Peperiksaan Akhir Tahun Selaras Tingkatan 4 Physics

Paper 1

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

Physics Paper 2 Marking scheme

Section A :

Question 1

(a) 0.1 cm (1)

(b) (i) (6.6 – 3.6) cm / 3.0 cm (1)

(ii) 3.0/5 / 0.6 cm (1)

(c) Vernier caliper/ micrometer screw gauge (1)

Total : 4

Question 2

(a) Work = Force X displacement (1)

(b) work done = F x s
= mg x h
= 30 x 10 x 3 (1)
= 900 J (1)

(c) Power = work done / time
= 900 / (2 x 60) (1)
= 7.5 W (1)

Total : 5

Question 3

(a) (i) Gravitational Potential energy (1)

(ii) Gravitational Potential energy → Gravitational Potential energy + Kinetic energy
→ Kinetic energy (2)

(b) - prolong time of impact (1)
- to prevent his knee injured (1)

(b) $F = \frac{mv}{t}$

$\frac{60 \times 5}{3} = \frac{300}{3}$ (1)

= 100 N (1)

Total : 7

Question 4

(a) velocity = rate of change of displacement (1)

(b) 4.5 s (1)

(c) distance = area under the graph

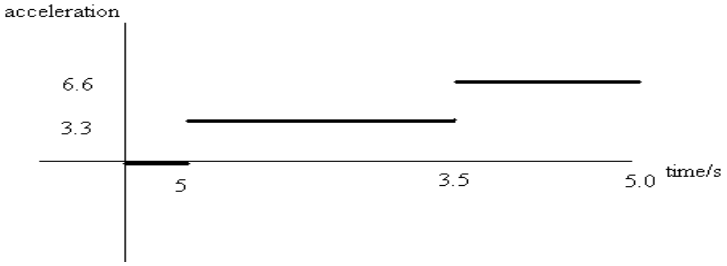
s1 = ½ (10 X 3) = 15 m (1)

s2 = ½ (3+ 4.5) 10 = 37.5 m (1)

total distance = s1 + s2 = 15 + 37.5 = 52.5 m

distance between the car and the road block when the car stop. = 60 – 52.5 = 7.5 m (1)

(d).



(2)

Total : 7

Question 5

(a) the length of the glass tube that is submerged in the oil is more compared to that of water (1)

(b) the density of the water is more than the oil (1)

(c)As the density of the liquid increased the length of the glass tube that is submerged in the liquid is decreased. (1)

(d) Upthrust / Bouyant Force (upwards) (1)
Weight (downwards) (1)

(e) Upthrust = Weight (1)

(f) Archimedes' Principle. (1)

Total : 7

Question 6

(a) The degree of hotness of an object. (1)

(b) (i) The rise in temperature of the soup in the metal pot is higher than the Rise in temperature of the soup in the clay pot. (1)

(ii) The rate of heat absorbed by the metal pot is higher than the rate of heat absorbed by the clay pot (1)

(c) When the rate of heat absorbed higher, the rise in temperature also higher (1)
Object that gain more heat will cause the higher temperature (1)

(d) temperature of the soup in the metal pot is lower than the temperature of soup in clay pot (1)

(e) An object with a lower specific heat capacity (1)
cools and heated faster due to its lower amount of heat stored. (1)

Total : 8

Question 7

(a) Bernoulli's Principle (1)

(b) (i) (1) (ii) (1)

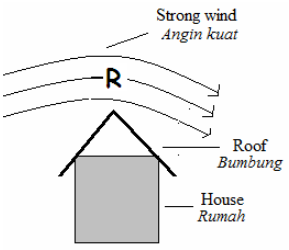


Diagram 7.1
Rajah 7.1

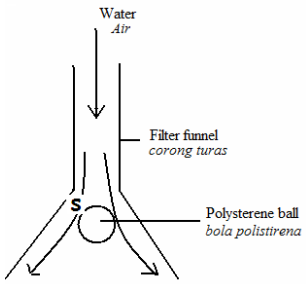


Diagram 7.2
Rajah 7.2

(ii) The air move with a high speed at R (1)

it will produce a region with low pressure (1)

