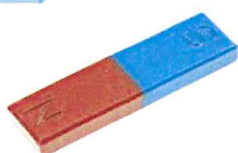


physics

12 GENERAL FINAL
EXAM (EOT3)

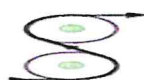
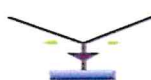
2023 – 2024

FAHED KAMAL ALSAGHBEENI



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PHYSICS

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يمكنكم الانضمام لقناتنا الجديدة على Telegram بمسح الباركود :

او الضغط على الرابط: <https://t.me/FahedKamal>

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1

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The unit of induced electromotive force (EMF) is the

وحدة القوة المحركة الكهربائية (المستحثة) هي :



A

Volt

B

Newton

C

Tesla

D

Ohm

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How is an electric potential supplied to a circuit driven by electromagnetic induction?

كيف يتم توفير الجهد الكهربائي لدائرة بواسطة الحث الكهرومغناطيسي؟



A

motor

B

cell

C

battery

D

separation of charge

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Electromagnetic induction was discovered by

تم اكتشاف الحث الكهرومغناطيسي بواسطة



A

Tesla

B

Newton

C

Faraday

D

Einstein

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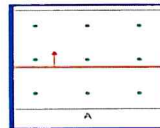
4

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Wire A moves up and wire B moves down in the magnetic fields as shown.

The current in A moves

The current in B moves.....



يتحرك السلك A لأعلى والسلك B يتحرك لأسفل في

المجالات المغناطيسية كما هو موضح

يتحرك التيار في A

يتحرك التيار في B

A

Right - Left

B

Left - Right

C

Up - Down

D

Down - Up

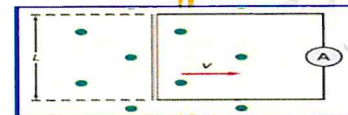
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A straight wire, 0.20 m long, moves at a constant speed of 7.0 m/s perpendicular to a magnetic field of strength 8.0×10^{-2} T.

What EMF is induced in the wire?



سلك مستقيم طوله 0.20 متر يتحرك في مجال مغناطيسي بسرعة ثابتة 7 متر بالثانية عامودياً على مجال مغناطيسي شدته 8.0×10^{-2} T احسب القوة الكهربائية المستحثة

A

 1.12×10^{-1} V

B

0.012 V

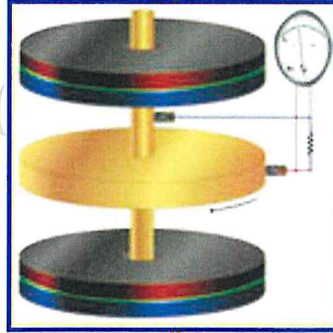
C

 11.2×10^{-3} V

D

115 V

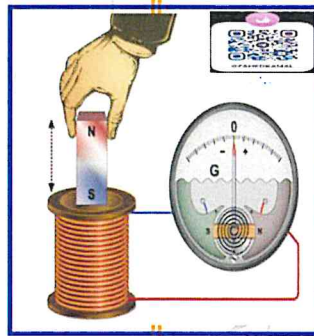
What will the relative motion between the disc and the magnets cause?



ما الذي ستسببه الحركة النسبية بين القرص والمغناطيس؟

- | | | | |
|---|---|---|---|
| A | separates the charges which stops current flowing through the circuit | B | induces a current which drives an EMF in the circuit |
| C | induces an EMF which drives a current in the circuit | D | creates a charge which makes EMF flow through the circuit |

If the magnet is moved down inside the coil of wire, the galvanometer moves to the right. Choose another arrangement that also causes the dial to move to the right



إذا تم تحريك المغناطيس لأسفل داخل ملف السلك، يتحرك الجلفانومتر إلى اليمين. اختر ترتيباً آخر يؤدي أيضاً إلى انتقال القرص إلى اليمين

- | | | | |
|---|---|---|---------------------------------------|
| A | reversing the magnet and moving it down | B | moving the magnet up through the wire |
| C | reversing the magnet and moving it up | D | stopping the magnet inside the wire |

What is the correct definition of the induced electromotive force (EMF)?

