11.2 Power Generation & Transmission

Question Paper

Course	DP IB Physics
Section	11. Electromagnetic Induction (HL only)
Topic	11.2 Power Generation & Transmission
Difficulty	Easy

Time allowed: 20

Score: /10

Percentage: /100

Question 1

To reduce power losses in the transmission lines between a power station and a town, two transformers are used. One is sited near to the power station and the second near to the town.

Which line correctly identifies the types of transformer used?

	Power station	Town
A.	step-down	step-down
B.	step-down	step-up
C.	step-up	step-down
D.	step-up	step-up

[1 mark]

Question 2

A dynamo which outputs direct current features a coil rotating in a magnetic field.

How is the direct current produced?

A. The induced emf in the coil changes direction every full turn and the commutator connects with a different side of the coil every half turn.

B. The induced emf in the coil changes direction every half turn and the commutator connects with the same side of the coil every half turn.

C. The induced emf in the coil does not change direction and the commutator connects with the same side of the coil.

D. The induced emf in the coil changes direction every half turn and the commutator connects with a different side of the coil every half turn.

[1 mark]

Question 3

Alternating current from a generator has a root mean square current of I.

Which expression give the peak current?

A. $2I$

B. $I\sqrt{2}$

C. $\frac{I}{2}$

D. $\frac{I}{\sqrt{2}}$

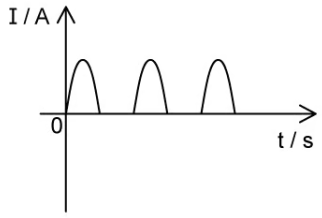
[1 mark]

Question 4

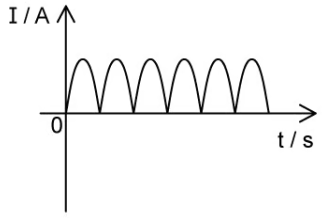
A student constructs a circuit with a supply of alternating current connected to an oscilloscope. They place a diode bridge between the supply and the oscilloscope.

Which diagram correctly represents the graph which will be seen on the oscilloscope?

A.



B.



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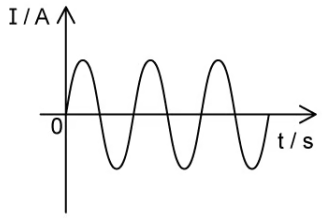

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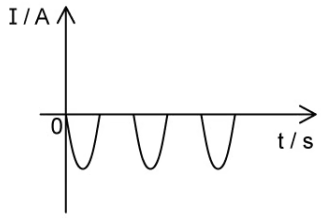


Question 5

A step-down transformer has an input voltage in the primary coil of 4000 V and an output voltage of 20 V in the secondary coil.

If the primary coil has 8000 turns, how many turns does the secondary coil have?

A. 40

B. 200

C. 80

D. 400

Question 6

[1 mark][1 mark]

Transformers allow current and voltage to be varied.

Which combination of voltage and current is the most efficient for transferring power over long distances in cables?

	Voltage	Current
A.	high	high
B.	low	low
C.	high	low
D.	low	high

[1 mark]

Question 7

A transformer receives alternating current. Both the rms voltage and the rms current increase by a factor of $\sqrt{2}$.

How is the maximum power affected?

A. It increases by a factor of $\sqrt{2}$.

B. It increases by a factor of 2.

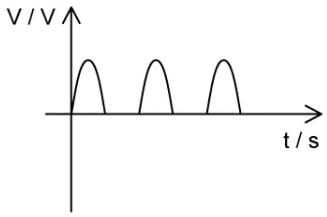
C. It increases by a factor of $\frac{1}{\sqrt{2}}$.

D. It does not increase.

[1 mark]

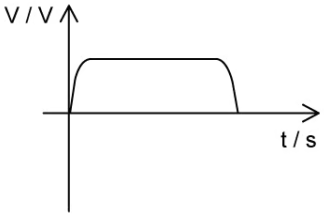
Question 8

The following input voltage is connected to a capacitor and resistor in parallel.



Which graph represents the output voltage after the capacitor-resistor configuration?

A.



