11.2 Power Generation & Transmission

Question Paper

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

Exam Papers Practice

To be used by all students preparing for DP IB Physics HL
Students of other boards may also find this useful

Question 1

Two identical resistors R are connected in parallel to an ac power supply with root mean squared (rms) voltage which provides rms current, *I*. What is the maximum power developed in one of the resistors in the circuit?

A. $\frac{IV}{\sqrt{2}}$

B. IV

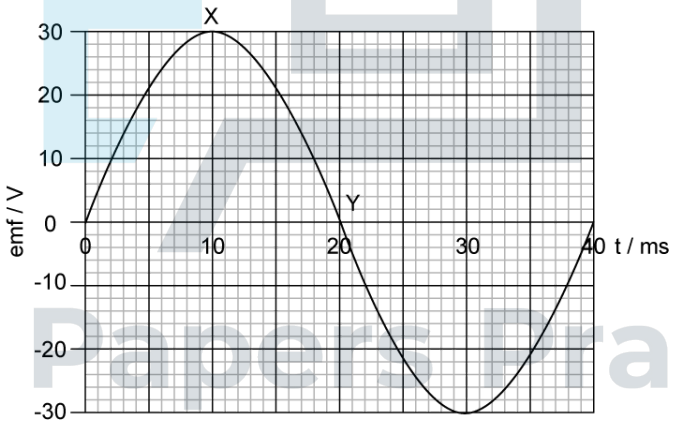
C. $\sqrt{2}IV$

D. $2IV$

[1 mark]

Question 2

A square loop of conducting wire is rotated at a constant rate in a region of magnetic field. The graph shows the variation with time *t* of the induced emf in the loop during one cycle.



The resistance of the coil is 10.0 Ω. Which of the following values gives the average power dissipated in the loop?

A. 90 W

B. 45 W

C. $\frac{90}{\sqrt{2}}$ W

D. $90\sqrt{2}$ W

[1 mark]

Question 3

What is the maximum instantaneous power delivered by a sinusoidal ac power supply with rms voltage V supplying rms current $2I$?

A. IV

B. $2IV$

C. $4IV$

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

[1 mark]

Question 4

An ac generator produces a root mean squared emf ε at frequency f. The rotational speed of the coil in the generator is increased by a factor of three. Which of the following correctly identifies the new values of frequency and output emf_{rms}?

	emf	frequency
A.	3ε	$\frac{f}{3}$
B.	3ε	$3f$
C.	$3\sqrt{2}\ \varepsilon$	$3f$
D.	$3\sqrt{2}\ \varepsilon$	$\frac{f}{3}$

[1 mark]

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Question 5

An ideal transformer is supplied with power P. The transformer has N_p turns on the primary coil and N_s turns on the secondary coil. Select the correct power output from the secondary coil.

A. $\frac{N_p V_s I_p}{N_s}$

B. $\frac{N_p}{N_s} \times P$

C. P

D. P^{-1}

[1 mark]

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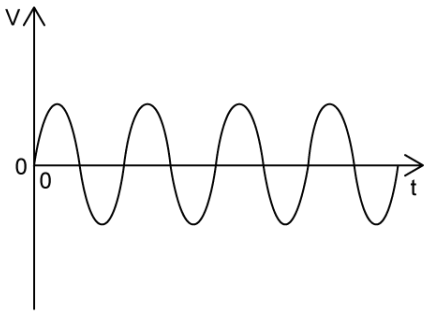
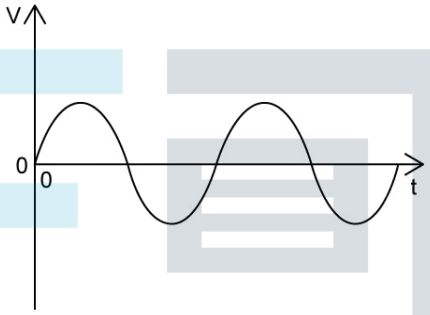
Question 6

The graph shows the variation with time t of the output voltage V of an ac generator.



Which graph, with identical scales on the axes, shows the output when the speed of rotation is doubled?

A.