ما هو التعريف الصحيح للقوة الدافعة الكهربائية المستحثة (EMF)



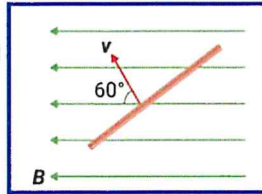
- | | |
|---|--|
| A | The force acting on the wire parallel to the magnetic field. |
| B | The potential difference across a wire caused by separation of charge. |
| C | The force acting on the wire to move it in a magnetic field. |
| D | The potential difference in a wire induced by a battery. |

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What is the velocity of a 25 cm length of wire moving in a direction at 60° relative to a magnetic field with a strength of 1.5 T, if it develops an induced EMF of 3.0 V?



ما هي سرعة سلك طوله 25 cm يدور بزاوية كما في الشكل في مجال مغناطيسي شدته 1.5 T بقوة دافعة مقدارها 3.0 V

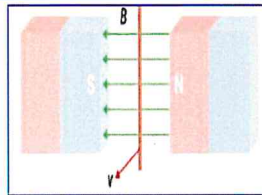
- | | | | | | | | |
|---|-------|---|---------|---|---------|---|---------|
| A | 5 m/s | B | 9.2 m/s | C | 4.1 m/s | D | 6.2 m/s |
|---|-------|---|---------|---|---------|---|---------|

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A vertical wire with a length of 55 cm moves horizontally, cutting across horizontal magnetic field with a strength of 45 mT. The speed of the wire is 12 m/s.



سلك رأسي بطول 55 سم يتحرك ليقطع خطوط المجال المغناطيسي 45 mT متحركاً بسرعة 12 m/s. القوة الدافعة الكهربائية نحو

The induced EMF in the wire is and the direction of force on the charges in the wire is

- | | | | | | | | |
|---|--------------|---|------------|---|--------------|---|------------|
| A | 0.3 V , Down | B | 300 V , Up | C | 300 V , Down | D | 0.3 V , Up |
|---|--------------|---|------------|---|--------------|---|------------|

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What principle drives electric generators?



ما هو المبدأ الذي يدفع المولدات الكهربائية؟

- | | | | |
|---|----------------------------|---|---------------------------|
| A | electromagnetic conduction | B | magnetic induction |
| C | electric motorization | D | electromagnetic induction |

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What is the maximum EMF generated by an AC generator with 5.5 m of wire that cuts a magnetic field of 15 T, rotating with a speed of 2.5 m/s?

ما هي القوة الدافعة الكهربائية الناتجة عن مولد تيار متردد طول سلكه 5.5 m متحركاً داخل مجال مغناطيسي شدته 15 T بسرعة 2.5 m/s (المطلوب اكبر قوة دافعة)



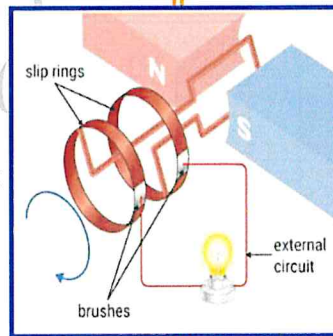
- | | | | | | | | |
|---|-------|---|-------|---|-------|---|------|
| A | 0.0 V | B | 207 V | C | 106 V | D | 90 V |
|---|-------|---|-------|---|-------|---|------|

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The armature loop of a generator is connected by slip rings to an external circuit. All of the statements completing this sentence are correct except one. Which statement is it?



السلك الفلزي للمولد متصل بحلقتين مغ دائرة كهربائية جميع العبارات التالية صحيحة ما عدا واحدة

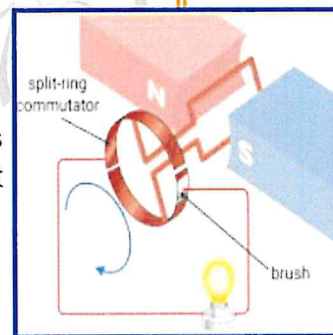
- | | | | |
|---|------------------------------|---|---------------------------------------|
| A | a direct current is produced | B | the current has a maximum and minimum |
| C | the current reverses | D | an alternating current is produced |

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The armature loop of a generator is connected by slip rings to an external circuit. All of the statements completing this sentence are correct except one. Which statement is it?



