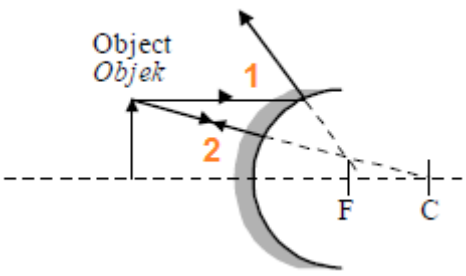
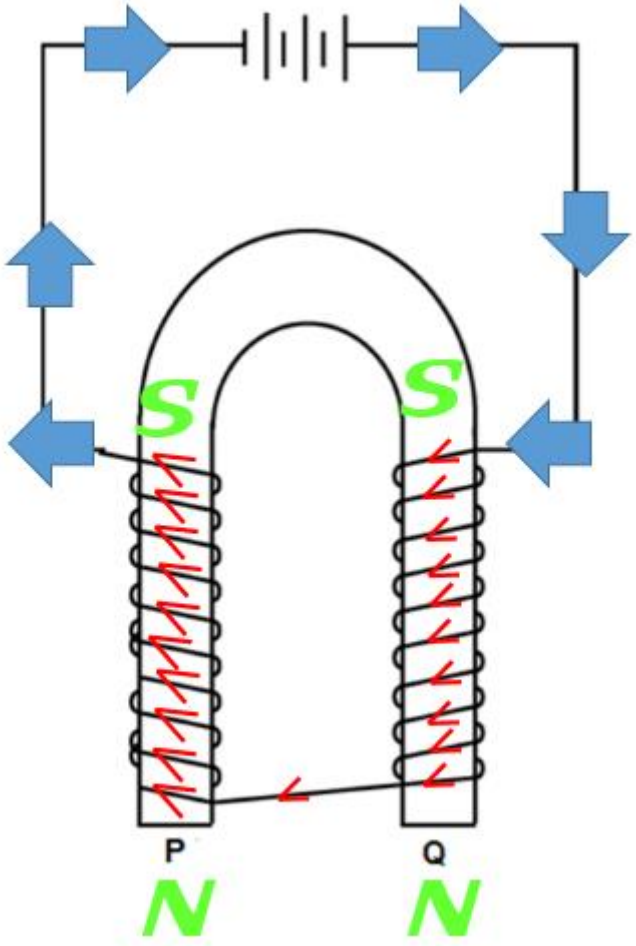
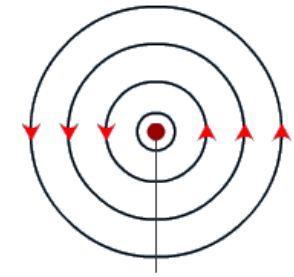
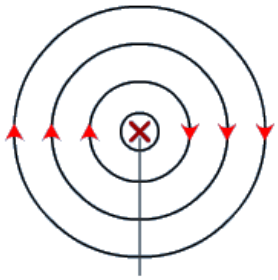
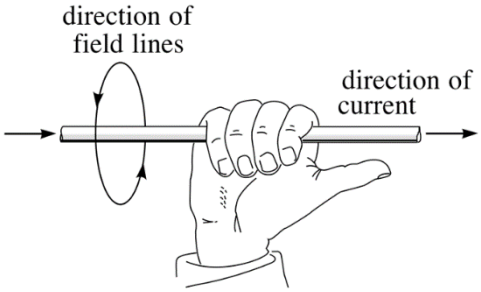
SCHEME ANSWER

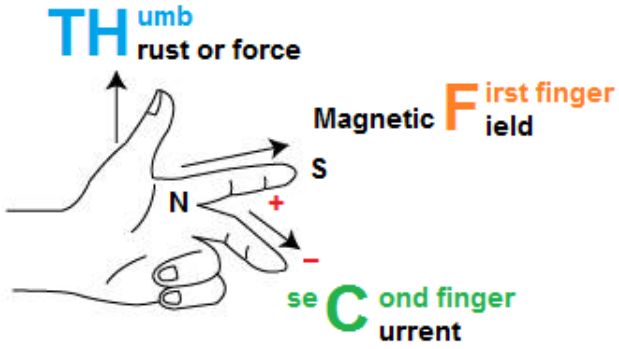
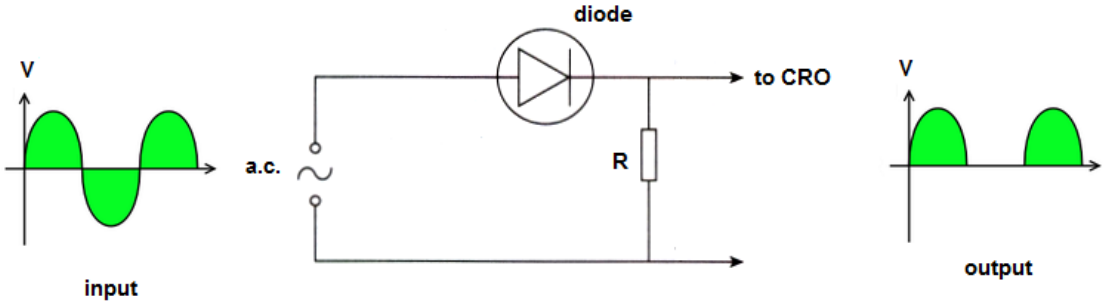
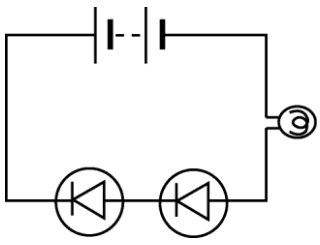
OBJECTIVE

1.	**A**	S.I unit for pressure is Pascal.
2.	**A**	Instrument A is the most sensitive because it has the smallest scale of 0.5 V.
3.	**C**	Converting units of m s^{-1} to km h^{-1} $330\ \text{m s}^{-1}$ $= 330 \times 10^{-3} \times 3600$ $= 1188\ \text{km h}^{-1}$
4.	**B**	The speed of the boy at R is $mgh = \frac{1}{2}mv^2$ $v = \sqrt{2gh}$ $v = \sqrt{2(10)(1.5)}$ $= 5.477\ \text{m s}^{-1}$
5.	**B**	From the equation given, y = p + qx, the gradient of graph y against x is q because y = y-axis / *paksi - y* x = x-axis / *paksi x* q = gradient / *kecerunan* p = intercept of y-axis / *pintasan pada paksi - y*
6.	**C**	Inertia has no unit because Inertia is the property of matter that causes it to resist any change in its motion or state of rest. When mass increase, inertia will increase.
7.	**B**	The gradient of the graph of velocity against time increases, the acceleration will also increase.
8.	**D**	Principle of conservation of momentum states that the total momentum of a system is constant, unless external force acts on the system.
9.	**A**	The acceleration of the rocket is $F = ma$ $\text{upward force} - \text{weight} = ma$ $800\,000 - 500\,000 = 50000a$ $300\,000 = 50\,000a$ $a = 6\ \text{m s}^{-2}$
10.	**A**	The elastic potential energy stored in the rubber cord is $\text{Elastic potential energy} = \frac{1}{2}kx^2$ $= \frac{1}{2}(300)(0.2)^2$ $= 6\ \text{J}$

11.	**C**	Manometer used to measure the pressure of a gas in an enclosed container. **Note:** Barometer an instrument measuring atmospheric pressure. Hydrometer an instrument that measures the specific gravity (relative density) of liquids.
12.	**C**	Atmospheric pressure refers to the force that is exerted by the Earth's atmosphere on a unit surface area.
13.	**A**	From Diagram 3, Pgas > Patm Gas pressure is equal to $Pgas > Patm$ $Pgas = Patm + h$ $= Patm\ (atmospheric\ pressure) + 5$
14.	**C**	The buoyant force exerted on a container ship is equal to the weight of container ship and its load carried. **Note:** Buoyant force equal to weight of the object
15.	**B**	Cooking oil is less dense than water. When density decrease, buoyant force increase, so the length of hydrometer will decrease.
16.	**B**	The lower and upper fixed points used when calibrating a thermometer is respectively 0^oC and 100^oC.
17.	**D**	Instrument can be used to give a reading of 35^0C is thermometer which used to measure temperature.
18.	**D**	Increasing the exposed surface area of the water will increase the rate of evaporation of water.
19.	**B**	The absolute zero temperature can be obtained by extrapolating the graph until it intercept the T-axis because absolute zero is the lower limit of the thermodynamic temperature scale. Absolute zero is taken as −273.15° on the Celsius scale.
20.	**D**	The specific heat capacity of liquid x in J $kg^{-1}°C^{-1}$ is $Q = mc\theta$ $c = \frac{Q}{m\theta} = \frac{Pt}{m\theta} = \frac{1000\,(6 \times 60)}{0.6\,(60-30)}$ $c = 20\,000\ J\ kg^{-1}\ {}^oC^{-1}$
21.	**B**	The characteristic of image formed by a plane mirror is **virtual**, upright, same size and laterally inverted.
22.	**A**	The distance between P and F is the focal length of the mirror
23.	**D**	Normal adjustment for the astronomical telescope at L = fo + fe which is fo>fe
24.	**C**	Microscope use a convex lens to focus all the light rays. Object distance is between f and 2f to produce real, inverted and magnified image.
25.	**B**	Ray diagram for convex mirror which is 1st ray to focal length 2nd ray to centre of curvature 

<table>
<tr><td>26.</td><td>B</td><td>Velocity of the water wave decrease when it travels from point Q to point P because region Q is deep region and P is shallow region. The wavelength also decrease as the velocity decrease due to refraction of wave.</td></tr>
<tr><td>27.</td><td>C</td><td>Sound wave cannot travel through vacuum because it need a medium to propagate.</td></tr>
<tr><td>28.</td><td>A</td><td>Arrangement of spectrum electromagnetism are
<table>
<tr><td>R</td><td>Radio wave</td></tr>
<tr><td>M</td><td>Microwave</td></tr>
<tr><td>I</td><td>Infrared</td></tr>
<tr><td>L</td><td>Light</td></tr>
<tr><td>U</td><td>UV</td></tr>
<tr><td>X</td><td>X-ray</td></tr>
<tr><td>G</td><td>Gamma ray</td></tr>
</table></td></tr>
<tr><td>29.</td><td>A</td><td>Wavelength of the water waves
$a = 3\,\text{cm}$
$x = \frac{16}{2} = 8\,\text{cm}$
$D = 18\,\text{cm}$
$\lambda = \frac{ax}{D} = \frac{3\,X\,8}{18} = 1.33\,\text{cm}$</td></tr>
<tr><td>30.</td><td>B</td><td>Characteristics of microwave makes it suitable to be used in satellite communication it has a high frequency, so it can travel further.</td></tr>
<tr><td>31.</td><td>A</td><td>The reason a fuse is used in an electrical device is to protect the device.
Note: A fuse is a type of low resistance resistor that acts as a sacrificial device to provide overcurrent protection, of either the load or source circuit. Its essential component is a metal wire or strip that melts when too much current flows through it, interrupting the circuit that it connects.</td></tr>
<tr><td>32.</td><td>B</td><td>Tungsten is chosen to be used as the filament of an electric bulb rather than copper. This is because The melting point of tungsten is higher and it can withstand higher temperature when resistance increase.</td></tr>
<tr><td>33.</td><td>C</td><td>When the sphere ball touches the negatively charged plate, the ball receives negative charges from the plate, so the sphere is negatively charged.</td></tr>
<tr><td>34.</td><td>D</td><td>Series arrangement will produce higher effective resistance because Re = R1+R2+R3, so low current flow.</td></tr>
<tr><td>35.</td><td>A</td><td>All the current flows through the bulb A, so it is brightest. Bulb B, C have the same current as in the arrangement of the series. While the bulb D, the current flow is higher than B and C. $I_A > I_D > I_{B+C}$</td></tr>
<tr><td>36.</td><td>C</td><td>The operation of a transformer based on electromagnetic induction.
Working principle of the transformer:
➢ Alternating current flows in the primary coil induces a magnetic field in the soft iron core
➢ The magnetic field is constantly changing
➢ The secondary coil also experienced magnetic flux linkage which is constantly changing
➢ Hence an alternating e.mf. is induced in the secondary coil</td></tr>
</table>

37.	**A**	 Use Right Hand Grip Rule.
38.	**C**	 A dot in the wire shows current flowing out of the paper  A cross in the wire shows current flowing into the paper 

39.	**D**	Use Fleming's Left-Hand Rule. 
40.	**A**	Soft iron core is used as the transformer core because it is easily magnetized and demagnetized. It's called soft-iron because it has low coactivity and it's magnetic domains can easily align with an external magnetic field.
41.	**B**	A process where only half of every cycle of an alternating current is made to flow in one direction only. 
42.	**A**	Function of transistor as a current amplifier. A small change in the base current, results in a big change in the collector current,
43.	**B**	A beam of electrons moving at high speed in a vacuum is known as a cathode ray. **Note:** **The properties of cathode rays:** 1. Negatively charged particles called electrons. 2. Travel in straight lines and cast sharp shadows. 3. Travel at very high speed and have kinetic energy. 4. Can cause fluorescence. (A process where the kinetic energy of the electrons is converted into light energy) 5. Deflected by electric and magnetic fields.
44.	**D**	Decrease the separation of the deflection plates will increase the angle of deflection of the spot on the screen because electric field is increase.
45.	**D**	The bulb light up because the connections is forward bias. The p-type of the diode is connected to the positive terminal and the n-type is connected to the negative terminal of a battery. 

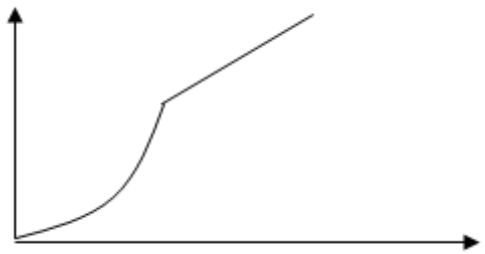
46.	**B**	The uses of cathode-ray oscilloscope are: 1. To measure a D.C or A.C voltage 2. To measure a short time intervals 3. To display the waveform
47.	**D**	$^{214}_{82}\text{Pb} \rightarrow {}^{214}_{83}\text{Bi} + {}^{0}_{-1}\text{X} + \text{Y}$ X = beta particle Y = gamma ray
48.	**A**	Radiation was being detected is gamma ray because it has higher penetrating power and be stopped by a few centimetres of lead or concrete.
49.	**D**	Nuclear fusion is the combining of two lighter nuclei to form a heavier nucleus, releasing a vast amount of energy during the process. Very high temperature and pressure is required to give high kinetic energy.
50.	**D**	Nuclear fission is a process of splitting a heavier nucleus into two lighter nuclei and emitting several neutron and energy.

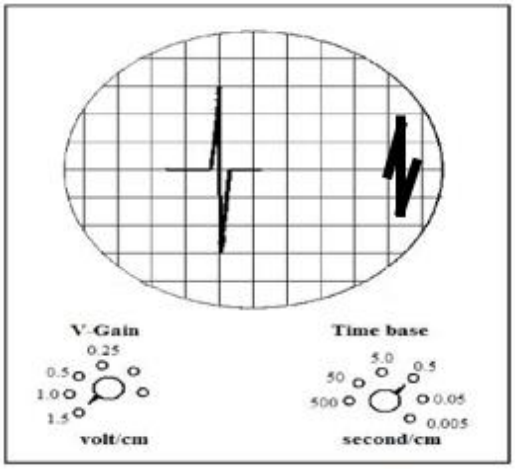
STRUCTURE

TRIAL SBP 2007

NO.			ANSWER	MARK
1.	(a)	(i)	mercury	1
		(ii)	Expansion / increase in volume	1
	(b)	(i)	thermometer X	1
		(ii)	The smallest division is smaller // able to detect the smallest change in temperature	1
			TOTAL	**4**

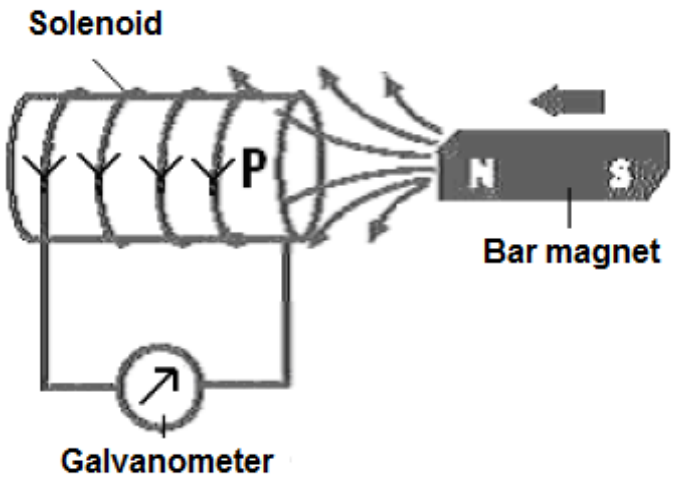
NO.			ANSWER	MARK
2.	(a)	(i)	Total internal reflection	1
		(ii)	The refractive index of Y is higher than the refractive index of X // vice versa	1
	(b)		Sin c = $\frac{1}{n} = \frac{1}{2.1}$ = 0.4762 c = 28.44^o	1 1
	(c)		Prism periscope // prism binoculars // endoscope	1
			TOTAL	**5**

NO.			ANSWER	MARK
3.	(a)	(i)	Constant // uniform velocity // acceleration is zero	1
		(ii)	Constant acceleration // increasing velocity uniformly followed by zero acceleration // constant velocity	1
	(b)	(i)	Zero / /F = 0 N	1
		(ii)	constant // uniform velocity // acceleration is zero	1
	(c)		1- a curve with the increasing gradient (from 2.00 pm – 2.01 pm) 2- Straight line (> 2.01pm) 	2
			TOTAL	**6**

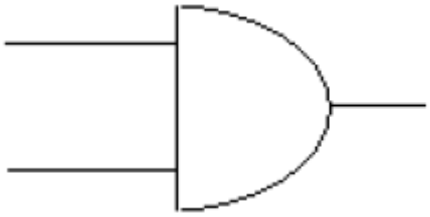
NO.			ANSWER	MARK
4.	(a)		Reflection of wave	1
	(b)		Higher frequency // can travel further	1
	(c)	(i)	d = $\frac{vt}{2}$ = $\frac{1560 \times 1.5}{2}$ = 1170 m	1 1 (awu)
		(ii)	1- Distance between two pulses is 3 cm 2- Amplitude is smaller 	2
			TOTAL	**6**

TRIAL SBP 2009

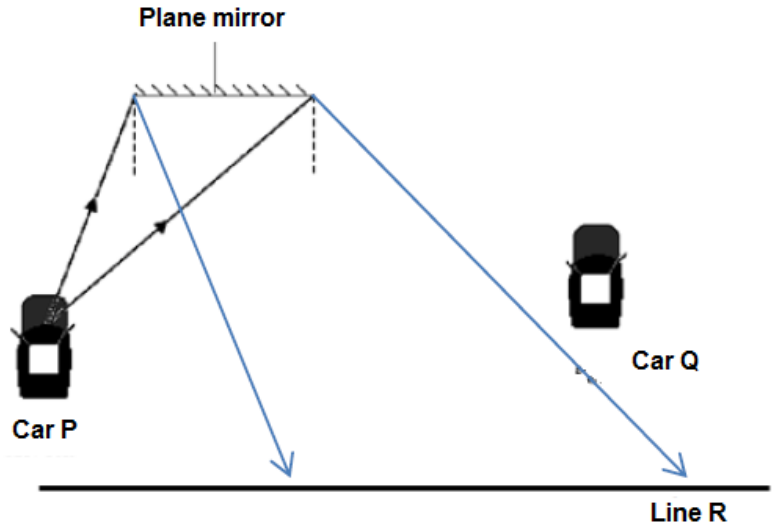
NO.			ANSWER	MARK
1.	(a)		Time	1
	(b)		Seconds // minutes	1
	(c)		Minutes // the pointer has pass 1 minutes // 60 s	1
	(d)		66.4 s // 1 min 6.4 sec	1 (awu)
			TOTAL	**4**

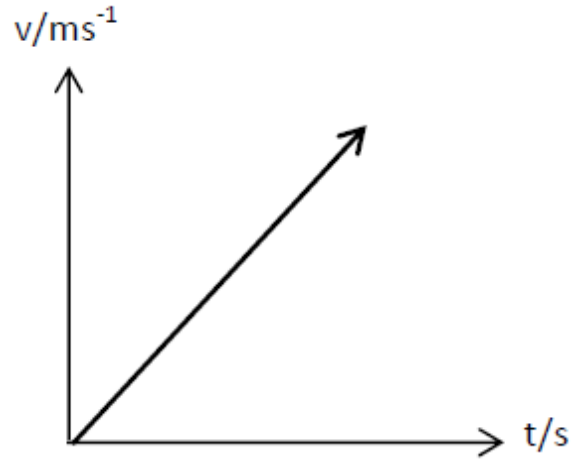
NO.			ANSWER	MARK
2.	(a)		North	1
	(b)	(i) (ii)		1 1
	(c)		Lenz's Law	1
	(d)		Move the magnet faster // Use stronger magnet	1
			TOTAL	**5**

NO.			ANSWER	MARK
3.	(a)	(i)	Net flow of heat is zero // same temperature	1
		(ii)	40°C	1 (awu)
		(iii)	Prevent heat loss to surrounding	1
	(b)	(i)	Heat supplied by hot metal = heat received by water $m_1C_1\ \theta_1 = m_2C_2\ \theta_2$ $0.4 \times C_1 \times (100-40) = 0.2 \times 4200 \times (40 - 28)$ $0.4 \times C_1 \times 60 = 0.2 \times 4200 \times 12$ $C^1 = 420\ J\ kg^{-1}\ °C^{-1}$	1 1(awu)
		(ii)	Heat released by water is absorb by the metal // no heat loss to surrounding	1
			TOTAL	**6**

<table>
<tr><th colspan="3">NO.</th><th>ANSWER</th><th>MARK</th></tr>
<tr><td>4.</td><td>(a)</td><td></td><td>Logic gates are electronic switches with one or more inputs and one output</td><td>1</td></tr>
<tr><td></td><td>(b)</td><td>(i)</td><td><table><tr><th>Detector 1</th><th>Detector 2</th><th>Air Conditioner</th></tr><tr><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>1</td><td>1</td></tr><tr><td>1</td><td>0</td><td>0</td></tr><tr><td>1</td><td>1</td><td>1</td></tr></table></td><td>2</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>AND gate</td><td>1</td></tr>
<tr><td></td><td></td><td>(iii)</td><td>  </td><td>1</td></tr>
<tr><td></td><td>(c)</td><td>(i)</td><td>LDR / light detecting resistor.</td><td>1</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>Thermistor / heat detecting resistor</td><td>1</td></tr>
<tr><td colspan="4">TOTAL</td><td>6</td></tr>
</table>

TRIAL PAHANG SET B 2015

NO.			ANSWER	MARK
1.	(a)	(i)	Reflection	1
		(ii)		2
	(b)		Use convex mirror	1
			TOTAL	**4**

NO.			ANSWER	MARK
2.	(a)	(i)	Alternating current	1
		(ii)	Time interval between two dots which is 0.02s	1
	(b)	(i)		2
		(ii)	Constant // unchanged	1
			TOTAL	**5**

NO.			ANSWER	MARK
3.	(a)	(i)	Metal plate	1
		(ii)	Latent heat of fusion	1
		(iii)	Heat absorb to overcome the force attraction between the molecule // kinetic energy constant	1
	(b)		$4.4 \times 10^3 = (0.0125)\ l$ $l = 352000\ J\ kg^{-1}$	1 1(awu)
	(c)		Condensation	1
			TOTAL	**6**

NO.			ANSWER	MARK
4.	(a)	(i)	Force per unit area // force acting perpendicular a unit area	1
		(ii)	Pressure exerted in Diagram 4.1 > in Diagram 4.2	1
		(iii)	Cross sectional area increase, pressure decrease	1
	(b)	(i)	$0.45 \times 4 = 1.8\ m^2$	1(awu)
		(ii)	$P = \frac{F}{A} = \frac{76230}{1.8}$ $= 42350\ Pa$	1 1(awu)
	(c)		Higher pressure exerted in a small cross sectional area (car will sink)	1
			TOTAL	**7**

TRIAL SBP 2015

NO.			ANSWER	MARK
1.	(a)		Triple beam balance	1
	(b)	(i)	Zero adjustment knob	1
		(ii)	To adjust zero reading of the instrument	1
	(c)		62.4 g	
			TOTAL	**4**

NO.			ANSWER	MARK
2.	(a)	(i)	Elasticity is the property of an object to return to its original length // shape after force exerted is removed	1
		(ii)	The spring is permanently deformed/damage // It has reached its elastic limit // Beyond the elastic limit, Hooke's Law is no longer applied	1
	(b)	(i)	Extension, x = 5 cm	1(awu)
		(ii)	Upper spring, 100 g → x = 5 m Two lower parallel springs, 100 g → x =2.5 m Total extension = 5 + 2.5 = 7.5 cm Total length, y = 10+10+5+2.5 = 27.5 cm	 1 1 (awu)
			TOTAL	**5**

NO.			ANSWER	MARK
3.	(a)		Gamma ray	1
	(b)	(i)	Q neutral	1
		(ii)	P and R has charges // P has positive charge // R has negative charge	1
	(c)	(i)	141	1
		(ii)	$E = mc^2$ $= (2.988 \times 10^{-28})(3 \times 10^8)^2$ $= 2.6892 \times 10^{-11}$ J	 1 1(awu)
			TOTAL	**6**

NO.			ANSWER	MARK
4.	(a)	(i)	Thermal equilibrium is a condition where the net rate of heat transfer between two bodies that are in contact is zero // same temperature	1
		(ii)	The heat is transferred (higher temperature to lower temperature) The net rate of heat transfer is zero // Temperature is equal	1 1
	(b)	(i)	$m_w c_w (95 - \theta) = m_e c_e (\theta - 27)$ $0.6\ (4200)(95 - \theta) = 0.05(3320)(\theta - 27)$ $\theta = 90.78\ ^0C$	1 1 1(awu)
		(ii)	No heat loss to the surrounding.	1
			TOTAL	**7**

TRIAL PERAK 2015

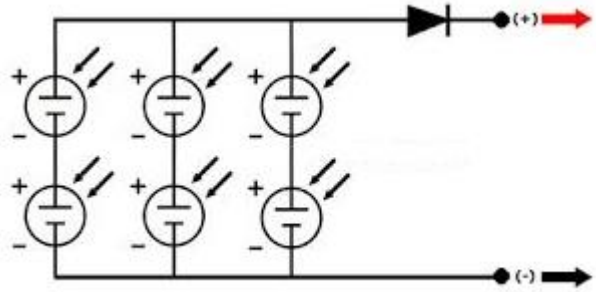
NO.			ANSWER	MARK
1.	(a)	(i)	distance AB = 3/2 λ 3/2 λ = 21 m λ = 14 m	1(awu)
		(ii)	frequency, f = $\frac{25}{10}$ = 2.5 Hz	1 (awu)
	(b)	(i)	Speed of wind // depth of water	1
		(ii)	Vertical distance A to B = 2 amplitude = 1.0 m amplitude = 0.5 m	1(awu)
			TOTAL	**4**

NO.			ANSWER	MARK
2.	(a)	(i)	Q	1
		(ii)	high speed	1
	(b)		smaller nozzle increase speed, reduce pressure	1 1
	(c)		Bernoulli's principle	1
			TOTAL	**5**

NO.			ANSWER	MARK
3.	(a)	(i)	The action of bringing a liquid to the temperature at which it bubbles and turns to vapor	1
		(ii)	No changed // cross sectional area not influence the boiling process	1
		(iii)	Boiling point decrease	1
	(b)		Q = Pt Pt = mL 60 × 5 × 60 = 0.75 × L L = 24 000 J kg^{-1}	1 1(awu)
	(c)		*Penyulingan berperingkat*	1
			TOTAL	**6**

NO.			ANSWER	MARK
4.	(a)	(i)	A product of force and displacement in the direction of the applied force	1
		(ii)	E = m g h = 2 x 7 x 10 = 140 J	1 1(awu)
		(iii)	Principle of Conservation of Energy Gravitational Potential Energy → Kinetic Energy	1 1
	(b)		Ep = Ek 140 = ½ x 2 x v^2 v = 11.83 m s^{-1}	1 1(awu)
			TOTAL	**7**

NO.			ANSWER	MARK
5.	(a)	(i)	P=1/f = 1/0.05 = 20 Diopter	 1 1(awu)
		(ii)	5 cm	1(awu)
		(iii)	Angle of incidence = 60^o Angle of refraction = 45^o	1 1
	(b)		$n = \frac{\sin 60}{\sin 45}$ $1.23 = \frac{3 \times 10^8}{v}$ $v = 2.45 \times 10^8 ms^{-1}$	1 1(awu)
			TOTAL	**7**

NO.			ANSWER	MARK
6.	(a)	(i)	series	1
		(ii)	The car not functioning // the motor not functioning	1
	(b)	(i)		3
		(ii)	V = 5 v + 5 v = 10 V Current flow is same (series) I= 50mA + 50mA + 50 mA = 150 mA	1 1 1(awu)
			TOTAL	**8**

NO.			ANSWER	MARK
7.	(a)	(i)	A device used to raise or lower the potential difference of an alternating current supply	1
		(ii)	Q The number of primary coil is greater than the number of secondary coil or vice versa	1 1
		(iii)	$\frac{Vs}{Vp} = \frac{Ns}{Np}$ $\frac{Vs}{30} = \frac{600}{50}$ $Vs = 600 \times 30 = 360\ V$	 1 1(awu)
	(b)	(i)	$\frac{Ns}{Np} = \frac{Vs}{Vp}$ $\frac{240}{6} = \frac{40}{1}$ $Ns : Np$ $40 : 1$	 1
		(ii)	The iron cores become magnetised. The two cores are attracted to each other.	1 1
		(iii)	The bulb becomes dimmer. Leakage of magnetic flux occurs and the flow of current decreases.	1 1
			TOTAL	**10**

NO.			ANSWER	MARK
8.	(a)	(i)	Beta particle penetrate through the paper Higher reading shows the paper is thin // Low reading shows the paper is thick	1 1
		(ii)	Low penetrating power // can be stopped by a piece of paper	1
		(iii)	Higher penetrating power	1
	(b)	(i)	Time take for undecayed nuclei to be reduced to half from its original number // activities	1
		(ii)	1→ 1/2 → 1/4 → 1/8 → 1/16 after forty minute = 1/16	1 1
		(iii)	Beta	1
			TOTAL	**8**

ESSAY SECTION B

TRIAL SBP 2014

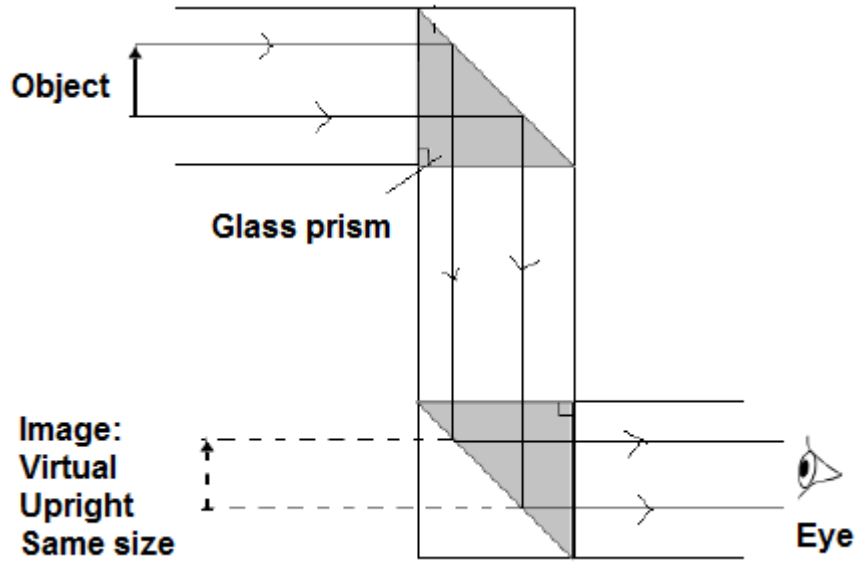
<table>
<tr><th colspan="3">NO.</th><th>ANSWER</th><th>MARK</th></tr>
<tr><td>9.</td><td>(a)</td><td></td><td>Apparent weight is actual weight minus the buoyant force</td><td>1</td></tr>
<tr><td></td><td>(b)</td><td>(i)</td><td>• Apparent weight in 9.1(b) is more than 9.1(c)
• The density of water is greater than density of oil
• The buoyant force in 9.1(b) is less than 9.1(c)</td><td>1
1
1</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>• The higher the density the greater the buoyant force
• The greater the buoyant force the smaller the apparent weight</td><td>1
1</td></tr>
<tr><td></td><td>(c)</td><td></td><td>• Rod A and rod B floats in water because their weights are equal to buoyant force // their densities are less than water.
• Rod B has greater mass/weight and density compared to Rod A.
• Hence buoyant force/ weight of water displaced of rod B is greater than rod A.
• Since the cross section of both rods are equal, rod B floats lower than rod A.</td><td>1
1
1
1</td></tr>
<tr><td></td><td>(d)</td><td></td><td>Modification

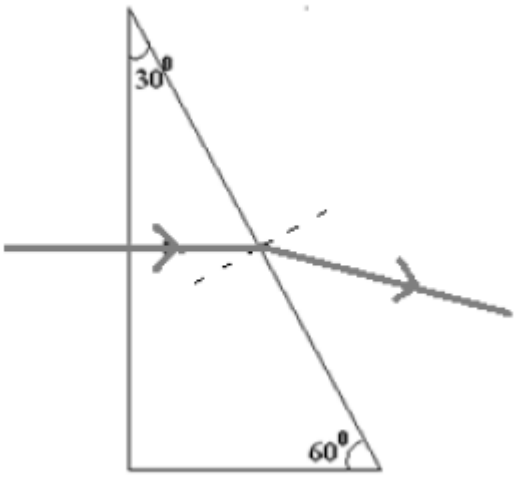
<table><tr><th>Characteristics</th><th>Reason</th></tr><tr><td>The submarine must be streamlined shape</td><td>To reduce water resistance</td></tr><tr><td>The material used must be strong</td><td>To withstand increasing pressure underwater</td></tr><tr><td>Equip with ballast tanks</td><td>To pump in water to submerge and pump out water to float</td></tr><tr><td>Divide the submarine into smaller compartments with strong doors</td><td>To protect the crews from drowning if leakage happens</td></tr><tr><td>Equip the submarine with oxygen tanks</td><td>To provide air to the crew</td></tr></table></td><td>10</td></tr>
<tr><td colspan="4">TOTAL</td><td>20</td></tr>
</table>

<table>
<tr><th colspan="3">NO.</th><th>ANSWER</th><th>MARK</th></tr>
<tr><td>10.</td><td>(a)</td><td>(i)</td><td>Electromotive force is defined as work done by the battery in driving one coulomb of charge round a complete circuit</td><td>1</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>• Emf for both batteries P and Q are the same.
• The reading of the voltmeter for battery P is higher.
• Ammeter reading for battery P is higher.
• The higher the voltage loss the lower the current.
• The higher the voltage loss the higher the internal resistance.</td><td>1
1
1
1
1</td></tr>
<tr><td></td><td>(b)</td><td></td><td>• Bulb is brighter using 4 batteries in parallel
• 4 batteries in parallel has the same emf as 2 batteries in series
• Internal resistance for batteries in parallel is less
• Current flow is higher when 4 batteries are connected parallel.</td><td>1
1
1
1</td></tr>
<tr><td></td><td>(c)</td><td></td><td>Modification
<table>
<tr><th>Characteristics</th><th>Reason</th></tr>
<tr><td>High melting point</td><td>Does not melt easily</td></tr>
<tr><td>Specific heat capacity of the filament is low</td><td>Get hot easily //
the temperature rises faster</td></tr>
<tr><td>Coiled coil filament</td><td>Longer in length //
high resistance //
concentrate heat</td></tr>
<tr><td>Thin filament</td><td>High resistance</td></tr>
<tr><td>Nichrome //
Tungsten //
Wolfrum</td><td>High resistance // to produce more heat</td></tr>
</table></td><td>10</td></tr>
<tr><td colspan="4">TOTAL</td><td>20</td></tr>
</table>

ESSAY SECTION C

TRIAL SBP 2014

NO.			ANSWER	MARK
11.	(a)		Total internal reflection	1
	(b)	(i)	• total internal reflections are shown correctly • direction of rays are shown correctly  	2
		(ii)	Virtual, Upright, Same size	2
	(c)	(i)	$n = \frac{1}{\sin c}$ $1.5 = \frac{1}{\sin c}$ $c = 41.81^0$	1(awu)

<table>
<tr><td></td><td></td><td>(ii)</td><td>• Draw the ray path correctly
 

• Incident angle is 30^0</td><td>1

1</td></tr>
<tr><td></td><td></td><td>(iii)</td><td>$n_g = \frac{\sin r}{\sin i}$
$\sin r = \sin i\,(n_g)$
$= 15\,(\text{Sin}\,30^o)$
$r = 48.59^0$</td><td>1

1(awu)</td></tr>
<tr><td></td><td>(d)</td><td></td><td>Decision making

<table><tr><th>Characteristics</th><th>Reason</th></tr><tr><td>Convex lens</td><td>Produce real image</td></tr><tr><td>Focal length of objective lens more than focal length of eyepiece lens
fo>fe</td><td>produce bigger final image // increase the linear magnification</td></tr><tr><td>Distance between two lenses
L = fo + fe</td><td>Normal adjustment to produce sharp image</td></tr><tr><td>Power of eyepiece: High</td><td>Produce bigger final image // increase the linear magnification</td></tr><tr><td>L</td><td>convex lens
has fo= 4 cm and
fe = 6 cm,
L = fo + fe
has high power of eyepiece.</td></tr></table></td><td>10</td></tr>
<tr><td colspan="4">TOTAL</td><td>20</td></tr>
</table>

<table>
<tr><th colspan="3">NO.</th><th>ANSWER</th><th>MARK</th></tr>
<tr><td>12.</td><td>(a)</td><td></td><td>A beam of electron that moves with high speed</td><td>1</td></tr>
<tr><td></td><td>(b)</td><td></td><td>• Connect the microphone to input Y of the CRO
• Adjust the time base and Y gain to a suitable value
• Make 2 claps in front of the microphone
• The time interval = length of 2 claps on the screen x magnitude of the time base</td><td>1
1
1
1</td></tr>
<tr><td></td><td>(c)</td><td>(i)</td><td>$T = 4\ cm \times 1\ ms\ cm^{-1}$
$= 4\ m\ s$
$= 0.004\ s$</td><td>1(awu)</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>$f = \frac{1}{T}$
$= \frac{1}{0.004}$
$= 250\ Hz$</td><td>1
1(awu)</td></tr>
<tr><td></td><td></td><td>(iii)</td><td>$v = f\lambda$
$\lambda = \frac{v}{f} = \frac{330}{250}$
$= 1.32\ m$</td><td>1
1(awu)</td></tr>
<tr><td></td><td>(d)</td><td></td><td>Decision making
<table><tr><th>Characteristics</th><th>Reason</th></tr><tr><td>2 resistors in series</td><td>The resistors act as the potential divider</td></tr><tr><td>Position of LDR is below // at base circuit</td><td>Produce higher base voltage // