

## JUNIOR LYCEUM ANNUAL EXAMINATIONS 2009

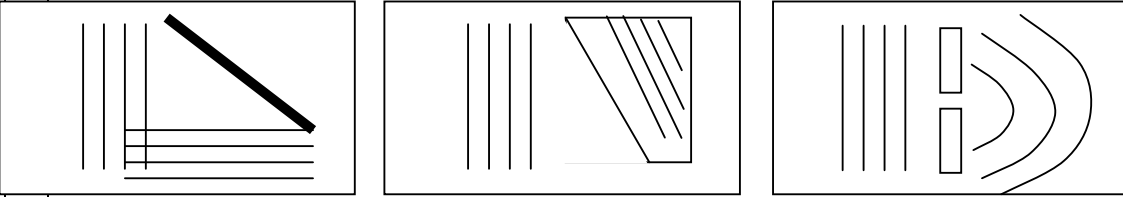
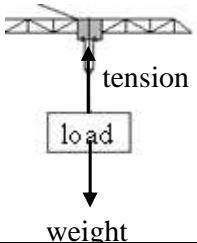
Directorate for Quality and Standards in Education  
Educational Assessment Unit

**FORM 3**

**PHYSICS**

**MARKING SCHEME**

SECTION A - 40 marks					
			<i>Answer</i>	<i>Marks</i>	<i>Additional Guidelines</i>
1	a		Force - N; Energy - J; Pressure - Pa; Frequency - Hz; Mass - kg	1,1,1,1, 1	
	b	i	Length	1	Breath or height
		ii	force meter / spring balance	1	
		iii	3500 J	1	
2		i	28cm <sup>3</sup>	1	
		ii	52cm <sup>3</sup>	1	
		iii	24cm <sup>3</sup>	1	
		iv	D = M / V = 214 / 24 = 8.9 g/cm <sup>3</sup>	1 1	Accept 8.9
		v	copper	1	
		vi	same rings of same material have the same density	1 1	
3	a	i	to create a vacuum	1	
		ii	outside air creates a force / pressure on the metal ball	1	
	b	i	P = ρ h g = 1000 x 1.3 x 10 = 13000 Pa or N/m <sup>2</sup>	1 1	This mark is for correct units
		ii	atmospheric pressure	1	
		iii	13,000 + 101,000 = 114,000 Pa or N/m <sup>2</sup>	1	
		iv	increases pressure is directly proportional to depth	1 1	as P increase with depth
4		i	universe, galaxy, solar system	1	
		ii	365 days	1	accept also 364 ¼ days
		iii	Jupiter is further away from the sun than the earth / larger orbit of Jupiter	1	
		iv	sun is the largest / has largest mass / has largest gravitational pull	1	
		v	moon	1	
		vi	any two suitable uses such as monitoring, communications, etc.	1,1	
		vii	gravitational force	1	

5	a	Ripple tank	1	
	b	i	lamp is to be drawn above water	1
		ii	correct label	1
		iii	X is under the ripple tank, close to the ground	1
	c	the wooden rod moves up and down by means of motor	1	
	d			
			1,1,1	
<b>SECTION B - 45 marks</b>				
6	a	Energy is neither created nor destroyed but only transformed	1 1	
	b	i	$P.E. = m g h$ $= 70 \times 10 \times 3.2$ $= 2240 \text{ J}$	1 accept 2240
		ii	$P.E. = K.E.$ $2240 = \frac{1}{2} m v^2$ $2240 = \frac{1}{2} \times 70 \times v^2$ $v = 8 \text{ m/s}$	1 1 1
		iii	PE and KE energies change into energy against friction and sound	1,1 accept heat energy
	c	i	correct scale correct axes correct points marked straight line passing through all points correct size of graph (takes up most of the page)	1 1 1 1 1
		ii	$1750 \pm 50 \text{ J}$ $4.3 \pm 0.1 \text{ m}$	1 1
7	a	i		1 1 mark for correct direction of arrows mark for correct labels
		ii	$W = F \times s$ $= 30,000 \times 15$ $= 450,000 \text{ J}$	1,1 1 mark for correct value & 1 mark for unit
		iii	$P = \text{work done} / \text{time taken}$ $= 450,000 / 60$ $= 7500 \text{ J/s or W}$	1,1,1 1 mark for conversion to seconds, 1 mark for correct value and 1 mark for correct unit

		iv	to balance moments on each side	1	
	b	i	stopwatch	1	
		ii	repeated readings of time	1	
		iii	speed = distance / time 330 = distance / 0.60 distance = 198 m	1 1	
		iv	longitudinal wave by compression and rarefaction through air	1 1	air molecules vibrate
		v	human error in switching on & off stopwatch at exactly the right moment / distance is too short	1	any acceptable answer
8	a	i	renewable	1	
		ii	Adv: clean energy / source is free Disadv: initial cost is high	1 1	any acceptable ans
		iii	batteries store energy during the day. Batteries are used during the night	1	
		iv	solar energy → stored energy → kinetic energy	1,1	
		v	K.E. = $\frac{1}{2}mv^2$ 5400 = $\frac{1}{2} \times 1200 \times v^2$ v = 3 m/s	1 1	
	b	i	renewable	1	
		ii	Adv - clean source of energy / source is free Disadv - power output is low / wind might not be always strong enough to turn turbines / high costs involved in setting up apparatus	1 1	any acceptable ans
		iii	less fossil fuel is burnt at power station / less pollutant gases are emitted	1	any acceptable ans
	c	i	diagram to the left - energy saving bulb diagram to the right - filament bulb	1	
		ii	an energy saving bulb converts electrical energy mainly into light energy and 'wastes' some heat energy. a filament bulb converts electrical energy mainly into heat energy and only small amount into light energy	1 1	