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- | | | | |
|---|-------------------------------------|---|--|
| A | the current reaches a maximum twice | B | a direct current is produced in the external circuit |
| C | the current becomes zero twice | D | an alternating current is produced in the external circuit |

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Which of the following is the correct SI unit for the induced EMF?

اي مما يلي هي وحدة النظام الدولي للقوة المستحثة ؟ EMF



- | | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | m | B | V | C | T | D | J |
|---|---|---|---|---|---|---|---|

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If an 80.0 W hair dryer is connected to an AC generator that supplies a maximum voltage of 220 V. The effective voltage of the hair dryer is equal to

مجفف شعر بقدرة 80 W تم توصيله بمصدر تيار متردد ذات يولد أقصى جهد بمقدار 220 V احسب قيمة الجهد الفعال



A

312 V

B

110 V

C

156 V

D

440 V

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The average power (P_{AC}) provided by an AC generator with maximum power ($P_{AC \max}$) is normally described by which of the following equations?

العلاقة بين القدرة المتوسطة والقدرة العظمي هي :



A

$$P_{avg} = 1/3 P_{Max}$$

B

$$P_{avg} = 2 P_{Max}$$

C

$$P_{Max} = 1/2 P_{avg}$$

D

$$P_{Max} = 2 P_{avg}$$

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If the average power (P_{AC}) provided by an AC generator is 4,950 W and the maximum potential difference is 450 V, the maximum current is ?

إذا كانت القيمة المتوسطة لقدرة مولد تيار مستمر تساوي 9450 w واكبر فرق جهد هو 450 V اكبر قيمة للتيار تكون ؟



A

12 A

B

22 A

C

15 A

D

10 A

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If the average power used by an electric heater is 2,000 W. What is the peak power of the electric heater?

إذا كان متوسط القدرة المستخدمة في السخان الكهربائي 2000 وات فما هي أقصى قوة للسخان الكهربائي؟



A

1000 W

B

2828 W

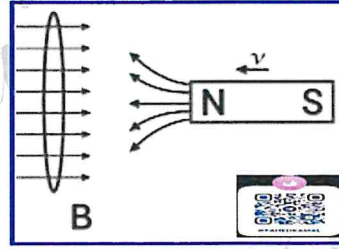
C

4000 W

D

6000 W

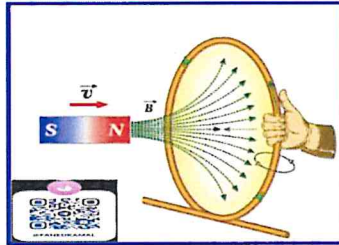
Choose the correct statement about this image of a magnet going through a loop of wire.



اختر العبارة الصحيحة حول هذه الصورة لمغناطيس يمر عبر حلقة من الأسلاك

- A** The induced electromagnetic field attracts the magnet.
- B** The induced S-pole in the wire is to the right.
- C** The induced N-pole in the wire is to the right.
- D** No current flows in the coil.

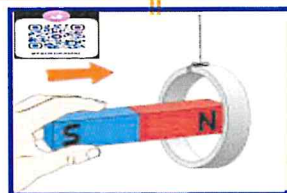
This image is a demonstration of Lenz's law. Choose the correct statement about the image.



هذه الصورة توضح قانون لنز اختر العبارة الصحيحة التي تصف الصورة

- A** If the magnet was moved to the left, the loop of wire would repel the magnet.
- B** The induced magnetic field around the loop of wire repels the magnet.
- C** The induced magnetic field around the loop of wire attracts the magnet.
- D** The magnet does not experience either attraction or repulsion.