(c) - use the flat roof (1)
which does not give rise to different velocity/ pressure
whereas no upthrust. (1)

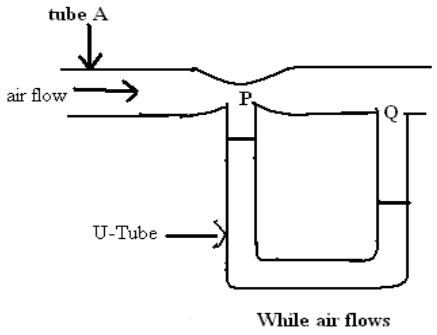
OR

- use much heavier roof (1)
which will be larger than the lifting force caused by
strong wind. (1)

(d) (i) same (1)

(ii) The pressuse at both column are same (1)

(e)



(1)

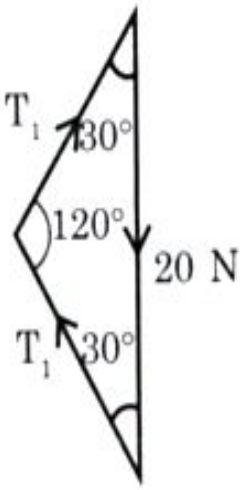
Total : 10

Question 8

(a) Equilibrium state is the state of an object in which the resultant force acting on the object is zero. (1)

(b) Weight of mirror = 2x10 = 20 N (1)

(c)



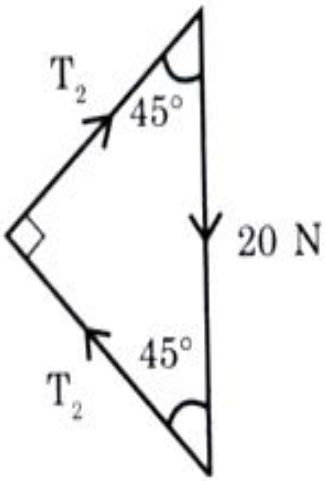
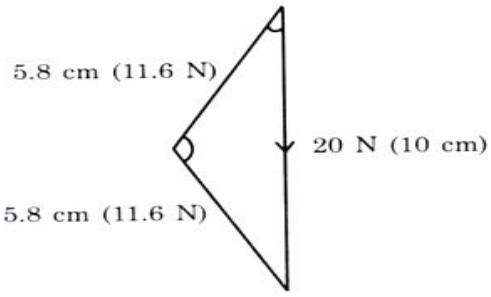
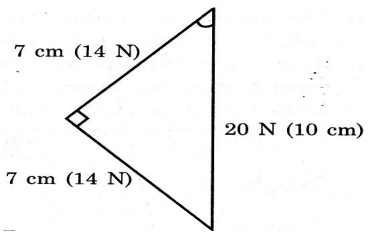


Diagram 8.1 Diagram 8.2 (2)

(d) (i)



By scale drawing
T_1 = 5.8 cm (1)
T_1 = 11.60 cm (1)



By measurement

T_2 = 7.00 cm (1)
T_2 = 14.00 cm (1)

(ii) The most suitable method to hang the mirror is as in Diagram 8. 1 (1)
This is due to the fact that the tension in the string T_1 is lower in value than T_2 (1)

(e) $v = u + gt$
v = 0 + 10(0.6) (1)
v = 6 ms $^{-2}$

(1)

Total : 12

Section B

Question 9 :

(a)

(i) Mass: A measure of the quantity of matter making up an object/ The quantitative measure of inertia of an object (1 mark)

(ii) - The calf is easier to moved than the bull (1 mark)
- The bull has a greater mass than the calf (1 mark)
- Inertia is a tendency of an object to remains its state of motion or if moving it will continue moving with constant velocity (1 mark)
- The bull therefore has a greater inertia than the calf (1 mark)
- the higher the mass the higher the inertia (1 mark)

(iii) inertia (1 mark)

(b) - A boy should run in zig-zag direction (1 mark)
- The wild bull has a greater mass so that it has a greater inertia. (1 mark)
- it difficult to change its direction (1 mark)