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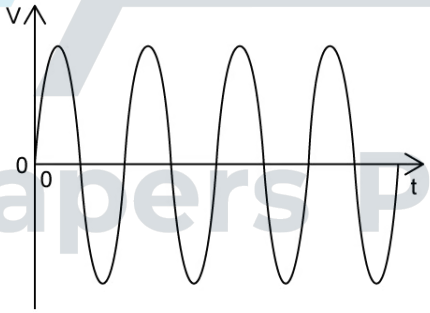
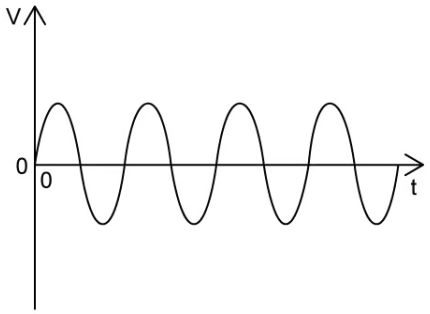


C.



D.

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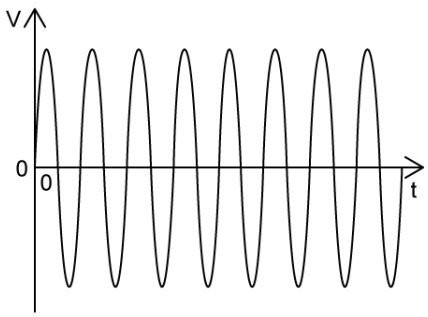

[1 mark]

Question 7

A power station produces ac voltage which is stepped up by a factor of 10^4. This reduces the power loss in the transmission cables by a factor of

A. 10^2

B. 10^4

C. 10^8

D. 10^{12}

[1 mark]

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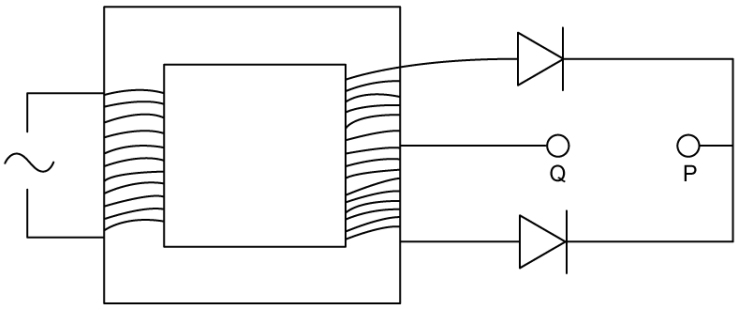
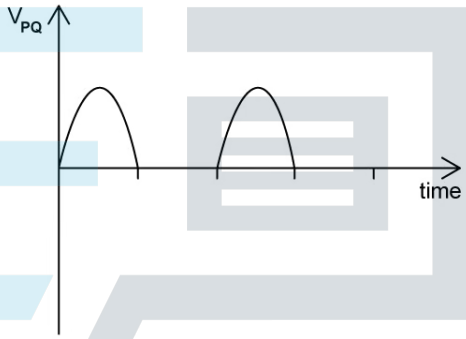
Question 8

The secondary coil of an ac transformer is connected to two diodes as shown.

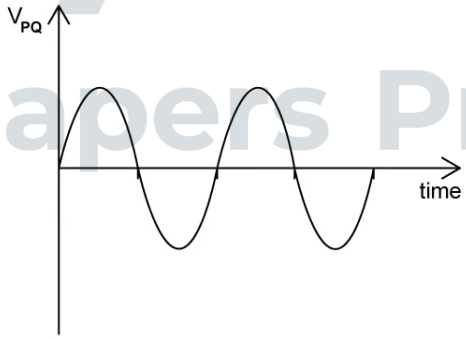


Which graph correctly shows the variation with time of the potential difference V_{PQ} between P and Q?

A.



B.



C.

