PHYSICS

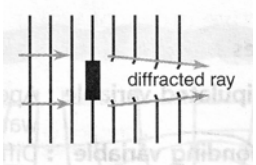
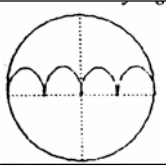
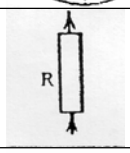
PAPER 1 (ANSWERS)

1. B
2. D
3. A
4. C
5. D
6. C
7. B
8. C
9. C
10. B
11. C
12. A
13. C
14. A
15. A
16. B
17. C
18. E
19. B
20. B
21. D
22. D
23. B
24. A
25. B
26. B
27. C
28. C
29. D
30. D
31. C
32. A
33. C
34. D
35. E
36. B
37. C
38. C
39. C
40. D
41. E
42. D
43. C
44. C
45. B
46. D
47. C
48. B
49. B
50. E

Marking scheme Paper 2

Section A

Section	Marks	Answer
Question 1 (a)	1	Potential difference
(b)	1	2.7 V
(c)	1	Parallel
(d)	1	Avoid parallax error
Total	4	
Question 2 (a)	1	inertia
(b)	1 1	1000(0.30) / 0.2 1.5 X 10^4 N
(c)(i)	1	time collision increases
(c)(ii)	1	safety seat belt.
Total	5	

Question 3 (a)(i)	1	
(a)(ii)	1	Diffraction
(b)	1 1	Amplitude decreases Energy of the wave is separated
(c)	1 1	$\lambda = 0.4$ m $v = 5 \times 0.4 = 2$ ms^{-1}
Total	6	
Question 4 (a)(i)	1	The process of changes from a.c to d.c.
(b)(i)	1	
(b)(ii)	1	
(c)(i)	1	
(c) (ii)	1	Charges and discharges process// smooth the waves
(d)	1 1	$V_{peek} = 240 \times /2$ 340 V
Total	7	
Question 5 (a)(i)	1	Parallel rays reflected by both mirror towards focal point, F.
(a)(ii)	1	Focal length both of the mirrors is FP // CP = 2F
(b)(i)	1 1	Curvature of Y mirror is greater than curvature of X mirror. Focal length of X mirror is greater than focal length of Y mirror.
(c)	1	The greater the curvature of mirror, the bigger the focal length.
(d)	1	Reflected ray is parallel to principle axis // CP
(e)	1 1	Car headlight/ torchlight To produce long distance light rays.
Total	8	
Questin 6 (a)	1	All the type of radioactive ray can be detected.
(b)(i)	1 1 1	The readings of rate meter decrease. At the end the readings of rate meter remain. The readings for A source decrease faster.
(b)(ii)	1	Same @ constant

(b)(iii)	1	Reading @ background ray
(c)	1 1	Alfa particle The power of penetration is low
Total	8	
Question 7 (a)(i)	1	Elastic Potential Energy
(a)(ii)	1	12 cm
(a)(iii)	1 1	k = F/x = 3.6/4 = 0.9 N cm^{-1}
(a)(iv)	1 1	x = 5/0.9 or 5.56 1 = 12 – 5.56 = 6.44 cm
(b)(i)	1	Directly proportional
(b)(ii)	1	Not be able to return to its original shape and size.
(b)(iii)	1 1	Add spring in parallel Use spring that have greater spring constant
Total	10	
Question 8 (a)	1	Isotope with unstable nucleic.
(b)	1 1	D The reading of count rate is highest.
(c)(i)	1	$^{226}_{88}Ra \rightarrow {}^{222}_{86}Rn + {}^{4}_{2}He$
(c)(ii)	1 1 1 1	100% → 50% → 25 % → 12.5% Natrium -24 : 3T = 45 T = 15 hours Cobalt -60 : T = 15.9/3 = 5.3 years Radium - 226 : T = 4860/3 = 1620 years
(d)(i)	1 1 1	Natrium – 24 Short half-life Emitting beta ray @ can be absorb in the ground but cannot absorbed in pipe.
Total	12	

