為逆電力而跳機

C. 電流最初下降，其後增加直到發電機A的輸出斷路器(breaker)因為過電流而跳脫

D. 電流最初下降，其後增加直到發電機B的輸出斷路器(breaker)因為過電流而跳脫

答案： D.

科目： 291005
知能類： K1.08 [3.4/3.5]
序號： B3543 (P2838)

Two identical 1000 MW electrical generators are operating in parallel supplying the same isolated electrical bus. The generator output breakers provide identical protection for the generators. Generator A and B output indications are as follows:

Generator A	Generator B
22 KV	22 KV
60.2 Hertz	60.2 Hertz
800 MW	800 MW
50 MVAR (out)	25 MVAR (in)

A malfunction causes the voltage regulator for generator B to slowly and continuously increase the terminal voltage for generator B. If no operator action is taken, generator B output current will...

A. increase continuously until the output breaker for generator A trips on overcurrent.
B. increase continuously until the output breaker for generator B trips on overcurrent.
C. initially decrease, and then increase until the output breaker for generator A trips on overcurrent.
D. initially decrease, and then increase until the output breaker for generator B trips on overcurrent.

ANSWER: D.

兩相同之1000MW 交流電力發電機以併聯方式運轉，提供相同獨立之電力匯流排，發電機輸出斷路器(breaker)對此二發電機提供相同之保護，發電機A與B輸出數值如下：

發電機A	發電機B
22 KV	22 KV
60.2 Hertz	60.2 Hertz
800 MW	800 MW
50 MVAR (正值)	25 MVAR (負值)

一故障導致發電機B之電壓調節器(voltage regulator)緩慢持續增加發電機B之終端電壓。若沒有採取運轉員作業，則下列何者描述了發電機B的輸出電流將會

A. 持續增加，直到發電機A的輸出斷路器(breaker)因過電流而跳脫
B. 持續增加，直到發電機B的輸出斷路器(breaker)因過電流而跳脫
C. 電流最初下降，其後增加直到發電機A的輸出斷路器(breaker)因為過電流而跳脫

D. 電流最初下降，其後增加直到發電機B的輸出斷路器(breaker)因為過電流而跳脫

答案： D.

科目： 291005
知能類： K1.08 [2.5/2.6]
序號： B3629 (P3629)

A main turbine-generator is operating in parallel with an infinite power grid. If the turbine control valves (or throttle valves) slowly fail open, the generator will experience high current primarily due to... (Assume no generator protective actuations occur.)
A. excessive generator MWe.
B. excessive generator KVAR (VARs out).
C. excessive generator KVAR (VARs in).
D. generator reverse power.
ANSWER: A.

一主渦輪發電機與一無限電力網併聯運轉，若此渦輪控制閥（或節流閥）故障致緩慢地開啟，則發電機會發生高電流，主要因為（假設沒有發電機保護動作發生。）
A. 發電機 MWe過高
B. 發電機 KVAR (正的VARs)過高
C. 發電機 KVAR (負的VARs)過高
D. 發電機逆電力
答案： A.

科目： 291005
知能類： K1.09 [2.3/2.6]
序號： B329

A 24,000 Vac generator is operating at 800 MWe, 20,700 amperes, and a negative 325 MVAR (VARs in). What is the power factor?
A. 0.93 leading
B. 0.93 lagging
C. 0.81 leading
D. 0.81 lagging
ANSWER: A.

一24,000V交流發電機在 800MWe， 20,700安培，以及負325MVAR下運轉，其功率因子是多少？
A. 0.93領先
B. 0.93落後
C. 0.81領先
D. 0.81落後
答案： A.

科目： 291005
知能類： K1.09 [2.3/2.6]
序號： B630

A 4160 Vac diesel generator (D/G) is loaded to 2850 kW with a 0.85 power factor. What is the approximate kVAR load on the D/G?
A. 503 kVAR
B. 1766 kVAR
C. 2850 kVAR
D. 3353 kVAR
ANSWER: B.

一4160V交流柴油發電機，負載為2850KW，功率因子0.85，此柴油發電機大約無效功率負載為何？
A. 503 kVAR
B. 1766 kVAR
C. 2850 kVAR
D. 3353 kVAR
答案： B.

科目： 291005
知能類： K1.09 [2.3/2.6]
序號： B930

A 125 Vdc motor is rated at 10 kW. What is the current rating of the motor?
A. 4.6 amps
B. 8.0 amps
C. 46.2 amps
D. 80.0 amps
ANSWER: D.

一125V直流馬達額定輸出功率為10kW，則此馬達的額定電流為何？
A. 4.6 安培
B. 8.0安培
C. 46.2安培
D. 80.0安培
答案： D.

科目： 291005
知能類： K1.09 [2.3/2.6]
序號： B1529 (P2228)

A diesel generator (D/G) is supplying an electrical bus that is connected to an infinite power grid. Assuming D/G terminal voltage and bus frequency do not change, if the D/G governor setpoint is increased from 60 Hz to 60.1 Hz, then D/G kVAR will be _____ and D/G amps will be _____.
A. the same; higher
B. the same; the same
C. higher; higher
D. higher; the same
ANSWER: A.

一柴油發電機供應一連接於一無限電力網之電力匯流排，假設柴油發電機的終端電壓與匯流排頻率不改變，若柴油發電機調速器(governor)的設定點從60Hz增加至60.1Hz，則柴油發電機之無效功率將會_____，而柴油發電機之安培數將會_____。
A. 維持不變；增加
B. 維持不變；維持不變
C. 增加；增加
D. 增加；維持不變
答案： A.

科目： 291005
知能類： K1.09 [2.3/2.6]
序號： B2029 (P1128)

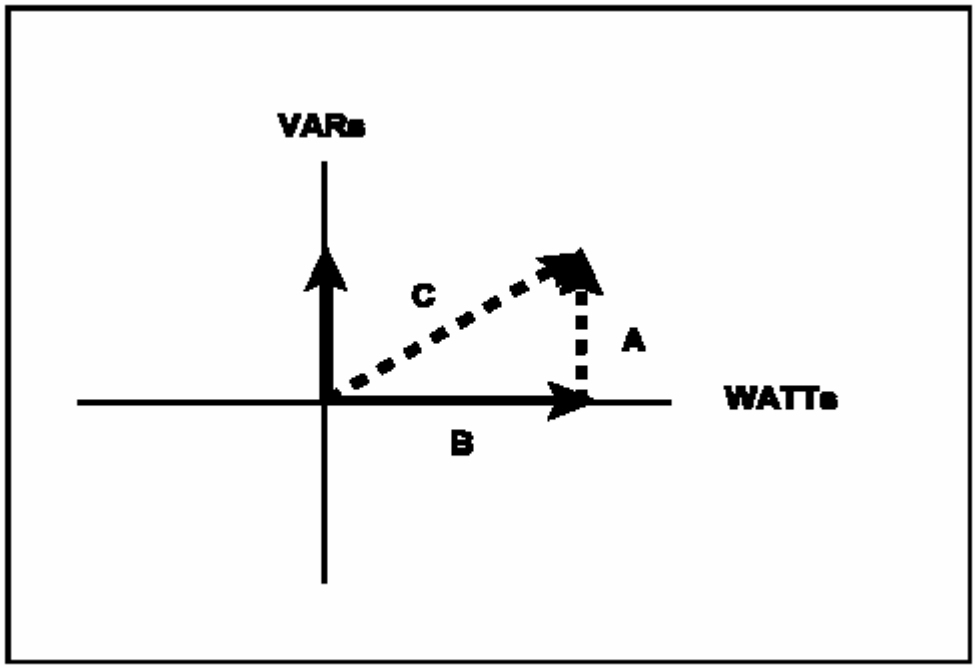
If the voltage supplied by an ac generator to an isolated electrical bus is held constant while loads (kW) are added to the bus, the current supplied by the generator will increase in direct proportion to the _____ of the change in kW. (Assume power factor does not change.)
A. cube root
B. square root
C. amount
D. square
ANSWER: C.