(c) (i) - The hammer is lifted high and then released (1 mark)
- Just before striking the pile, the hammer would have acquired a high momentum (or velocity). (1 mark)
- On striking the pile, the momentum of the hammer is reduced to almost zero in a short time. (2 marks)
- This produces an impulsive force of great magnitudes (1 mark)
- The impulsive force on the pile drives it deep into the ground. (1 mark)

(ii) - The increase in mass will result in higher momentum (1 mark)
- The increase in height of the hammer will increase the velocity of the hammer before it hits the pile, thus resulting in higher momentum (1 mark)
- When the hammer hits the pile with higher momentum, a bigger impulse force is produced on the pile and drives the pile deeper into the ground. (2 marks)

Total : 20 marks

Question 10 :

(a)

(i) Pressure is defined as force per unit area (1 mark)

(ii) - The air speed on both sides of the paper in Diagram 10.1 is the Same (1 mark)

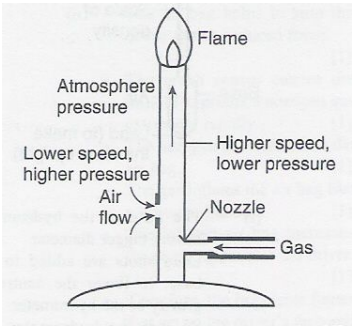
. In Diagram 10.2 The air speed on upper sides is higher than the air speed at the lower sides (1 mark)

- The higher the speed the lower the pressure (1 mark)
- The air pressure on the upper sides in smaller than the air pressure at the lower sides (1 mark)
- The higher the speed the lower the pressure (1 mark)
- The difference of pressure causes upward resultant force which acting on the paper. (1 mark)

any 4 marks

(iii) Bernoulli's principle (1 mark)

(iv)



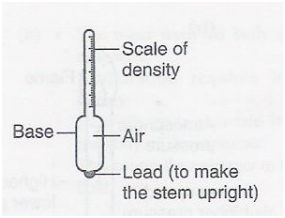
(2 marks)

The pressure of fast moving gas stream from the nozzle is less than the surrounding atmospheric pressure.

(1 mark)

The difference in pressure causes air to be drawn into the tube. (1 mark)

(b)



- The base of the hydrometer having bigger diameter (1mark)
- the hydrometer can stand up right in the liquid. (1 mark)
- Lead shots are added to the base , (1 mark)
  to lower the centre of gravity of the hydrometer (1 mark)
- It becomes more stable (1 mark)
- The stem of the hydrometer has a small diameter (1 mark)
- it needs to sink more in order to displace the same amount of water. It will increase its sensitivity. (1 mark)
- The stem be made thin and long (1 mark)
- Liquids with known densities are used to calibrate the hydrometer. (1 mark)
  For every liquid with known density, the level of the liquid on the hydrometer stem is marked. (1mark)
- The more the hydrometer sinks in a liquid, the smaller is the density of the liquid (1 mark)

any 10 marks

Question 11

(a) (i) . Enables to return to its original shape after applied external force is removed (1mark)

(ii)- Repulsion force and attraction force between atoms are always present in metals in solid state. (1 mark)

- When a compressive force is applied a force of repulsion between atoms acts (1 mark)
- When a stretching force is applied a force of attraction between atoms acts. (1 mark)
- When the external force is removed the repulsive force pushes and the attraction pull the atoms back to their original position (1 mark)

(b) 1. smaller diameter of coil (1 mark)
2. less elastic (1 mark)
3. length of spring not too long or too short (1 mark)
4. there is a space to compression of the spring (1 mark)
5. force constant moderately large (1 mark)
6. can give larger damping force to stop the oscillation of car Body (1 mark)
7. rate of spring low (1 mark)
8. last longer and not spoilt due to rusting (1 mark)
9. spring S is suitable (1 mark)
10. because of smaller diameter of coil, moderately length of spring , large force constant and low rate of rusting. (1mark)