Section B

Section	Marks	Answer
Question 9 (a)(i)	1	The pressure because of air mass/atmospheric
(ii)	1 1 1 1 1 1 1	the ping-pong ball in figure 9.2 is pushed to the water flow $P_1 = P_2$ // atmospheric pressure. $P_3 < P_4$ when air is flowing, the surrounding pressure was reduced. $P_3 > P_4$ the ping-pong ball is pushed to low pressure/ to water flow Bernoulli's principle.
(iii)		Bernoulli's principle
(b)	1 1 1	The upwards air velocity of the wing/aerofoil is greater The upwards pressure of the wing/aerofoil is higher The different between upwards and downwards of the wing produced lifted force.
(c)	1 1 1 1 1 1 1 1 1 1	Used air gun To obtain continues air flow the narrow of the jet / the thin air gun Air flow is greater Paint container made from metal Not easy to break Used the low density of metal light and mobility /easy to manage the volume of the paint container is bigger no need to refill
Total	20	
Question 10(a)	1	A distance between two successive crests or two successive troughs.
(b)	1 1 1 1 1	Hard surface Same wavelength Wave is reflected from hard surface Angle of reflection ray is equal to angle of incidence ray. Echoes
(c)	 1 1 1 1	In the region of the shallow water: wavelength is reduced speed is reduced After passing the shallow region: circular wavefront will be converged to the focal point, F after that it will be diverged

<table>
<tr><td>(d)</td><td>1
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1</td><td>
<table>
<tr><th>Suggestion</th><th>Explanation</th></tr>
<tr><td>Roof of the house is bent into a curved shape.</td><td>to reduce the difference in pressure</td></tr>
<tr><td>Bigger mass of the roof</td><td>need bigger force to be lifted.</td></tr>
<tr><td>Concrete wall</td><td>Harder @ to prevent the hit by the strong wave.</td></tr>
<tr><td>House is built in bay area</td><td>small amplitude of wave @ calm wave.</td></tr>
<tr><td>House is built in the area that have barmier</td><td>Water wave is reflected</td></tr>
</table>
</td></tr>
<tr><td>Total</td><td>20</td><td></td></tr>
<tr><td>Question 11 (a)</td><td>1</td><td>solar energy ⟶ heat energy</td></tr>
<tr><td>(b)(i)</td><td>1
1
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1

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1</td><td>
<table>
<tr><th>Characteristic</th><th>Reason</th></tr>
<tr><td>Used concave mirror</td><td>Reflecting and converging solar energy to solar heater</td></tr>
<tr><td>Concave mirror with small curvature aperture.</td><td>Short focal length @ more converged @ high converged power</td></tr>
<tr><td>Wall with blackened surface</td><td>Rate of absorption of solar heat is high.</td></tr>
<tr><td>Low specific heat capacity</td><td>container is easy to hot and easy to transfer heat to water</td></tr>
</table>
</td></tr>
<tr><td>(b)(ii)</td><td>1
1</td><td>R
Used concave mirror, concave mirror with small curvature aperture, wall with blackened surface and low specific heat capacity.</td></tr>
<tr><td>(c)</td><td>1
1
1
1</td><td>It’s easy to renew
Cheap
Pollution is not happened
Malaysian have a sun light for the hold year.</td></tr>
<tr><td>(d)(i)</td><td>1
1</td><td>Q = 1.5 x 4 200 x 6
= 37 800 J</td></tr>
<tr><td>(d)(ii)</td><td>1
1
1</td><td>80 x 600 @ 48 000J
48 000 – 37 800 @ 10 200
$Q = \frac{1.25 \times 10^6 \text{ J}}{4000} = 850 \text{ J}$</td></tr>
<tr><td></td><td>Total</td><td>20</td></tr>
<tr><td>Question 12 (a)(i)</td><td>1</td><td>The ratio of potential difference (V) across the conductor to the current (I).</td></tr>
<tr><td>(a)(ii)</td><td>1</td><td>Alternating current flows through the primary coil and induced the magnetic field.</td></tr>
</table>

