Name of the Student:_____
Max. Marks : 27 Marks **Time : 27 Minutes**

Mark Schemes

Q1.

Question Number	Acceptable answer	Additional guidance	Mark
	D	The only correct answer is **D** because when damping is decreased maximum amplitude increases and the frequency at which it occurs increases A is not correct because it states that they both decrease B is not correct because it states that the maximum amplitude decreases C is not correct because it states that the frequency decreases	1

Q2.

Question Number	Answer	Mark
	D	1

Q3.

Question Number	Answer	Mark
	D	1

Q4.

Question Number	Answer	Mark
	C	1

Q5.

Question Number	Answer	Mark
	D	1

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Q6.

Question Number	Answer	Mark
	B	1

Q7.

Question Number	Acceptable answers	Additional guidance	Mark
	A		1

Q8.

Question Number	Answer	Mark
	C	1

Q9.

Question Number	Answer	Mark
	A	1

Q10.

Question Number	Answer	Mark
	C	1

Q11.

Question Number	Answer	Mark
	B	1

Q12.

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Question Number	Answer	Mark
	B	1

Q13.

Question Number	Answer	Mark
	D	1

Q14.

Question Number	Acceptable answer	Additional guidance	Mark
	D	The only correct answer is **D** because the frequency is inversely proportional to the square root of length and independent of the mass, so if length is quadrupled, frequency is halved to $f/2$ A is not the correct answer because it is $4f$ B is not the correct answer because it is $2f$ C is not the correct answer because it is f	1

Q15.

Question Number	Answer	Mark
	B – 0.40 Hz	1
	Incorrect Answers: Correct method: $f = 24 \div 60\ s = 0.40$ Hz A – uses 1 minute ÷ 24 C – uses 60 s ÷ 24 D – uses 24 ÷ 1 minute	

Q16.

Question Number	Answer	Mark
	C	1

Q17.

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Question Number	Answer	Additional guidance	Mark
	B		**(1)**

Q18.

Question Number	Answer	Additional guidance	Mark
	A	$(\frac{f}{\sqrt{2}})$	**(1)**

Q19.

Question Number	Acceptable answers	Additional guidance	Mark
	The only correct answer is B A is not correct as $E_k = 0$ when x = amplitude C is not correct as E_k is a scalar quantity D is not correct as E_k is a scalar quantity		1

Q20.

Question Number	Answer	Mark
	A	1

Q21.

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Question Number	Acceptable answer	Additional guidance	Mark
	D	The only correct answer is **D**: velocity is maximum when displacement is zero, and vice versa, and has positive and negative values since the direction reverses A is not correct because this shows maximum velocity when it should be minimum and vice versa B is not correct because this shows maximum velocity when it should be minimum and vice versa C is not correct because this does not show the change in direction of velocity during an oscillation	1

Q22.

Question Number	Answer	Mark
	C	1

Q23.

Question Number	Answer	Mark
	C	1

Q24.

Question Number	Answer	Mark
	B	1

Q25.

Question Number	Answer	Mark
	C	1

Q26.

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Question Number	Answer	Mark
	The only correct answer is B because acceleration is proportional to force, so the acceleration graph would have the shape of the force graph. The acceleration at the start is zero, so the velocity graph must have an initial gradient of zero. For the acceleration to be positive in the first quarter cycle the velocity must be increasing. This graph has an initial gradient of zero and increasing velocity. A the initial gradient is not zero C the initial gradient is not zero D the velocity in the first quarter cycle is decreasing	1

Q27.

Question Number	Acceptable answers	Additional guidance	Mark
	The only correct answer is **D** because velocity is equal to the gradient of the displacement-time graph A is not correct because velocity is equal to the gradient of the displacement-time graph, but here velocity is shown as proportional to −1 times the displacement B is not correct because velocity is equal to the gradient of the displacement-time graph, but here velocity is shown as −1 times the gradient C is not correct because velocity is equal to the gradient of the displacement-time graph, but here velocity is shown as proportional to the displacement		1

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