若匯流排的負載增加時, 由一交流發電機所提供給一獨立電力匯流排之電壓維持不變，則由發電機所提供的電流將會正比於負載改變值的_____而增加。（假設功率因子不變。）
A. 立方根
B. 平方根
C. 數值
D. 平方
答案： C.

科目： 291005
知能類： K1.09 [2.3/2.6]
序號： B2929 (N/A)

If the voltage supplied by an ac generator to an isolated electrical bus is held constant while loads (kW) are added to the bus, the current supplied by the generator will increase in direct proportion to the _____ of the change in kW. (Assume power factor does not change.)
A. cube root
B. square root
C. amount
D. square
ANSWER: C.

參考一電力系統功率三角形圖示(見下圖)，下列何者代表了此系統之功率因子？
A. A 除以 B
B. A 除以 C
C. B 除以 A
D. B 除以 C
答案： D.



科目： 291005
知能類： K1.09 [3.4/3.5]
序號： B3130 (P3142)

A plant is operating at 80% power in the middle of a fuel cycle. The main generator is connected to an infinite power grid with the following initial main generator output parameters:

Frequency: 60 Hz
Voltage: 25 KV
Reactive Load: 300 MVAR (out)
Real Load: 800 MW

A hydraulic oil system malfunction causes the main turbine steam inlet valves to begin to slowly drift closed. Over the next 10 minutes, the main generator real load decreases to 300 MW. Assuming no operator actions are taken during the load decrease, how will the following main generator output parameters be affected?

	Frequency	Voltage	Reactive Load
A.	Decrease	Decrease	No change
B.	Decrease	No change	Decrease
C.	No change	No change	No change
D.	No change	Decrease	Decrease

ANSWER: C.

一電廠在一燃料循環當中，以80%功率下運轉。主發電機連接到一無限電力網，主發電機初始輸出數值如下：

頻率: 60 Hz
電壓: 25 KV
無效負載: 300 MVAR (正值)
實際負載: 800 MW

一液壓油系統故障，導致渦輪蒸汽進汽閥(steam inlet valve)開始緩慢關閉。在其後十分鐘內，主發電機實際負載減少至300MW。假設在負載下降當中沒有採取運轉員作業，則下列主發電機輸出數值將受到何種影響？

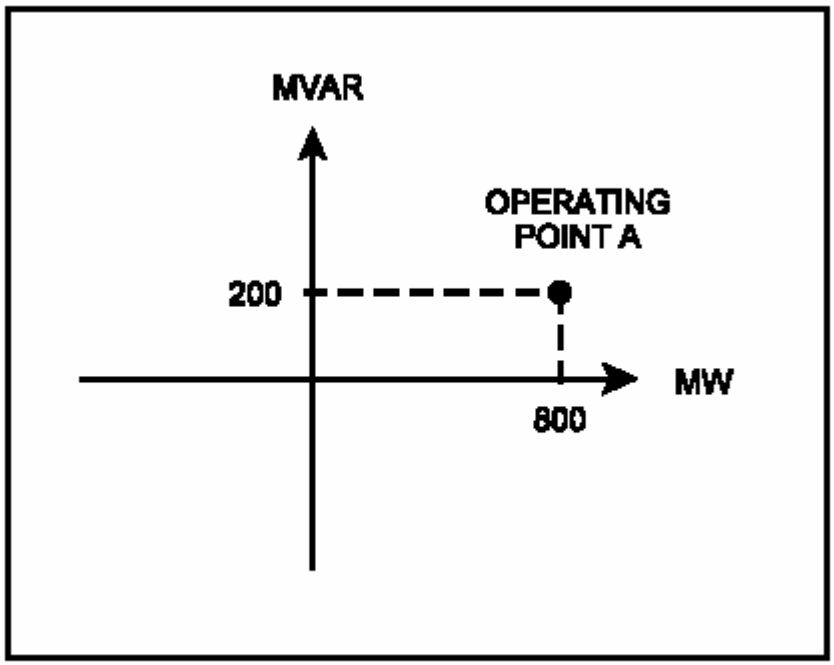
	無效頻率	電壓	負載
A.	減小	減小	不變
B.	減小	不變	減小
C.	不變	不變	不變
D.	不變	減小	減小

答案： C.

科目： 291005
知能類： K1.09 [2.3/2.6]
序號： B4015

Refer to the drawing of an electrical system power curve (see figure below).
If the system is operating at point A, which one of the following is the power factor for this system?
A. 0.80
B. 0.88
C. 0.93
D. 0.97
ANSWER: D.

參考電力系統功率曲線圖示（見下圖），若此系統在A點運轉，下列何者是此系統的功率因子？
A. 0.80
B. 0.88
C. 0.93
D. 0.97
答案： D.



科目/題號：291005/1 (2016新增)
知能類：K1.01 [2.6/2.6]
序號：B5914 (P5914)

When a motor-driven centrifugal pump was started, the motor ammeter reading immediately increased to, and stabilized at, many times the normal operating value. Which one of the following describes a possible cause for the ammeter response?
A. The pump was started with a fully closed discharge valve.
B. The pump was started with a fully open discharge valve.
C. The pump shaft seized upon start and did not rotate.
D. The pump shaft separated from the motor shaft upon start.
ANSWER: C.

當一個馬達驅動的離心泵啟動時，馬達電流表讀數立即上升到數倍於正常運轉值後穩定。
下列描述何者是上述電流表反應可能的原因？
A.泵啟動時，出口閥全關
B.泵啟動時，出口閥全開
C.泵啟動時，泵軸卡住未旋轉
D.泵啟動時，泵軸和馬達軸承未耦合

答案： C

科目/題號：291005/2 (2016 新增)
知能類：K1.03 [2.6/2.7]
序號：B4714 (P4714)

A nuclear power plant startup is in progress. The main generator has just been connected to the power grid with the following generator indications:

20 KV
288 amps
10 MW
0 MVAR

The operator suspects the main generator is operating under reverse power conditions and attempts to increase generator load (MW) normally. If the main generator is operating under reverse power conditions when the operator attempts to increase generator load, generator MW will initially _____; and generator amps will initially _____.
A. decrease; decrease
B. decrease; increase
C. increase; decrease
D. increase; increase
ANSWER: A.