While the magnet is moving into the metal ring hanged from a string, the ring will move



أثناء تحرك المغناطيس إلى الحلقة المعدنية المعلقة بخيط ، ستتحرك الحلقة

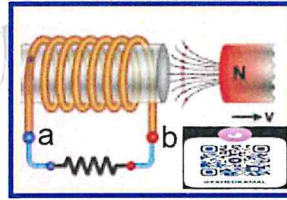
- A** Up **B** Down **C** Right **D** Left

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The direction of the induced current passing through the resistance



اتجاه التيار المستحث المار في المقاومة

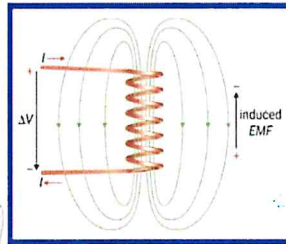
- | | | | | | | | |
|----------|--------|----------|--------|----------|-------------------|----------|-----------------|
| A | a to b | B | b to a | C | doesn't direction | D | doesn't current |
|----------|--------|----------|--------|----------|-------------------|----------|-----------------|

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What is the best explanation for the induced EMF in the coil?



ما هو أفضل تفسير للحث EMF في الملف

- | | |
|----------|---|
| A | Self-inductance induces an EMF in the same direction to the applied potential difference across the coil. |
| B | Self-inductance happens when the magnetic field is constant. |
| C | Mutual inductance induces an EMF in the direction opposite to the applied potential difference. |
| D | Self-inductance induces an EMF in the direction opposite to the change in the applied potential difference. |

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Which of the following is the correct definition of magnetic levitation?

أي مما يلي هو التعريف الصحيح للارتفاع المغناطيسي؟



- | | |
|----------|--|
| A | a device that changes mechanical energy into electrical energy for transmission and uses in external circuits |
| B | the movement of electric charge that periodically reverses direction along the wire |
| C | a property of a wire where an EMF is induced in the wire to oppose the change in the potential difference that caused it |
| D | the use of a magnetic field to suspend an object in air |

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Which of the following statements describes correctly the transformer?

ما هي العبارة الصحيحة التي تعطي وصفا دقيقا للمحول



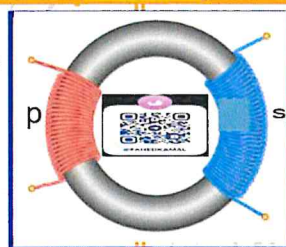
- A** The transformer increases or decreases voltage in an AC circuit.
- B** The transformer is always used to step up voltage to your house.
- C** The transformer is always used to step down voltage from the power station.
- D** The transformer increases or decreases voltage in a DC circuit.

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What is the correct statement about the transformer shown in this image?



ما هي العبارة الصحيحة التي تعطي وصفا دقيقا للمحول

- A** It is a step-up transformer with an input voltage that is higher than the output voltage.
- B** It is a step-up transformer with an input voltage that is lower than the output voltage.
- C** It is a step-down transformer with an input voltage that is higher than the output voltage.
- D** It is a step-down transformer with an input voltage that is lower than the output voltage.

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If the turns ratio on a transformer is $\frac{1}{22}$ and the primary voltage is 225 V, the secondary voltage is

إذا كانت نسبة عدد اللفات الثانوية إلى الأساسية في محول هي $\frac{1}{22}$ والجهد الأساسي هو 225 V فيكون الجهد الثانوي



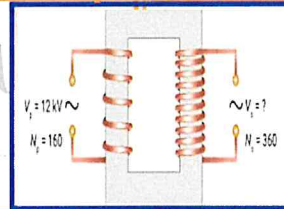
- A** 20 V **B** 15 V **C** 10.2 V **D** 20.4 V

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What is the output voltage for the transformer shown in the image?



احسب الجهد الثانوي للمحول المبين بالشكل

- | | | | | | | | |
|----------|-------|----------|--------|----------|------|----------|-------|
| A | 5.3 V | B | 5.3 kV | C | 27 V | D | 27 kV |
|----------|-------|----------|--------|----------|------|----------|-------|

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The transmission lines usually carry high voltage. What is the role of the device indicated by an arrow in the image?



عادة ما تحمل خطوط النقل جهدًا عاليًا. ما هو دور الجهاز الذي يشير إليه السهم في الصورة؟

- | | |
|----------|--|
| A | The device is a step-down transformer used to lower the voltage transmitted from the power line to the house. |
| B | The device is a step-down transmitter used to transmit the voltage from the house to the power line. |
| C | The device is a step-up transformer used to increase the voltage transmitted from the house to the power line. |
| D | The device is a step-up transmitter used to transmit the voltage from the power line to the house. |

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What does the term "ideal transformer" mean?