<table>
<tr><td></td><td>1
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1
(Choose four of these)</td><td>The iron core becomes electromagnetic.
The alternating current produced the changing in the polarity of the magnetic field.
Changes in the magnetic flux occur in the secondary coil.
The changes in the magnetic flux produces an induced electromotive
force / current across the secondary coil.</td></tr>
<tr><td>(a)(iii)</td><td>
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1</td><td>
<table>
<tr><td>Aspects to be consider</td></tr>
<tr><td>- the type of current generated is alternating current.
- the potential difference of the alternating current supply can be raised or lowered using transformer.</td></tr>
<tr><td>- a high voltage transmission
- by reducing the current in the cables , the loss of the electrical power will be less.</td></tr>
<tr><td>- by using the low density of cables.
- so that it is lighter / easier to support.</td></tr>
<tr><td>- the resistance of the cables should be low.
- reduce the energy loss.</td></tr>
<tr><td>Choice : Q
Because alternating current, a high voltage transmission, cables with low density and less resistance.</td></tr>
</table>
</td></tr>
<tr><td>(b) (i)</td><td>1</td><td>Secondary current = 2A</td></tr>
<tr><td>(b)(ii)</td><td>1
1
1

1</td><td>Output power $P = I^2R + 24$
$= 48$ W
Input power $P = VI$
$= 60$W
Efficiency = (output power / input power) x 100
= 80%</td></tr>
<tr><td>Total</td><td>20</td><td></td></tr>
</table>

Marking scheme Paper 2

Section A

Sec	Marks	Answers
Question 1		
(a)	1	Potential difference / voltage
(b)	1	2.7 V
(c)	1	Parallel
(d)	1	Avoid parallax error
Total	4	

ANSWER S2K2Q05

a(i)	1	Parallel rays reflected by both mirror towards focal point, F.	
a(ii)	1	Focal length of both mirrors is FP ***or*** Focal point F is situated in the middle of the radius of curvature, R ***or*** CP = 2F	
b(i)	1	The curvature of mirror Y is greater than the curvature of mirror X ***or*** Mirror Y is more curved than mirror X.	
b(ii)	1	Focal length of mirror X is greater than focal length Y.	
c	1	The greater the curvature of mirror , the shorter the focal length.	
d	1	Reflected ray is parallel to principle axis or CP.	
e	1 1	Torch light ***or*** motorbike ***or*** car light. To produce long distance light ray / infinity .	Accept other answer that correct.
Total	8		

ANSWER S2K2Q06

a	1	Degree of hotness.	
b	1	Metal Q is higher / vice versa.	
c	1	Container Y is faster / vice versa.	
d (i)	1	The bigger the area, the faster the temperature become constant.	
d (ii)	1	The rate of heat absorbed is equal the rate of heat released.	
d (iii)	1	Thermal Equilibrium	
e	1 1	The constant temperature for metal R is higher. The amount of heat is greater.	
Total	8		

Answers

Sec	Marks	Answers
Question 12		
(a)(i)	1	The ratio of potential difference (V) across the conductor to the current (I).
	1 1 1 1 1	1. Alternating current flows through the primary coil and induced the magnetic field. 2. The iron core becomes electromagnetic. 3. The alternating current produced the changing in the polarity of the magnetic field. 4. Changes in the magnetic flux occur in the secondary coil. 5. The changes in the magnetic flux produces an induced electromotive force / current across the secondary coil. (Choose four of these)
(ii)	 1 1 1 1 1 1 1 1 1 1	Aspects to be consider - the type of current generated is alternating current. - the potential difference of the alternating current supply can be raised or lowered using transformer. - a high voltage transmission - by reducing the current in the cables , the loss of the electrical power will be less. - by using the low density of cables. - so that it is lighter / easier to support. - the resistance of the cables should be low. - reduce the energy loss. Choice : Q Because alternating current, a high voltage transmission, cables with low density and less resistance.
(b) (i)	1	Secondary current = 2A

