



PMT Education

GCSE

PHYSICS

8463/2H

Paper 2

Higher Tier

Mark scheme

Predicted Paper 2026 (Based on AQA)



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Question	Answers	Extra information	Mark	Main topic(s) tested
1.1	thumb represents the direction of the force (motion) on the wire	allow direction stated for each / conventional current	1	Fleming's left-hand rule
	first finger represents the direction of the magnetic field	allow alternate names for the fingers e.g. first finger = pointer finger	1	
	second finger represents the direction of the current		1	

1.2	strength of the magnetic field / force	allow how strong the magnetic field is	1	Magnetic fields Magnetic flux density
	per unit current per unit length		1	

1.3	a potential difference is induced / produced	allow current induced for emf / cutting magnetic field lines	1	Electromagnetic induction
	when a conductor moves through a magnetic field / when there is a change in magnetic field		1	

1.4	sound (waves) cause the diaphragm to vibrate	diaphragm moves is insufficient	1	Electromagnetic induction
	the diaphragm causes the coil / wire to vibrate		1	
	the coil / wire moves through the magnetic field or the coil / wire cuts magnetic field lines	do not accept moves the coil / wire up and down	1	
	a potential difference is <u>induced</u>	allow <u>induced</u> current for <u>induced</u> p.d.	1	



Question	Answers	Extra information	Mark	Main topic(s) tested
2.1	a magnetic force	allow non - contact force	1	Magnetism
	repulsion / magnets push apart		1	Magnetic fields

2.2	each half becomes a magnet	allow no isolated poles / no single pole	1	Magnetism
	each has a north and south pole		1	Magnetic poles

2.3	the permanent magnet has no effect on aluminium		1	Magnetic fields
	iron is attracted to the permanent magnet		1	
	only the permanent magnet can be repelled (by another permanent magnet)		1	

2.4	The magnetic field lines inside the solenoid are parallel to each other		1	Magnetic forces
	The field lines outside the solenoid form complete loops		1	
	The magnetic fields from the individual loops add together / reinforce each other		1	
	This creates the North / South poles (where the fields are the strongest)		1	



Question	Answers	Extra information	Mark	Main topic(s) tested
2.5	20 cm = 0.2 m $F = BIl$ $0.045 = B \times 1.5 \times 0.2$ $B = 0.045 / (1.5 \times 0.2)$ $B = 0.15$ T (Tesla)		1 1 1 1	Electromagnetism



Question	Answers	Extra information	Mark	Main topic(s) tested
3.1	Level 3: The description is detailed and logically sequenced, covering all key stages from formation to final stage		5-6	Life cycle of a star
	Level 2: Some stages are described correctly but sequence may be incomplete or lack detail		3-4	
	Level 1: Limited stages identified with little detail or incorrect sequence		1-2	
	No relevant content		0	
	Indicative content	<ul style="list-style-type: none"> • nebula (cloud of gas and dust) • gravitational collapse forms a protostar • temperature and pressure increase • nuclear fusion of hydrogen begins → main sequence star • hydrogen runs out so star begins to perform fusion with heavier elements → star collapses and pressure / temperature increases • star expands to red giant • outer layers lost • core remains → white dwarf • core cools → black dwarf 		





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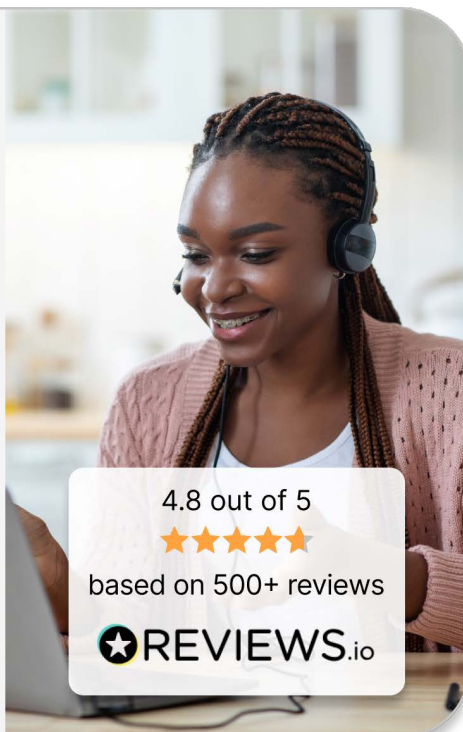
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Question	Answers	Extra information	Mark	Main topic(s) tested
3.2	acceleration is the rate of change of velocity		1	
	velocity is a vector quantity which has both magnitude and direction		1	
	direction is constantly changing (so it is accelerating)		1	

3.3	galaxies are moving away from us		1	Red shift Expanding universe
	light is shifted towards the red end of the spectrum		1	
	(as) wavelength increases / is stretched	allow frequency decreases	1	

3.4	an explanation linking:			Big Bang theory Cosmic microwave background
	<ul style="list-style-type: none"> The Big Bang theory has a beginning / initial explosion That releases / gives out radiation 	allow explosion from a point	1	
		allow radiation still present	1	



Question	Answers	Extra information	Mark	Main topic(s) tested
4.1	8 wavefronts = 7 complete waves		1	Waves Wavelength calculation
	140 mm = 0.14 m			
	$\lambda = 0.14 / 7 = 0.02 \text{ m}$		1	
	500 ms = 0.5 s		1	
	$f = 25 / 0.5 = 50 \text{ Hz}$		1	
	$v = f \times \lambda$			
	$v = 50 \times 0.02 = 1 \text{ ms}^{-1}$		1	