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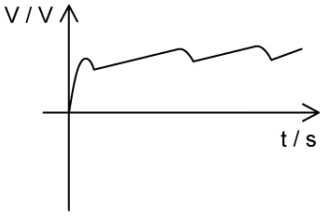

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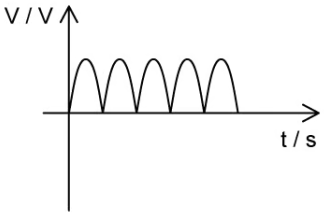

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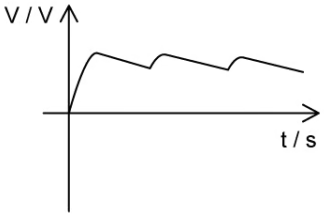
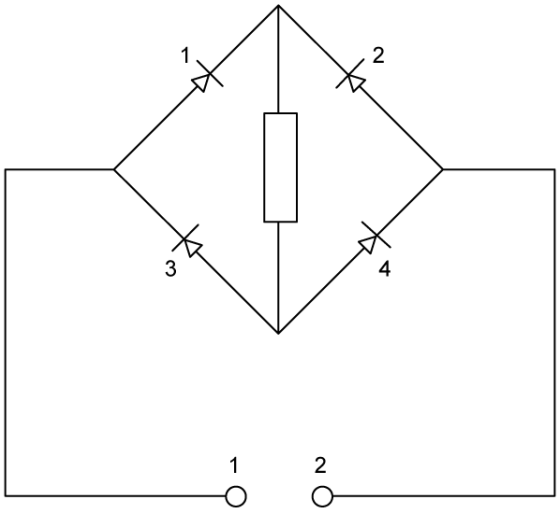


[1 mark]

Question 9

A diode bridge is shown below, alternating current is supplied between terminals 1 and 2.

When terminal 1 is positive, which diodes are conducting?



A. 1 and 2

B. 3 and 4

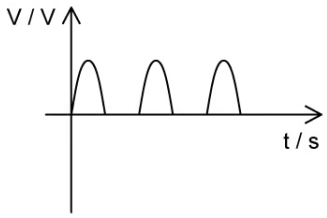
C. 1 and 4

D. 2 and 3

[1 mark]

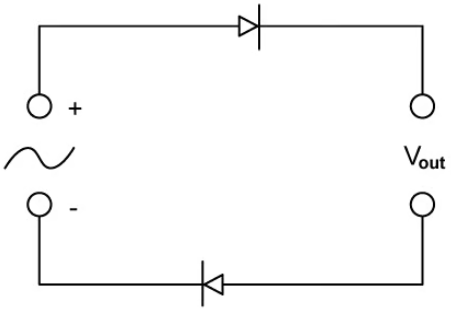
Question 10

A laptop charger must convert the alternating voltage it receives into the following direct voltage.



Which circuit will achieve this?

A.



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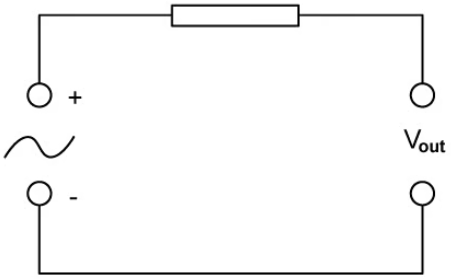

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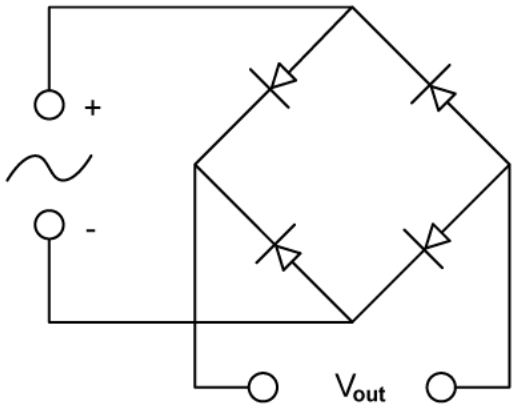

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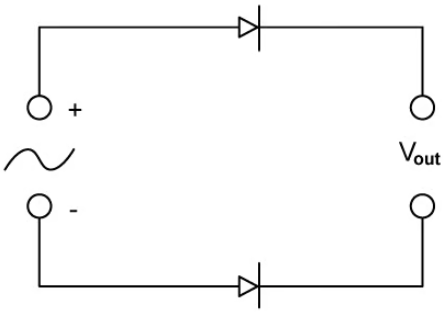

[1 mark]