核能電廠啟動階段，主發電機剛併聯。相關主發電機數據如下：

電壓 20kV
電流 288 amps
功率 10 MW
無效功率 0 MVAR

運轉員懷疑主發電機是處於逆向功率條件下運轉，通常會試圖增加發電機的負載(MW)。當運轉員試圖增加發電機的負載時，假設主發電機是處於逆向功率條件下運轉，此時發電機MW會___；而且發電機電流(amps)會___。
A.降低；降低
B.降低；增加
C.增加；降低
D.增加；增加

答案： A

科目/題號：291005/3 (2016 新增)
知能類：K1.03 [2.6/2.7]
序號：B7615 (P7615)

A 4,000 KW diesel generator (DG) is supplying 2,000 KW to a 4.16 KV emergency bus. The DG governor is in the isochronous mode (no speed droop). The emergency bus is about to be synchronized with, and then connected to, an infinite offsite power grid by closing the emergency bus normal power feeder breaker.
The following stable emergency bus and normal power conditions currently exist:

Emergency Bus (from DG)	Normal Power (from Offsite)
4.16 KV	4.16 KV
60.0 Hz	60.1 Hz

When the emergency bus normal power feeder breaker is closed, the DG will…
(Assume no additional operator action.)
A. transfer KW load to the offsite power grid but remain partially loaded.
B. transfer KW load to the offsite power grid until the DG is completely unloaded.
C. acquire KW load from the offsite power grid but remain within its KW load rating.
D. acquire KW load from the offsite power grid and ultimately exceed its KW load rating.
ANSWER: B.

一個 4,000kW柴油發電機(DG)，供應 2,000kW給一個4.16kV緊急匯流排。柴油發電機調速器置於定速(Isochronous)模式(非轉速垂降)。緊急匯流排即將經由正常電源斷路器閉合，與外部電網同步併聯。下列是目前穩定中緊急匯流排和正常電源的情況：

緊急匯流排 (DG端)	正常電源 (外部電源)
4.16kV	4.16kV
60.0 Hz	60.1 Hz

當緊急匯流排正常電源斷路器閉合，柴油發電機將…
A.轉移KW負載到外部電網，但仍然部分加載
B.轉移KW負載到外部電網直到DG完全卸載
C.獲得來自外部電網 kW負載，但仍然維持其kW負載內
D.獲得來自外部電網 kW負載，且最終超過其kW負載

答案： B

科目/題號：291005/4 (2016 新增)
知能類：K1.03 [2.6/2.7] K1.04 [2.7/2.7]
序號：B7635 (P7635)

A radial flow centrifugal cooling water pump is being powered by a 480 VAC induction motor. If the motor input voltage slowly decreases from 480 VAC to 450 VAC, the pump flow rate will _____; and the motor current will _____. (Assume the motor does not stall.)
A. decrease; increase
B. decrease; decrease
C. remain the same; increase
D. remain the same; decrease
ANSWER: A.

徑流式離心泵是由一個 480V 交流感應馬達供電驅動。假設馬達輸入電壓慢慢由 480VAC 遞減至 450VAC，則泵的流量將_____；且馬達電流將_____。(假設馬達不失速)
A.減低；增加
B.減低；減低
C.維持一樣；增加
D.維持一樣；減低

答案： A

科目/題號：291005/5 (2016 新增)
知能類：K1.03 [2.6/2.7]
序號：B7684 (P7684)

A main generator is connected to an infinite power grid with the following generator output
parameters:

22 KV
60 Hertz
975 MW
200 MVAR (out)

Main generator stator winding temperature is abnormally high. Which one of the following contains a combination of manual adjustments to the main generator speed control and voltage regulator setpoints such that each adjustment will reduce the main generator stator winding temperature? (Assume power factor remains less than 1.0.)

	Speed Setpoint	Voltage Setpoint
A.	Increase	Increase
B.	Increase	Decrease
C.	Decrease	Increase
D.	Decrease	Decrease

ANSWER: D.

一主發電機連接於無限電網，下列為主發電機輸出參數：

電壓 22 kV
頻率 60 Hz
功率 975 MW
無效功率 200 MVAR (輸出)

主發電機定子繞組溫度顯示異常高。下列何者為手動調整主發電機轉速控制和電壓調節器設定值的組合，可降低主發電機定子繞組溫度？(假設功率因數保持小於 1.0)

	轉速設定值	電壓設定值
A.	增加	增加
B.	增加	減低
C.	減低	增加
D.	減低	減低

答案： D

科目/題號：291005/6 (2016 新增)
知能類：K1.04 [2.7/2.7]
序號：B4515 (P4515)

Refer to the pump performance curves for a centrifugal cooling water pump (see figure below). The pump is being driven by a single-speed AC induction motor. Pump flow rate is being controlled by a throttled discharge flow control valve.
The following initial pump conditions exist:

Pump motor current = 50 amps

Pump flow rate = 400 gpm

What will be the approximate value of pump motor current if the flow control valve is repositioned such that pump flow rate is 800 gpm?
A. Less than 100 amps
B. 200 amps
C. 400 amps
D. More than 500 amps
ANSWER: A.

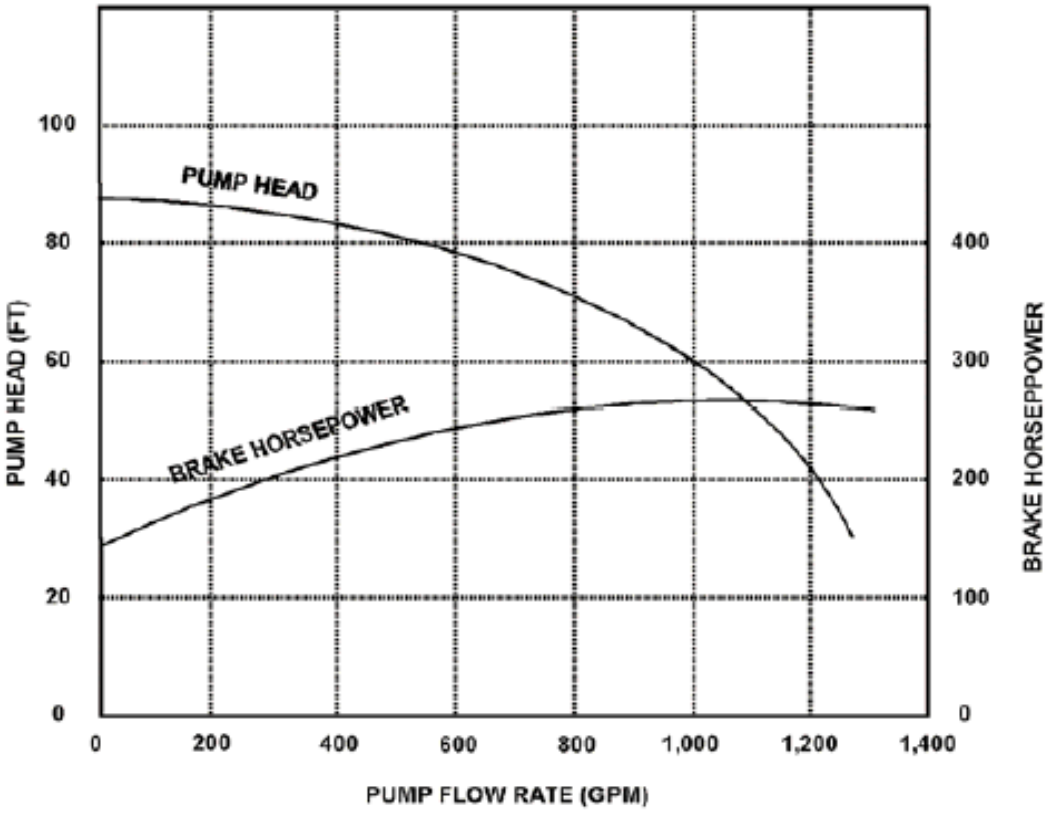
參考一個離心泵的性能曲線圖(見下圖) 。泵是由一個定速交流感應馬達驅動。泵流量率是由出口流量控制閥控制。泵的初始運轉狀態如下：