ماذا يعني مصطلح "محول مثالي"؟



- | | | | |
|----------|---------------------------|----------|---|
| A | It has 100% efficiency. | B | It always has a turns ratio of 1. |
| C | It can work on AC and DC. | D | Its input current = its output current. |

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The output current of an ideal transformer is 3.5 A and the output voltage is 240 V. The turns ratio is 2. What is the input current

تيار الثانوي في محول مثالي هو 3.5 A وجهد الخرج هو 240 V اذا كانت نسبة عدد اللفات هي 2 احسب التيار الاساسي (الدخل)



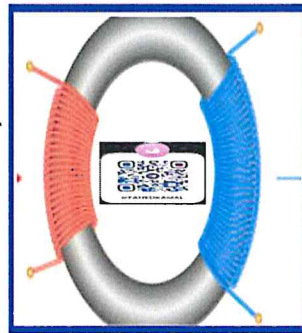
A	220 A	B	7 A	C	1.8 A	D	480 A
---	-------	---	-----	---	-------	---	-------

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All these formulas are correct for an ideal step-up transformer, except one. Which one is incorrect?.



كل هذه الصيغ صحيحة لمحول رفع مثالي ، باستثناء واحد. أيهما خاطئ؟

A	$I_p \times V_p = I_s \times V_s$	B	$P_p < P_s$
C	$I_p > I_s$	D	$V_p < V_s$

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What do you think a real transformer means?

ما هو الوصف الصحيح للمحول الحقيقي؟



A	Real transformers increase the voltage and the current at the same time.
B	Real transformers have perfect efficiency (100%).
C	Real transformers have efficiency $< 100\%$.
D	Real transformers have the same aim as isolation transformers.

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A transformer receives an input power across the primary coil of 600 W. What will be the power across the secondary coil if the transformer efficiency is 96%?

يستقبل المحول طاقة إدخال عبر الملف الأساسي 600 وات. ماذا ستكون الطاقة عبر الملف الثانوي إذا كانت كفاءة المحول 96%؟



- | | | | | | | | |
|---|----------|---|-------|---|----------|---|-------|
| A | 57,600 W | B | 625 W | C | 62,500 W | D | 576 W |
|---|----------|---|-------|---|----------|---|-------|

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Which of the following is the principle of transformer work?

اي مما يلي يمثل مبدأ عمل المحولات ؟



- | | | | | | | | |
|---|-----------------|---|-------------------|---|--------------------------|---|------------------------|
| A | Self-inductance | B | Mutual inductance | C | Conservation of charges. | D | Conservation of energy |
|---|-----------------|---|-------------------|---|--------------------------|---|------------------------|

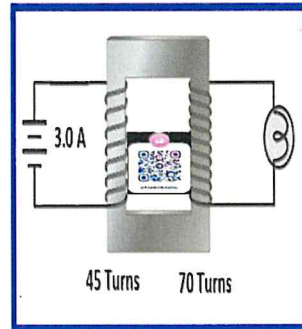
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Relay on the figure and find the current that will flow through the bulb?

انظر الشكل المجاور واحسب قيمة التيار المار في المصباح .



- | | | | |
|---|-------|---|-------|
| A | 1.9 A | B | 4.7 A |
| C | 2.6 A | D | 0.0 A |

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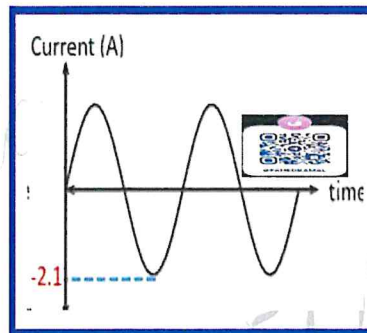
A straight wire that is 1.2 m long moves at speed of 12 m/s in parallel to a uniform magnetic field of 0.4 T strength, what EMF is induced in the wire?