(c) i. $200/ L-12 = 300/ L – 9$ (2 marks)
$L = 18$ cm (1 mark)

ii. Elastic Potenial energy = ½ F x
= ½ (3) (0.09) (1 mark)
= 0.135 J (1 mark)

Total : 20 marks

Question 12

(a) Total internal reflection (1 mark)

(b) (i). velocity decreases (1 mark)
the light ray is refracted towards normal (1 mark)
(ii). the light ray passing through more dense to less denser medium (1 mark)
angle of incidence more than critical angle. (1 mark)

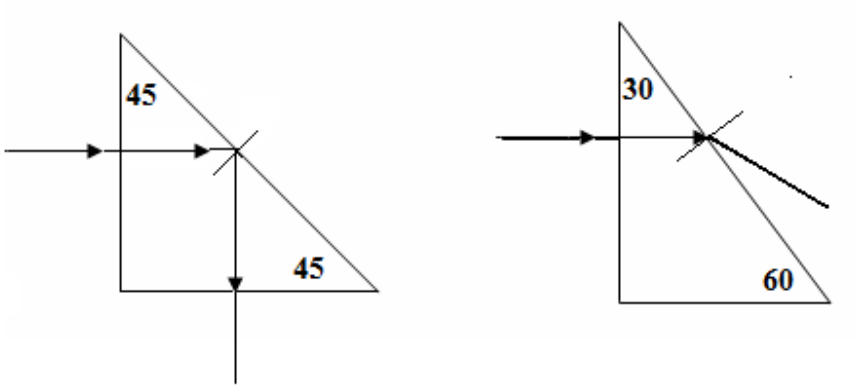
(c) 1. high refractive index than outer cadding (1 mark)
2. so that light ray can reflect when angle of incidence more than critical angle (1 mark)
3. lower density (1 mark)
4. the optical fibre will be lighter (1 mark)
5. should not contain impurity (1 mark)
6. impurity absorb light causes the image to be blurred (1 mark)
7. strong but flexible (1 mark)
8. do not break easily and can bent (change their shape) (1 mark)
9. K is most suitable (1 mark)
10. because high refractive index, low density, pure and strong and flexible. (1 mark)

(d) (i) n = 1/sin C (1 mark)

1.5 = 1/ sin C (1 mark)

C = 41.8 (1 mark)

(ii) (1) (1)



Total : 20 marks

END OF MARKING SCHEME

Physcis Paper 3 Answer :

Section A :

1 (a) (i) The temperature of the air / T
(ii) the pressure of the air / p / h
(iii) the mass of the air

(b) teachers check the marks on the manometer by students

(c)

T / ° C	T / K	h / cm
0	273	6.5
20	293	7.0
40	313	7.5
60	333	8.0
80	353	8.5
100	373	9.0

Correct label – 1, correct unit – 1, all values correct – 1, decimal places consistent – 1

(d) Uniform scale - 1 , correct label - 1, correct unit- 1, best straight line - 1, 5 points plot correctly - 1

(e) T increases linearly with h

2 (a) (i) Measure t_{20} for 20 oscillations. Period , $T = t_{20} / 20$

(ii) Oscillation in one vertical plane or amplitude of oscillation must be less than 15°.

(b) (i) T^2 decreases linearly with h

(ii) Gradient = - 1.60 / 0.40 = - 4.0 s^2 m^{-1}

$$g = \frac{-4\pi^2}{\text{gradient}}$$

$$= \frac{-4\pi^2}{-4.0}$$

$$= 9.87 \text{ m s}^{-2}$$

(iii) From the graph, when h = 0, $T^2 = 12.8\ s^2$

(iv) Height, $H = \frac{12.8}{3.99}$

$= 3.21$ m

Section B :

1.

(a) **Inference** : The inertia of the swing depends on the mass of the object.