	1 1 1 1	Output power $P = I^2R + 24$ $= 48$ W Input power $P = VI$ $= 60$W Efficiency = (output power / input power) x 100 $= 80\%$
Total	20	

Marking scheme Paper 3

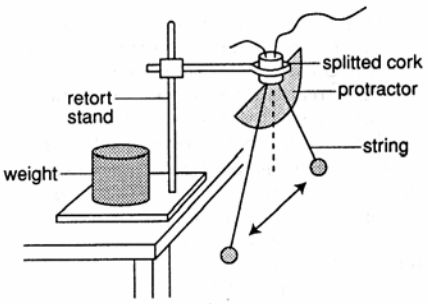
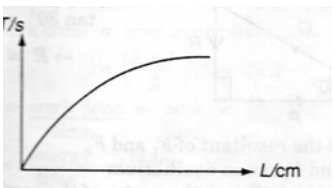
Section A

<table>
<tr><th>Section</th><th>Marks</th><th>Answer</th></tr>
<tr><td>Question 1
(a)(i)</td><td>1</td><td>Mass of oil , m</td></tr>
<tr><td>(a)(ii)</td><td>1</td><td>Rise in temperature of oil, θ</td></tr>
<tr><td>(a)(iii)</td><td>1</td><td>Power @ type of immersion @ heater @ time of heating</td></tr>
<tr><td>(b)</td><td>1</td><td>26 ºC</td></tr>
<tr><td>(c)</td><td>6</td><td>
<table>
<tr><th>m(kg)</th><th>1/m(kg^{-1})</th><th>θ_f</th><th>θ</th></tr>
<tr><td>0.20</td><td>5.0</td><td>58</td><td>32</td></tr>
<tr><td>0.25</td><td>4.0</td><td>51</td><td>25</td></tr>
<tr><td>0.30</td><td>3.3</td><td>47</td><td>21</td></tr>
<tr><td>0.35</td><td>2.9</td><td>44</td><td>18</td></tr>
<tr><td>0.40</td><td>2.5</td><td>42</td><td>16</td></tr>
</table>
</td></tr>
<tr><td>(c)</td><td>5</td><td></td></tr>
<tr><td>(d)</td><td>1</td><td>θ_f is inversely proportional to m</td></tr>
<tr><td>Total</td><td>16</td><td></td></tr>
<tr><td>Question 2
(a)</td><td>1</td><td>T^2 is directly proportional to l</td></tr>
<tr><td>(b)</td><td>1
1
1</td><td>$T^2 = 1.69\ s^2$
Show on the graphs when $T^2 = 1.69\ s^2$
length of pendulum = 42 cm</td></tr>
<tr><td>(c)(i)</td><td>1
1

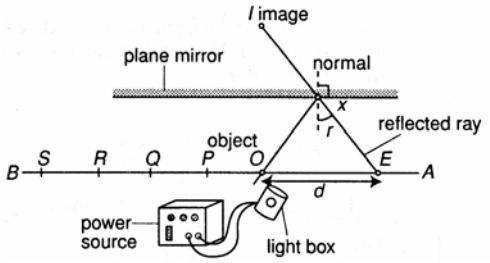
1</td><td>show on the graph
$\frac{2.10 - 0.65}{5^2 - 16}$
$0.040\ s^2\ cm^{-1}$</td></tr>
<tr><td>(c)(ii)</td><td>1

1</td><td>$g = \frac{0.3948}{0.04}$
$= 9.87\ ms^{-2}$</td></tr>
<tr><td>(d)</td><td>1