馬達電流= 50 amps

泵流量率= 400 gpm

如果調整流量控制閥使得泵的流量率為 800 gpm，則馬達的電流大約值為何？
A.小於 100 amps
B. 200 amps
C. 400 amps
D.大於 500 amps

答案： A


PUMP HEAD
BRAKE HORSEPOWER
PUMP HEAD (FT)
BRAKE HORSEPPOWER
PUMP FLOW RATE (GPM)
0
20
40
60
80
100
0
100
200
300
400
0
200
400
600
800
1,000
1,200
1,400

科目/題號：291005/7 (2016 新增)
知能類：K1.04 [2.7/2.7]
序號：B4914 (P4915)

Consider two identical single-speed AC induction motors, one of which is connected to a radial-flow centrifugal pump and the other to a reciprocating-type positive displacement pump (PDP). Both pumps are taking suction at the same elevation from a vented water storage tank.
Each pump has a maximum design backpressure of 800 psig, and each is operating with the following initial conditions:

Flow rate = 200 gpm
Backpressure = 400 psig
Motor current = 100 amps

If the backpressure for each pump increases to 600 psig, the centrifugal pump will have a _____ flow rate than the PDP; and the centrifugal pump will have a _____ motor current than the PDP.
A. lower; higher
B. lower; lower
C. higher; higher
D. higher; lower
ANSWER: B.

兩台相同的定速交流感應馬達，其中一台連接到一個徑流式離心泵，另一台為往復式正排量泵（PDP）。兩台泵進口均自同一設有排氣裝置之儲水槽取水，且高度相同。每台泵最高設計背壓為 800 psig，且每台泵運轉初始狀態如下：

流量率=200 gpm
背壓=400 psig
馬達電流= 100 amps

假設每台泵背壓增加至 600 psig，離心泵將具有比該 PDP _____流量率；離心泵將具有比該 PDP _____馬達電流。
A.較低的；較高的
B.較低的；較低的
C.較高的；較高的
D.較高的；較低的

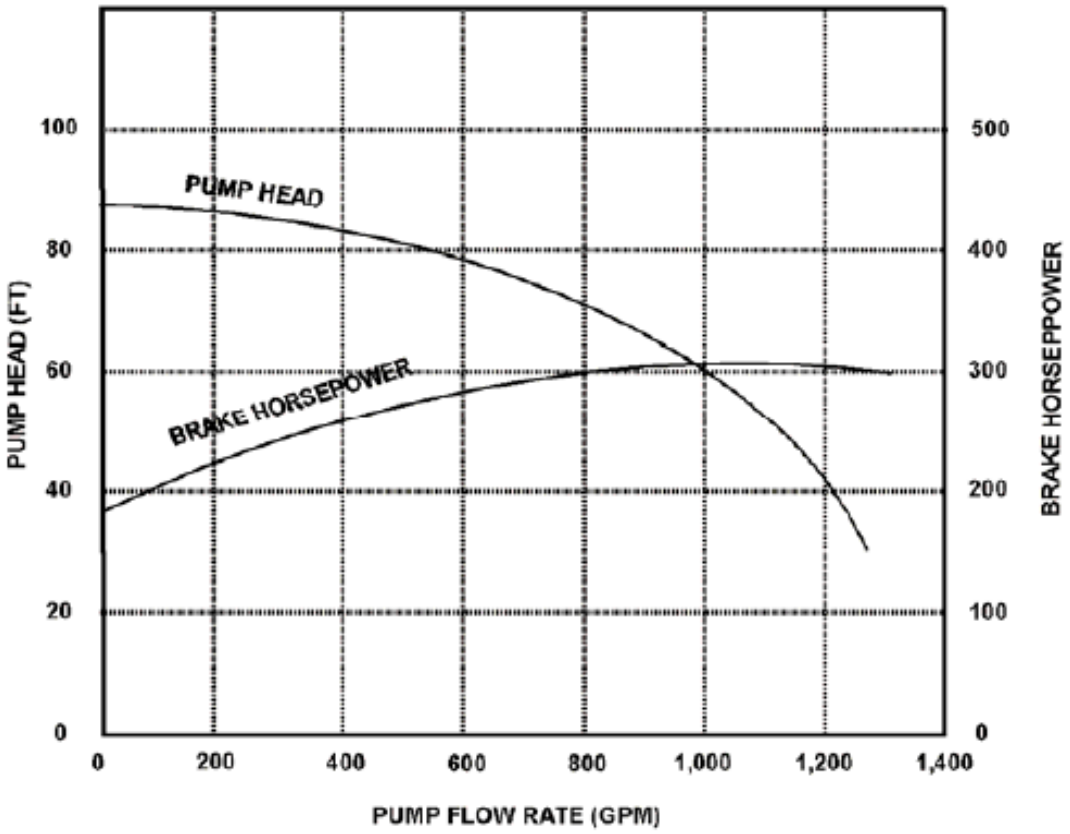
答案： B

科目/題號：291005/8 (2016 新增)
知能類：K1.04 [2.7/2.7]
序號：B5814 (P5814)

Refer to the pump performance curves for a centrifugal cooling water pump (see figure below). The pump is being driven by a single-speed AC induction motor. Pump flow rate is being controlled by a throttled discharge flow control valve.
The following initial pump conditions exist:
Motor current = 100 amps
Pump flow rate = 800 gpm
What will be the approximate value of pump motor current if the flow control valve is repositioned such that pump flow rate decreases to 400 gpm?
A. Less than 15 amps
B. 25 amps
C. 50 amps
D. Greater than 75 amps
ANSWER: D.