سلك مستقيم طوله 1.2 m يتحرك بسرعة 12 m/s موازيا لخطوط المجال المغناطيسي المنتظم والذي تبلغ شدته 0.4 T احسب EMF المستحثة في السلك.



- | | | | | | | | |
|---|-------|---|-------|---|-------|---|-------|
| A | 5.8 V | B | 3.6 V | C | 4.1 V | D | 0.0 V |
|---|-------|---|-------|---|-------|---|-------|

The graph shows the changes of the induced current by an AC generator, what is the RMS current induced by this generator?



يوضح الرسم البياني التغيرات في التيار المستحث بواسطة مولد التيار المتردد ما هو التيار RMS الحالي الناتج عن هذا المولد؟

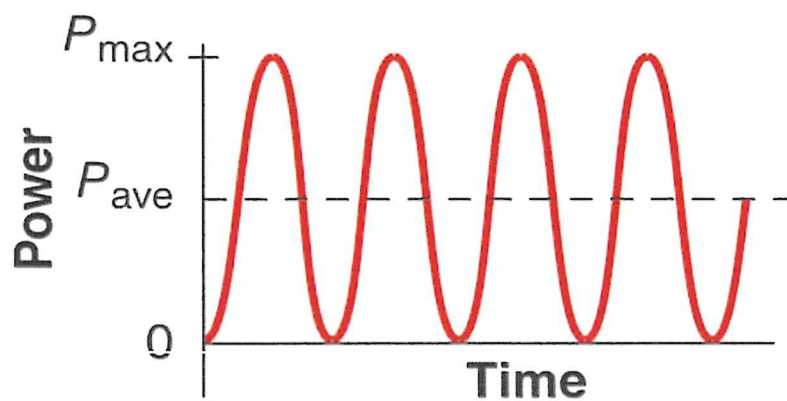
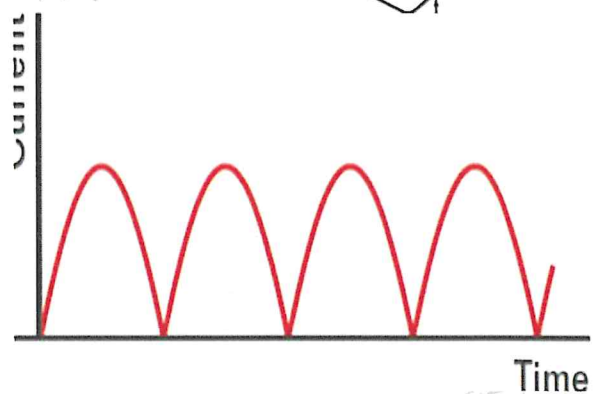
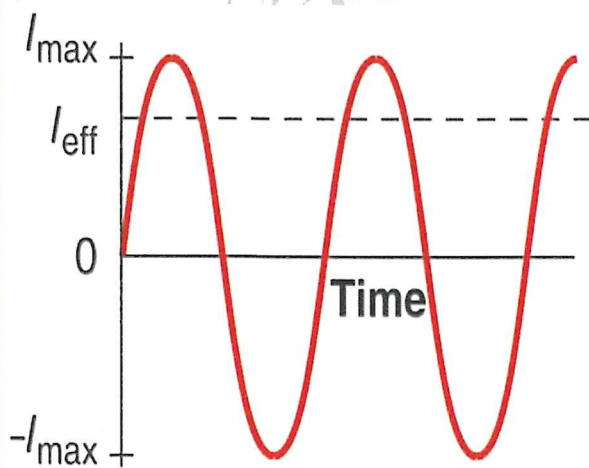
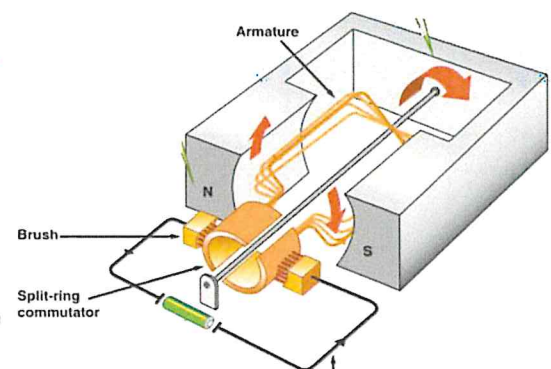
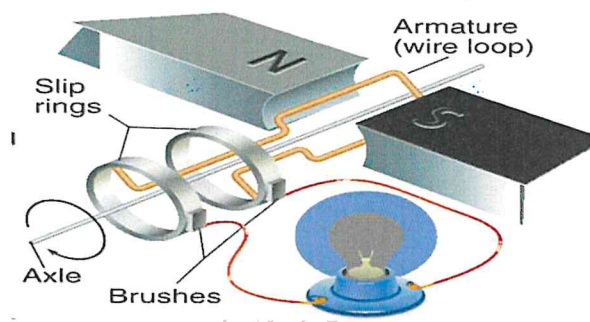
A 2.9 A