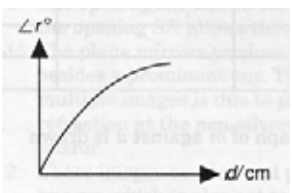
1</td><td>$T^2 = 0.3948\ \frac{80}{9.87}$ @ 3.2
T = 1.79 s</td></tr>
<tr><td>(e)</td><td>1</td><td>The simple pendulum swings through small angles from its equilibrium position.@ Set up wind block so its not affected by wind.</td></tr>
<tr><td>Total</td><td>12</td><td></td></tr>
<tr><td>SECTION B
Question 1
(a)</td><td>1</td><td>Student P, who is swinging with a longer metal chain ,oscillates with a longer period than student Q.</td></tr>
<tr><td>(b)</td><td>1</td><td>The longer the length of a pendulum, the longer the period of its oscillation.</td></tr>
<tr><td>(c)(i)</td><td>1</td><td>To investigate the relationship between the length of a pendulum</td></tr>
</table>

<table>
<tr><td></td><td></td><td>and its period of oscillation.</td></tr>
<tr><td>(ii)</td><td>2</td><td>manipulated variable – length of a simple pendulum, L
responding variable – the period of oscillation, T
constant variable – the mass of the pendulum bob.</td></tr>
<tr><td>(iii)</td><td>1</td><td>A pendulum bob, 120 cm of string , a retort stand, a metre-rule, a splitted cork, a stopwatch, a protractor and a 1 kg weight.</td></tr>
<tr><td>(iv)</td><td>1</td><td> 
</td></tr>
<tr><td>(v)</td><td>1
1
1</td><td>The length of the string, which is measured from the centre of the pendulum bob, is set at L = 100.0 cm.
The time of 20 complete oscillations, t_1, is recorded by using a stopwatch.
The experiment is repeated for length, L = 80.0 cm, 60.0 cm, 40.0 cm, and 20 cm.</td></tr>
<tr><td>(vi)</td><td>1</td><td>
<table>
<tr><th rowspan="2">Length, L/cm</th><th colspan="3">Time for 20 oscillations</th><th rowspan="2">Period T/s</th></tr>
<tr><th>t_1/s</th><th>t_2/s</th><th>Average t/s</th></tr>
<tr><td>100.0</td><td></td><td></td><td></td><td></td></tr>
<tr><td>80.0</td><td></td><td></td><td></td><td></td></tr>
<tr><td>60.0</td><td></td><td></td><td></td><td></td></tr>
<tr><td>40.0</td><td></td><td></td><td></td><td></td></tr>
<tr><td>20.0</td><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>(vii)</td><td>1</td><td> 

The result of the graph shows that the period of oscillation, T, of a pendulum increases with increasing length of the pendulum, L.</td></tr>
<tr><td>Total</td><td>12</td><td></td></tr>
<tr><td>Question 2
(a)</td><td>1</td><td>When the object is placed away from the observer, the image seen by the observer in the mirror also moves further away from the observer.</td></tr>
<tr><td>(b)</td><td>1</td><td>As an object is moving parallel to a vertical plane mirror, the larger the distance between the object and the observer, the larger the</td></tr>
</table>

		angle of reflection made by the reflected ray with the mirror.
(c)(i)	1	To investigate the relationship between the object distance from the observer and the angle of reflection made by the reflected ray.
(ii)	2	Manipulated variable – object distance from the observer, x Responding variable – angle of reflection Constant variable – distance of object and observer from mirror.
(iii)	1	Alight box, a narrow slit, plane mirror, power supply, protractor, metre rule.
(iv)	1	
(v)	1	

Distance, *d*/cm	Reflected angle, ∠r°
4.0	
6.0	
8.0	
10.0	
12.0	

(vi)	1 1 1	Two points O and E are marked on the line AB with d = 4.0 cm The angle of reflection < r is measured by using a protractor. The experiment is repeated with numerous distance from E, d = 6.0 cm, 8.0 cm, 10.0 cm and 12.0 cm
(viii)	1	 The shape of the graph shows that the hypothesis is proven correct.
Total	12	