參考離心式泵性能曲線圖（見下圖）。泵是由一個定速交流感應馬達驅動。泵流量率是由流量控制閥控制。泵的初始運轉狀態如下：
馬達電流=100 amps
泵流量率=800 gpm
假設調整流量控制閥使得泵流量率降低到 400 gpm，則泵馬達電流的近似值大約為何？
A.小於 15 amps
B. 25 amps
C. 50 amps
D.大於 75 amps

答案： D


PUMP HEAD
BRAKE HORSEPOWER
PUMP HEAD (FT)
BRAKE HORSEPOWER
PUMP FLOW RATE (GPM)
0
20
40
60
80
100
0
100
200
300
400
500
0
200
400
600
800
1,000
1,200
1,400

科目/題號：291005/9 (2016 新增)
知能類：K1.04 [2.7/2.7]
序號：B6215 (P6215)

An AC induction motor is connected to a radial-flow centrifugal pump in a cooling water system.
When the pump is started, the time period required to reach a stable running current will be shorter if the pump discharge valve is fully _____; and the stable running current will be lower if the pump discharge valve is fully _____.
A. open; open
B. open; closed
C. closed; open
D. closed; closed
ANSWER: D.

在冷卻水系統中，一交流感應馬達連接徑流式離心泵。當泵啟動時，如果泵出口閥是_____時，達到穩定運轉電流所需的期間將會縮短；如果泵的出口閥_____，則穩定的運轉電流會低一些。
A.全開；全開
B.全開；全關
C.全關；全開
D.全關；全關

答案： D

科目/題號：291005/10 (2016 新增)
知能類：K1.04 [2.7/2.7]
序號：B6814 (P6814)

A centrifugal pump is driven by a single-speed AC induction motor. Pump flow rate is controlled by a throttled discharge flow control valve.
The following initial pump conditions exist:
Pump motor current = 50 amps
Pump flow rate = 400 gpm
What will the resulting pump motor current be if the flow control valve is repositioned such that pump flow rate increases to 800 gpm?
A. 100 amps
B. 200 amps
C. 400 amps
D. Cannot be determined without additional information.
ANSWER: D.

離心泵是由一個定速交流感應馬達驅動。泵流量率是由一個節流排放流量控制閥控制。下列是泵的初始狀況：
泵馬達電流=50 amps
泵流量率=400 gpm
如果調整流量控制閥使得泵流量率增加至 800 gpm，結果泵馬達電流為何？
A. 100amps
B. 200amps
C. 400amps
D.資料不足，不能確定

答案： D

科目/題號：291005/11 (2016 新增)
知能類：K1.04 [2.7/2.7]
序號：B7214 (P7214)

An axial flow ventilation fan is being driven by an AC motor. The fan is operating at its maximum rated flow rate. How will the fan motor current initially change if the flow rate through the fan is decreased by partially closing a discharge damper?
A. The motor current will increase in accordance with the centrifugal pump laws.
B. The motor current will increase, but not in accordance with the centrifugal pump laws.
C. The motor current will decrease in accordance with the centrifugal pump laws.
D. The motor current will decrease, but not in accordance with the centrifugal pump laws.
ANSWER: B

軸流式風扇是由一個交流馬達驅動。風扇在其最大額定流量運轉。如果減少風門開度以降低風扇流量，則初始風扇的馬達電流如何改變？
A.馬達電流將按照離心泵定律增加
B.馬達電流會增加，但不按照離心泵的定律
C.馬達電流將按照離心泵定律減小
D.馬達電流會減小，但不按照離心泵的定律

答案： B

科目/題號：291005/12 (2016 新增)
知能類：K1.04 [2.7/2.7]
序號：B7414 (P7414)

Consider two identical single-speed AC induction motors, one of which is connected to a radial-flow centrifugal pump and the other to a rotary-type positive displacement pump (PDP). Both pumps are taking suction from the bottom of a vented water storage tank.
Each pump is operating with the following initial conditions:
Flow rate = 200 gpm
Backpressure = 600 psig
Motor current = 100 amps
If the backpressure for each pump decreases to 400 psig, the centrifugal pump will have a _____ flow rate than the PDP; and the centrifugal pump will have a _____ motor current than the PDP.
A. lower; lower
B. lower; higher
C. higher; lower
D. higher; higher
ANSWER: D.

兩台相同的定速交流感應馬達，其中一台連接到徑流式離心泵，另一台連接到旋轉式正排量泵（PDP）。兩台泵進口均從排氣儲水槽的底部取水。每台泵的初始運轉狀態如下：
流量率=200gpm
背壓=600 psig
馬達電流= 100amps
假設每台泵背壓減低至 400 psig，離心泵將具有比該 PDP _____流量率；離心泵將具有比該 PDP _____馬達電流。
A.較低的；較低的
B.較低的；較高的
C.較高的；較低的
D.較高的；較高的

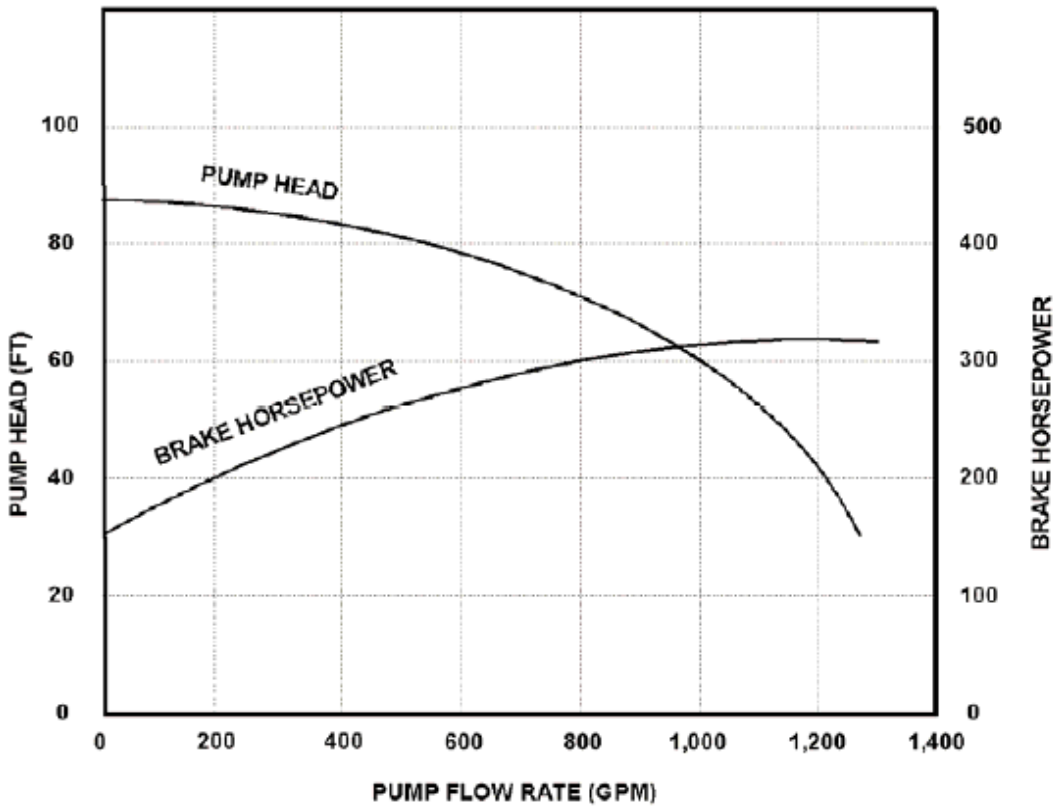
答案： D

科目/題號：291005/13 (2016 新增)
知能類：K1.04 [2.7/2.7]
序號：B7605 (P7605)

Refer to the pump performance curves for a centrifugal cooling water pump (see figure below). The pump is being driven by a single-speed AC induction motor. Pump flow rate is being controlled by a throttled discharge flow control valve.
The following initial pump conditions exist:
Motor current = 10 amps
Pump flow rate = 200 gpm
What will be the approximate value of pump motor current if the flow control valve is repositioned such that pump flow rate increases to 800 gpm?
A. 15 amps
B. 40 amps
C. 160 amps
D. Greater than 200 amps
ANSWER: A.

參考離心泵性能曲線圖（見下圖）。泵是由一個定速交流感應馬達驅動。泵流量率是由出口流量控制閥控制。泵的初始運轉狀態如下：
馬達電流=10amps
泵流量率=200gpm
假設調整流量控制閥使得泵流量率增加到 800gpm，則泵馬達電流的近似值大約為何？
A. 15amps
B. 40amps
C. 160amps
D. 大於 200amps

答案： A


PUMP HEAD
BRAKE HORSEPOWER
PUMP HEAD (FT)
BRAKE HORSEPOWER
PUMP FLOW RATE (GPM)
0
20
40
60
80
100
0
100
200
300
400
500
0
200
400
600
800
1,000
1,200
1,400

科目/題號：291005/14 (2016 新增)
知能類：K1.04 [2.7/2.7]
序號：B7655 (P7655)

A motor-driven radial-flow centrifugal pump is operating to provide makeup water from a constant head source to a vented storage tank that is 30 feet tall. The pump is located at the base of the tank and discharges directly into the bottom of the tank. As the tank water level increases from 20 to 25 feet, the pump discharge pressure will _____; and the pump motor current will _____.
A. decrease; decrease
B. decrease; increase
C. increase; decrease
D. increase; increase
ANSWER: C.

一台馬達驅動的徑流式離心泵，從固定水頭水源補水到 30 feet 高排氣式儲水槽，泵位於槽的底座上，且其出口直接進入水槽的底部。當水槽的水位從 20 feet 增加到 25 feet，泵的出口壓力將_____；泵馬達電流將_____。
A.減低；減低
B.減低；增加
C.增加；減低
D.增加；增加

答案： C

科目/題號：291005/15 (2016 新增)
知能類：K1.04 [2.7/2.7]
序號：B7665 (P7665)

An air-cooled AC induction motor is initially operating at steady-state conditions, producing a work output of 50 hp. A reduction in cooling air flow rate to the motor causes the average stator winding temperature to increase by 20ºF. To maintain a 50 hp work output at the higher stator winding temperature, the voltage applied to the motor must be _____ because the stator winding resistance has _____.
A. increased; increased
B. increased; decreased
C. decreased; increased
D. decreased; decreased
ANSWER: A.

一個氣冷式交流感應馬達，運轉在穩定狀態，產生 50 馬力的功率輸出。若減少馬達冷卻空氣流量率將導致平均定子繞組溫度增加 20˚F。為維持在較高的定子繞組溫度下有 50 馬力的功率輸出，施加到馬達的電壓必須_____，因為定子繞組的電阻已經_____。
A.增加；增加
B.增加；減低
C.減低；增加
D.減低；減低

答案： A

科目/題號：291005/16 (2016 新增)
知能類：K1.05 [2.6/2.7]
序號：B4614 (P4615)

To minimize the adverse effects of starting current, an AC induction motor should be started _____ to _____ the stator counter electromotive force.
A. unloaded; quickly establish
B. unloaded; delay
C. partially loaded; quickly establish
D. partially loaded; delay
ANSWER: A.

為使啟動電流的不利影響降低至最小化，交流感應馬達應該從_____啟動到_____定子逆電動勢。
A.無載；快速建立
B.無載；延遲
C.部份負載；快速建立
D.部份負載；延遲

答案： A

科目/題號：291005/17 (2016 新增)
知能類：K1.05 [2.6/2.7]
序號：B5714 (P5715)

Two identical AC induction motors are connected to identical radial-flow centrifugal pumps in identical but separate cooling water systems. Each motor is rated at 200 hp. The discharge valve for pump A is fully open and the discharge valve for pump B is fully closed. Each pump is currently off.
If the pumps are started under these conditions, the shorter time period required to reach a stable running current will be experienced by the motor for pump _____; and the higher stable running current will be experienced by the motor for pump _____.
A. A; A
B. A; B
C. B; A
D. B; B
ANSWER: C.

兩個相同的交流感應馬達連接到兩個相同的徑流式離心泵，其冷卻水系統雖然相同但是各自分離而獨立。每個馬達有 200 匹額定馬力。目前每台泵都未運轉，A 泵的出口閥完全打開而 B 泵出口閥完全關閉。假設泵在這些條件下開始啟動，所需較短的時間以達到穩定運行的電流將是_____泵馬達；所需較高穩定運轉電流將是_____泵馬達。
A. A；A
B. A；B
C. B；A
D. B；B

答案： C

科目/題號：291005/18 (2016 新增)
知能類：K1.07 [2.6/2.6]
序號：B5515

A 125 VDC battery is rated at 600 amp-hours for a continuous 50 KW load. Approximately how long will the fully charged battery be able to supply a continuous 50 KW load before the battery rating is exceeded?
A. 115 minutes
B. 90 minutes
C. 75 minutes
D. 60 minutes
ANSWER: B.

一個 125V 直流電池額定在 600 安培-小時(AH)可連續提供 50kW 的負載。充滿電的電池在未低於電池額定值前，能夠連續提供 50kW 負載大約多久？
A. 115 分鐘
B. 90 分鐘
C. 75 分鐘
D. 60 分鐘

答案： B

科目/題號：291005/19 (2016 新增)
知能類：K1.08 [2.5/2.6] K1.09 [2.3/2.6]
序號：B4115 (P4115)

A main generator is operating and connected to an infinite power grid. Elevated main generator winding temperature requires a reduction in reactive load from 200 MVAR (out) to 150 MVAR (out). To accomplish the reactive load reduction, the operator must _____ the generator field current; when generator reactive load equals 150 MVAR (out) the generator power factor will be _____ than the initial power factor.
A. increase; larger
B. increase; smaller
C. decrease; larger
D. decrease; smaller
ANSWER: C.

一台主發電機，併聯到無限電網。提高主發電機繞組的溫度需要減少無效負載由 200MVAR(輸出)降到 150MVAR(輸出)。為了達成減少無效負載，運轉員必須_____發電機磁場電流；當發電機的無效負載等於 150MVAR(輸出)時發電機的功率因數將_____初始功率因數。
A.增加；大於
B.增加；小於
C.減低；大於
D.減低；小於

答案： C

科目/題號：291005/20 (2016 新增)
知能類：K1.08 [2.5/2.6] K1.09 [2.3/2.6]
序號：B4315 (P6515)

A main generator is connected to an infinite power grid with the following generator output parameters:

22 KV
60 Hertz
575 MW
100 MVAR (out)

Which one of the following contains a combination of manual adjustments to the main generator voltage regulator and speed control setpoints such that each adjustment will result in main generator operation at a power factor closer to 1.0? (Assume the generator power factor remains less than 1.0.)

	Voltage Setpoint	Speed Setpoint
A.	Increase	Increase
B.	Increase	Decrease
C.	Decrease	Increase
D.	Decrease	Decrease

ANSWER: C.

一台主發電機併聯到無限電網，下列為發電機輸出參數：

電壓 22kV
頻率 60 Hz
功率 575 MW
無效功率 100 MVAR(輸出)

下列何者為手動調整主發電機電壓調整器和轉速控制之設定值組合，可使主發電機運轉功率因數接近1.0？(假設發電機功率因數保持小於1.0)

	電壓設定值	轉速設定值
A.	增加	增加
B.	增加	減低
C.	減低	增加
D.	減低	減低

答案： C

科目/題號：291005/21 (2016 新增)
知能類：K1.08 [2.5/2.6]
序號：B4615 (P4620)

Two identical 1,000 MW generators are operating in parallel supplying the same isolated electrical bus. The generator output breakers provide identical protection for the generators. Generator A and B output indications are as follows:

Generator A	Generator B
22 KV	22 KV
60.2 Hertz	60.2 Hertz
200 MW	200 MW
25 MVAR (out)	50 MVAR (out)

A malfunction causes the voltage regulator setpoint for generator B to slowly and continuously increase. If no operator action is taken, generator A output current will...
A. increase continuously until the output breaker for generator A trips on overcurrent.
B. decrease continuously until the output breaker for generator B trips on overcurrent.
C. initially decrease, and then increase until the output breaker for generator A trips on overcurrent.
D. initially decrease, and then increase until the output breaker for generator B trips on overcurrent.
ANSWER: D.

兩個相同的 1000 MW 發電機併聯運轉，同時供電至一隔離的電氣匯流排。兩發電機輸出斷路器提供各發電機相同的保護。下列為 A 發電機和 B 發電機輸出所顯示數據：

	A 發電機	B 發電機
電壓	22kV	22 kV
頻率	60.2Hz	60.2Hz
功率	200MW	200MW
無效功率	25MVAR(輸出)	50MVAR(輸出)

一故障導致 B 發電機電壓持續緩慢上升，如果運轉員沒有採取行動，A 發電機的輸出電流會…
A. 繼續增加，直到 A 發電機輸出斷路器因為過電流跳脫
B. 繼續降低，直到 B 發電機輸出斷路器因為過電流跳脫
C. 最初降低，然後增加，直到 A 發電機輸出斷路器因為過電流跳脫
D. 最初降低，然後增加，直到 B 發電機輸出斷路器因為過電流跳脫

答案： D

科目/題號：291005/22 (2016 新增)
知能類：K1.08 [2.5/2.6] K1.09 [2.3/2.6]
序號：B5015

A main generator is connected to an infinite power grid with the following generator output parameters:

22 KV
60 Hertz
600 MW
100 MVAR (in)

Which one of the following contains a combination of manual adjustments to the main generator voltage regulator and speed control setpoints such that each adjustment will result in main generator operation at a power factor closer to 1.0? (Assume the generator power factor remains less than 1.0.)

	Voltage Setpoint	Speed Setpoint
A.	Increase	Increase
B.	Increase	Decrease
C.	Decrease	Increase
D.	Decrease	Decrease

ANSWER: A.

一台主發電機併聯到無限電網，下列為發電機輸出參數：

電壓 22 kV
頻率 60 HZ
功率 600 MW
無效功率 100MVAR(輸入)

下列何者為手動調整主發電機電壓調整器和轉速控制之設定值組合，可使主發電機運轉在功率因數接近 1.0？(假設發電機功率因素保持小於 1.0)

	電壓設定值	轉速設定值
A.	增加	增加
B.	增加	減低
C.	減低	增加
D.	減低	減低

答案： A

科目/題號：291005/23 (2016 新增)
知能類：K1.08 [2.5/2.6]
序號：B5415 (P5414)

A main generator is connected to an infinite power grid. Which one of the following pairs of main generator output parameters places the generator in the closest proximity to slipping a pole.
A. 800 MW; 200 MVAR (in)
B. 800 MW; 600 MVAR (in)
C. 400 MW; 200 MVAR (out)
D. 400 MW; 600 MVAR (out)
ANSWER: B.

一台主發電機併聯到一個無限電網。下列何者為主發電機輸出參數最接近發電機欠激磁點。
A. 800MW；200MVAR(輸入)
B. 800MW；600MVAR(輸入)
C. 400MW；200MVAR(輸出)
D. 400MW；600MVAR(輸出)

答案： B

科目/題號：291005/24 (2016 新增)
知能類：K1.08 [2.5/2.6]
序號：B6014 (P6014)

During a surveillance test, a 4,000 KW diesel generator (DG) and a 1,000 MW main generator (MG) at a nuclear power plant are connected to the same power grid. The following stable generator output conditions exist:

Diesel Generator	Main Generator
700 KW	800 MW
200 KVAR (out)	100 MVAR (out)

A malfunction then occurs, causing the voltage regulator for the MG to slowly and continuously increase the MG field current. If no operator action is taken, the DG output current will _____ until a breaker trip separates the generators.
A. remain about the same
B. increase continuously
C. initially increase, and then decrease
D. initially decrease, and then increase
ANSWER: D.

核能發電廠在偵測試驗期間，一台 4000KW 的柴油發電機（DG）和一台 1000MW 主發電機（MG）被併聯到同一電網。下列是穩定的發電機輸出狀況：

柴油發電機	主發電機
700kW	800 MW
200kVAR(輸出)	100 MVAR (輸出)

故障發生，導致 MG 電壓調整器慢慢地，不斷增加 MG 激磁電流。如果運轉員不採取行動，DG 輸出電流將_____直到其斷路器跳脫。
A.保持不變
B.不斷增加
C.初始增加，然後減低
D.初始減低，然後增加

答案： D

科目/題號：291005/25 (2016 新增)
知能類：K1.08 [2.5/2.6] K1.09 [2.3/2.6]
序號：B6115 (P6114)

A main generator is connected to an infinite power grid with the following generator output parameters:

22 KV
60 Hertz
575 MW
100 MVAR (in)

Which one of the following contains a combination of minor adjustments to the main generator voltage regulator and speed control setpoints such that each adjustment will cause the main generator to operate at a power factor closer to 1.0? (Assume the generator power factor remains less than 1.0.)

	Voltage Setpoint	Speed Setpoint
A.	Increase	Increase
B.	Increase	Decrease
C.	Decrease	Increase
D.	Decrease	Decrease

ANSWER: A.