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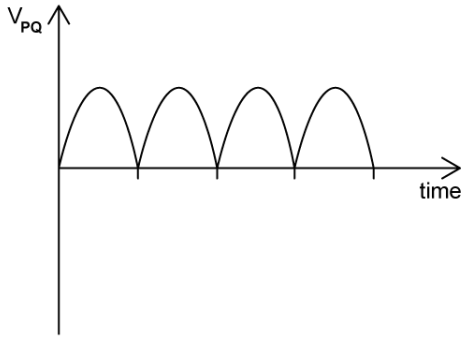
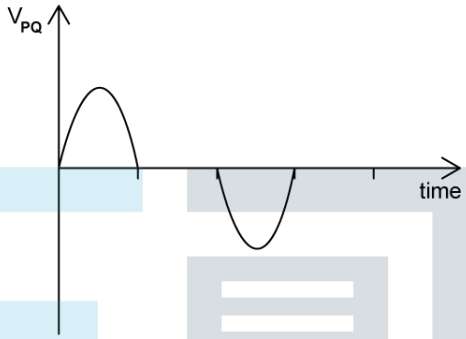


D.



[1 mark]

Question 9

A resistor of 3.0 kΩ is connected to an alternating current (ac) power supply of root mean square voltage 120 V. The graph shows the power dissipated in the resistor.

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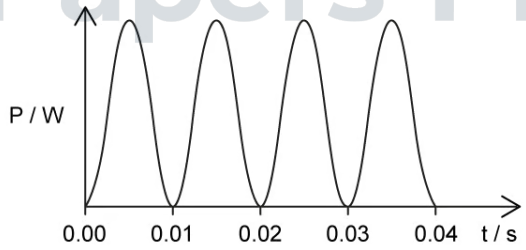

Which row correctly shows the frequency of the ac power supply and the average power dissipated in the resistor?

	frequency / Hz	power / W
A.	50	4.8
B.	50	9.6
C.	100	4.8
D.	100	9.6

[1 mark]

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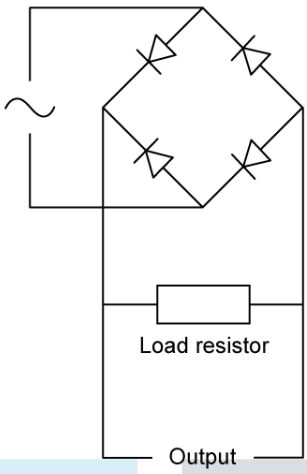
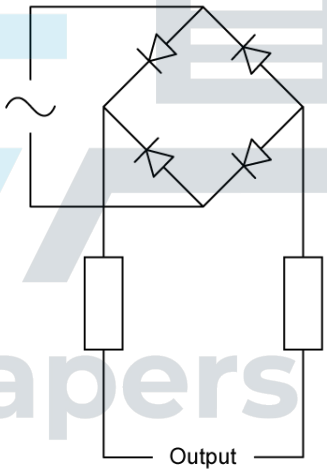
Question 10

The diagram shows a diode bridge rectification circuit connected to a load resistor.



Which change to the circuit will produce an output signal showing the most smoothing?

A.



B.

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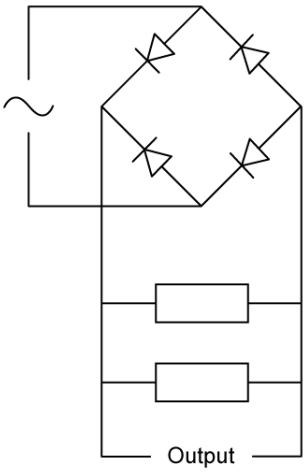
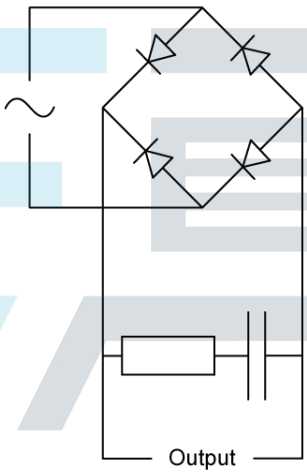
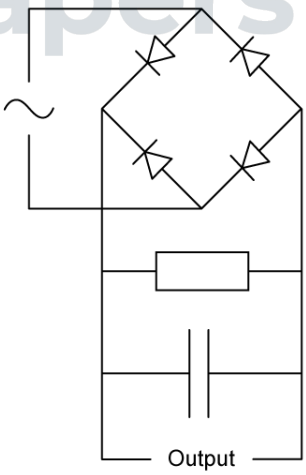


C.



D.



[1 mark]

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