4.2	As depth increases, there is a larger column of liquid above the point	allow more particles above	1	Pressure in liquids
	this exerts more weight		1	
	As pressure is force per unit area, pressure increases		1	

4.3	pressure = ρgh		1	Pressure in liquids
	150 cm = 1.5 m			
	$= 1000 \times 9.8 \times 1.5$		1	
	$= 14700 \text{ Pa}$			
	Total pressure =			
	14 700 + 101 000		1	
	$= 115 700 \text{ Pa}$		1	



Question	Answers	Extra information	Mark	Main topic(s) tested
5.1	Centre of mass	allow centre of gravity	1	Moments

5.2	Moment of a force = Force x distance	allow $M = Fd$	1	Moments
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5.3	Moment clockwise = moment anticlockwise	allow correct unit conversions throughout		Moments
	Moment clockwise = $W \times 3.2$		1	
	Moment anticlockwise = 2.1×28		1	
	$W \times 3.2 = 2.1 \times 28$ $W = (2.1 \times 28) / 3.2$ $W = 18.4 \text{ N}$		1	
		allow $W = 18.375 \text{ N}$	1	

5.4	Momentum before = momentum after			Momentum
	160 g = 0.16 kg		1	
	300 g = 0.3 kg			
	Momentum before = $0.16 \times 38 = 6.08$		1	
	Momentum after = $0.46 \times v$		1	
$6.08 = 0.46v$ $v = 6.08 / 0.46$ $v = 13.2 \text{ ms}^{-1}$	1			

5.5	12 ms = 0.012 s		1	Momentum
	change in momentum = $0.3 \times (13.2 - 0) = 3.96$		1	
	$F = 3.96 / 0.012$ $F = 330 \text{ N}$		1	



Question	Answers	Extra information	Mark	Main topic(s) tested
5.6	padding increases the time taken for the ball to stop		1	Momentum
	this decreases the rate of change of momentum		1	
	this decreases the resultant force on the player		1	





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Question	Answers	Extra information	Mark	Main topic(s) tested
6.1	There is a resultant force	allow the weight is greater than the air resistance allow (initially) weight is the only force acting	1	Forces on a falling object
6.2	as the velocity of the skydiver increases, air resistance increases	allow speed for velocity 80	1	Terminal velocity
	until air resistance becomes equal to the weight of the skydiver so, the resultant force is (equal to) zero		1	
6.3	W = mg W = 80 x 9.8 W = 784 N		1	Resultant force Forces in motion
	F = m x a F = 80 x 15 F = 1200 N		1	
	Parachute must overcome weight force, then apply additional force for deceleration Total force = 1200 + 784 = 1984 N		1	
6.4	Force per chord = 1984 / 20 = 99.2 N	allow 2000 N instead of 1984 N	1	Forces and motion Terminal velocity
	F = ke 99.2 = 3000 x e e = 99.2 / 3000 e = 0.033 m		1	
	E _e = 0.5 x 3000 x 0.033 ² E _e = 1.63 J		1	



Question	Answers	Extra information	Mark	Main topic(s) tested
7.1	Any two from: <ul style="list-style-type: none"> The temperature of the object The colour of the object The material of the object 		2	Infrared radiation Emission

7.2	(as the cube gets hotter) the rate of emission of radiation is greater		1	Infrared radiation
	Eventually the rate of emission is equal to the rate of absorption		1	Emission and absorption

7.3	Shiny silver surfaces are good reflectors / poor absorbers of radiation		1	Infrared radiation
	Rate of absorption is lower, so rate of absorption = rate of emission at a lower temperature		1	Emission and absorption

7.4	Radiation emitted by the Earth is absorbed instead of escaping into space		1	Infrared radiation
	The atmosphere re-emits some of this radiation back to the Earth		1	
	Temperature of the Earth increases, as more radiation is absorbed than emitted		1	Emission
	Earth continues to warm until rate of absorption = rate of emission		1	



Question	Answers	Extra information	Mark	Main topic(s) tested
8.1	<p>Level 3: A clear, logical, and complete method is described. The setup is correct, and the student explains how to identify the critical angle</p>		5-6	Waves
	<p>Level 2: A functional method is described. Most steps are present, though there may be less detail on how to specifically identify the critical angle</p>		3-4	
	<p>Level 1: Simple relevant points are made, such as naming the equipment or stating that light reflects. The procedure is incomplete.</p>		1-2	
	<p>No relevant content</p>		0	
	<p>Indicative content</p> <ul style="list-style-type: none"> • Place the semi-circular glass block on a piece of paper and trace its outline. • Mark the normal at the centre of the flat face of the block. • Set up the ray box so a single thin beam of light enters through the curved face of the block. • Start with a small angle of incidence. • Slowly increase the angle of incidence by moving the ray box. • Observe the refracted ray leaving the flat face into the air. • Continue increasing the angle until the refracted ray travels along the flat boundary. • Mark the path of the incident ray at this exact point. • Remove the block and use a protractor to measure the angle between this incident ray and the normal. • This is the critical angle. • If the angle of incidence is increased any further, the light will undergo total internal reflection (no light leaves the block). • Repeat the measurement and calculate a mean to improve accuracy. 			



Question	Answers	Extra information	Mark	Main topic(s) tested
8.2	A wide beam makes it difficult to judge the centre of the beam		1	Waves

8.3	The ray box can become hot Switch off the ray box in between measurements		1 1	Waves
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