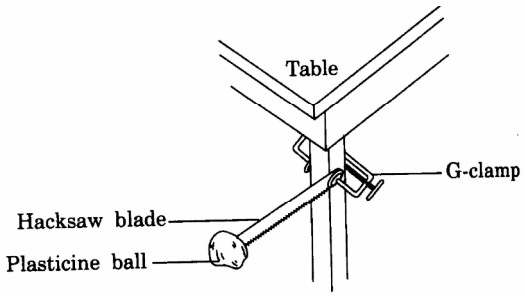
(b) **Hypothesis** : The bigger the mass, the larger the period.

(c) (i) **Aim** : To investigate the relationship between mass and period.

(ii) **Variables** :Manipulated - mass
:Responding - period
:Constant - stiffness of the hacksaw blade

(iii) **List of apparatus and materials** : hacksaw blade, G-clamp, stopwatch, plasticine balls of mass 20g, 40g, 60g, 80 g and 100g, table.

(iv) **Arrangement of apparatus** :



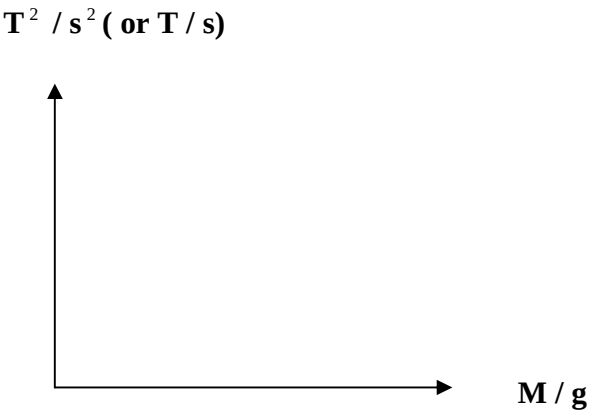
(v) Procedures :

- Place a 20g plasticine ball on the free end of the hacksaw blade.
- Displace the free end of the hacksaw blade horizontally and release it to oscillate. Measure the time for 20 oscillations using a stopwatch. Repeat the step. Calculate the average time for 20 oscillations. Determine the period using $T = \frac{t_{average}}{20}$
- Repeat the experiment using mass 40g, 60g, 80g and 100g.

(vi) Tabulation of data :

Mass / g	Time for 20 oscillations (T) / s			T / s	T^2 / s^2
	t_1	t_2	$T_{average}$		
20					
40					
60					
80					
100					

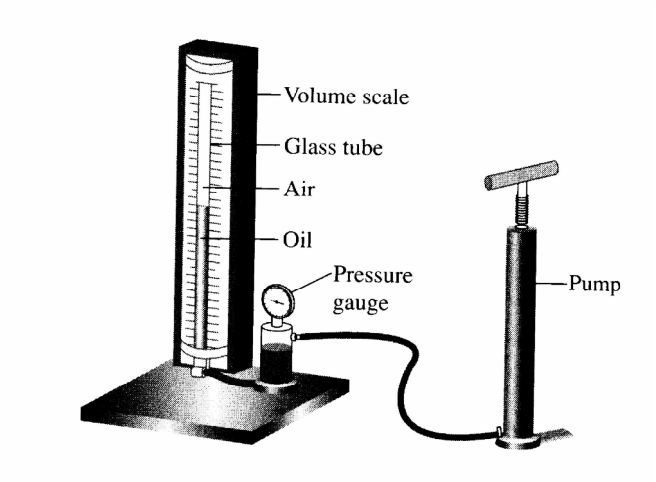
(vii) Analysis of data :



2.

(a) Volume of the bubble depends on the pressure of the sea water.
(b) The bigger the pressure, the smaller the volume
(c) (i) To investigate the relationship between pressure and volume
(ii) - Manipulated variable : pressure
- Responding variable : volume
- Fixed variable : temperature
(iii)Oil reservoir, glass tube with volume scale, pressure gauge, bicycle pump

(iv)



(v)
- Push the piston into the pump until P = 100 KPa
- Record the volume of the air in the capillary tube.
- Repeat the experiments with P = 150 KPa, 200 KPa, 250 KPa and 300 Kpa.

(vi)

Pressure, P / KPa	Volume, V / cm^3	$\frac{1}{V}$ / cm^{-3}
100		
150		
200		
250		
300		

(vii)