一台主發電機併聯到一個無限電網，下列為主發電機輸出參數：

電壓 22 kV
頻率 60 Hz
功率 575 MW
無效功率 100MVAR(輸入)

下列何者為微調主發電機電壓調整器和轉速控制的設定值組合，可降低主發電機功率因數接近 1.0？
(假設發電機功率因數保持小於 1.0)

	電壓設定值	轉速設定值
A.	增加	增加
B.	增加	減低
C.	減低	增加
D.	減低	減低

答案： A

科目/題號：291005/26 (2016 新增)
知能類：K1.08 [2.5/2.6]
序號：B6314 (P6315)

A main turbine-generator is connected to an infinite power grid with the following generator output parameters:

25 KV
20,000 amps
830 MW
248 MVAR (out)

Which one of the following will significantly increase main generator output current without a significant change in main generator real load? (Assume the generator power factor remains less than 1.0.)
A. Increasing the main turbine speed control setpoint.
B. Increasing the main generator voltage regulator setpoint.
C. A 10 percent decrease in power grid electrical loads.
D. A 10 percent increase in power grid electrical loads.
ANSWER: B

一台主汽輪發電機併聯到一個無限電網，下列為主發電機輸出參數：

電壓 25 kV
電流 20,000 amps
功率 830 MW
無效功率 248 MVAR(輸出)

在主發電機實際負載沒有顯著變化下，下列何者會顯著增加主發電機的輸出電流？(假設發電機功率因數保持小於 1.0)
A.增加主汽輪機轉速控制設定值
B.增加主發電機電壓調整器設定值
C.降低 10％電網的電力負載
D.增加 10％電網的電力負載

答案： B

科目/題號：291005/27 (2016 新增)
知能類：K1.08 [2.5/2.6]
序號：B6615 (P6614)

During a surveillance test, a 4,000 KW diesel generator (DG) and a 1,000 MW main generator (MG) at a nuclear power plant are connected to a power grid.
The following stable generator output conditions initially exist:

Diesel Generator	Main Generator
700 KW	800 MW
200 KVAR (out)	100 MVAR (out)

A malfunction then occurs, causing the voltage regulator for the MG to slowly and continuously decrease the MG field current. If no operator action is taken, the DG output current will _____ until a breaker trip separates the generators.
A. increase continuously
B. decrease continuously
C. initially increase, and then decrease
D. initially decrease, and then increase
ANSWER: A.

核能發電廠在偵測試驗期間，一台 4000kW 的柴油發電機（DG）和一台 1000MW 主發電機（MG）併聯到同一電網。下列是穩定的發電機輸出狀況：

柴油發電機	主發電機
700 kW	800MW
200 kVAR (輸出)	100 MVAR (輸出)

故障發生，導致 MG 電壓調整器慢慢地，不斷減低 MG 激磁電流。如果運轉員不採取行動，DG 輸出電流將_____直到其斷路器跳脫。
A.持續增加
B.持續減低
C.初始增加，然後減低
D.初始減低，然後增加

答案： A

科目/題號：291005/28 (2016 新增)
知能類：K1.08 [2.5/2.6]
序號：B6915 (P6914)

A main generator is connected to an infinite power grid with the following generator output parameters:

100 MW
0 MVAR
2,625 amps
22 KV

If the main generator field current is decreased, main generator amps will initially _____; and MW will initially _____.
A. decrease; decrease
B. increase; decrease
C. decrease; remain the same
D. increase; remain the same
ANSWER: D.

一台主發電機併聯到一個無限電網，下列為主發電機輸出參數：

功率 100 MW
無效功率 0 MVAR
電流 2,625 amps
電壓 22 kV

如果主發電機磁場電流減低，主發電機電流將_____；且 MW 將_____。
A.減低；減低
B.增加；減低
C.減低；保持一樣
D.增加；保持一樣

答案： D

科目/題號：291005/29 (2016 新增)
知能類：K1.08 [2.5/2.6] K1.09 [2.3/2.6]
序號：B7644 (P7644)

A main generator is connected to an infinite power grid with the following generator output parameters:

22 KV
60 Hertz
575 MW
100 MVAR (out)

Which one of the following contains a combination of minor adjustments to the main generator voltage regulator and speed control setpoints such that each adjustment will cause the main generator to operate at a power factor farther from 1.0? (Assume the generator power factor remains less than 1.0.)

	Voltage Setpoint	Speed Setpoint
A.	Increase	Increase
B.	Increase	Decrease
C.	Decrease	Increase
D.	Decrease	Decrease

ANSWER: B.

一台主發電機併聯到一個無限電網，下列為主發電機輸出參數：

電壓 22kV
頻率 60 Hz
功率 575 MW
無效功率 100 MVAR(輸出)

下列何者為微調主發電機電壓調節器和轉速控制的設定值組合，可降低主發電機功率因數遠離 1.0？(假設發電機功率因數保持小於 1.0)

	電壓設定值	轉速設定值
A.	增加	增加
B.	增加	減低
C.	減低	增加
D.	減低	減低

答案： B

科目/題號：291005/30 (2016 新增)
知能類：K1.09 [2.3/2.6]
序號：B4415

A main generator is supplying 300 MVAR to the power grid with a 0.85 power factor. What is the approximate MW load on the main generator?
A. 186 MW
B. 353 MW
C. 484 MW
D. 569 MW
ANSWER: C.

一台主發電機供給 300MVAR 到電網，其功率因數為 0.85，主發電機上有大約多少 MW 負載？
A. 186MW
B. 353MW
C. 484MW
D. 569MW

答案： C

科目/題號：291005/31 (2016 新增)
知能類：K1.09 [2.3/2.6]
序號：B4815 (P4814)

A main generator is connected to an infinite power grid with the following generator output parameters:

22 KV
60 Hertz
575 MW
100 MVAR (in)

Which one of the following contains a combination of manual adjustments to the main generator voltage regulator and speed control setpoints such that each adjustment will initially result in a decrease in main generator amps?

	Voltage Setpoint	Speed Setpoint
A.	Increase	Increase
B.	Increase	Decrease
C.	Decrease	Increase
D.	Decrease	Decrease

ANSWER: B.

一台主發電機併聯到一個無限電網，下列為主發電機輸出參數：

電壓 22kV
頻率 60 Hz
功率 575 MW
無效功率 100 MVAR(輸入)

下列何者為調整主發電機電壓調整器和轉速控制設定值的組合，可調整使主發電機電流的減少？

	電壓設定值	轉速設定值
A.	增加	增加
B.	增加	減低
C.	減低	增加
D.	減低	減低

答案： B

科目/題號：291005/32 (2016 新增)
知能類：K1.09 [2.3/2.6]
序號：B6415

A main generator has the following output parameters:
830 MW
25 KV
20,000 amps
What is the reactive power for this generator?
A. 36 MVAR
B. 143 MVAR
C. 247 MVAR
D. 330 MVAR
ANSWER: C.

下列為主發電機輸出參數：
功率 830MW
電壓 25kV
電流 20,000amp
此發電機的無效功率為多少？
A. 36MVAR
B. 143MVAR
C. 247MVAR
D. 330MVAR

答案： C

科目/題號：291005/33 (2016 新增)
知能類：K1.09 [2.3/2.6]
序號：B6515

A main generator is supplying 300 MVAR with a 0.90 power factor. What is the approximate MW load on the main generator?
A. 145 MW
B. 270 MW
C. 484 MW
D. 619 MW
ANSWER: D.

一台主發電機供給 300 MVAR，其功率因數為 0.9，主發電機上大約有多少 MW 負載？
A. 145 MW
B. 270 MW
C. 484 MW
D. 619 MW

答案： D