B 2.1 A

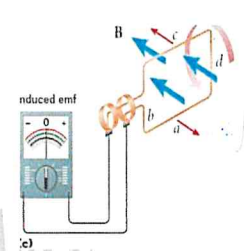
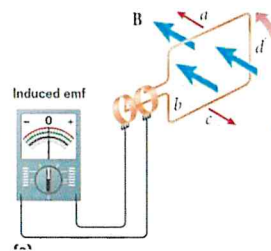
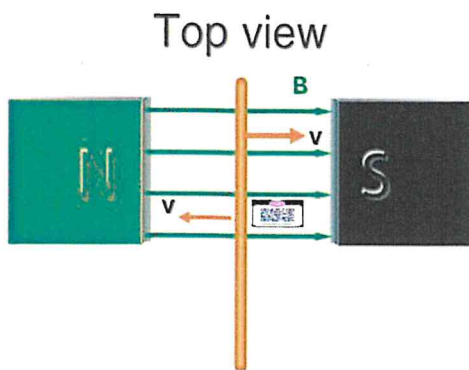
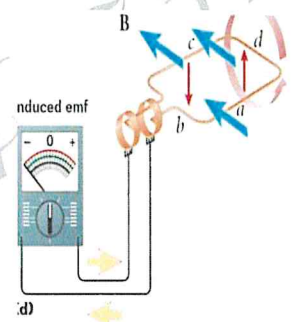
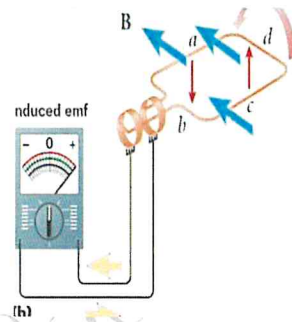
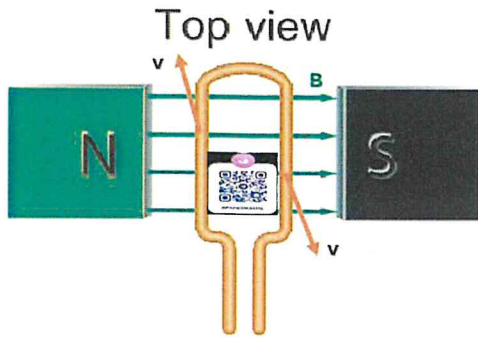
C 1.5 A

D 0.8 A

Notes



Notes

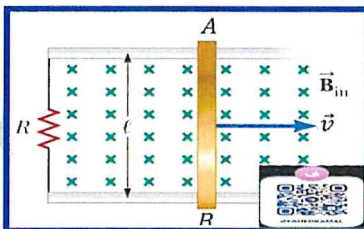


PART 2

$$EMF = BLv \sin \theta, \quad I = \frac{EMF}{R} = \frac{V}{R} \quad P_{AC} = \frac{1}{2} P_{max} = \frac{1}{2} I_{max}^2 R$$

$$Eff = \frac{\sqrt{2}}{2} \max \quad \text{or} \quad Eff = 0.707 \max \quad \text{or} \quad \max = \sqrt{2} \quad Eff$$

A straight wire AB, 1.3 m long, moves at a constant speed of 6.0 m/s perpendicular to a magnetic field of strength 0.42 T. The wire is part of a circuit that has a resistance of $= 3.0 \Omega$. What is the current through the wire?



سلك مستقيم AB طوله 1.3 متر يتحرك بسرعة ثابتة 6 m/s بشكل عامودي على خطوط مجال مغناطيسي 0.42 T والسلك هو جزء من دائرة مقاومتها 3.0Ω ما هو التيار المار بالسلك؟

An AC generator delivers a peak voltage of 425 V.

- What is the V_{eff} in a circuit placed across the generator?
- The resistance is $5.0 \times 10^2 \Omega$. What is the effective current?
- what is the average and peak power?



يوفر مولد التيار المتردد جهدا يصل إلى 425 فولت
أ. ما هو V_{eff} في الدائرة الموضوعة عبر المولد؟
ب. إذا كانت المقاومة $5 \times 10^2 \Omega$ فما هو التيار الفعال؟
ج. احسب كل من القدرة المتوسطة والعظمى.

The power supply in a laptop computer requires an effective voltage of 9.0 V from a 120-V line.

- If the primary coil has 475 turns, how many does the secondary coil have?
- A 125-mA current is in the computer. What current is in the primary circuit?
- What are the power input and output of the transformer?
- What is the efficiency of transformer?



يتطلب مصدر الطاقة في جهاز اللابتوب جهدا فعالا مقداره 9.0 V من مصدر تيار متردد 120 V.
1- إذا كان الملف الأساسي يحوي 475 لفة. احسب عدد لفات الملف الثانوي.
2- تيار الكمبيوتر هو 125 mA كم هو التيار الأساسي؟
3- احسب كل من قدة الدخل والخرج؟
4 - احسب كفاءة المحول

Defined :

Electromagnetic induction:

عرف :
الحث الكهرومغناطيسي

Electromotive force:



القوة المحركة الكهربائية:

Lenz's law:

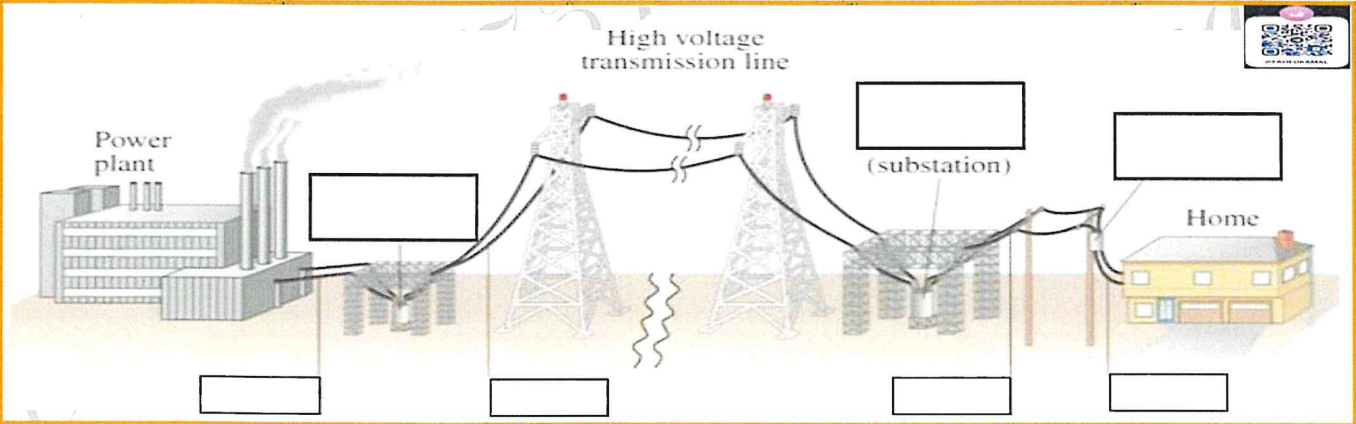


قانون لينز

magnetic levitation:



التعليق المغناطيسي :



GOOD LUCK



يمكنكم الانضمام لقناتنا الجديدة على Telegram بمسح الباركود :

او الضغط على الرابط: <https://t.me/FahedKamal>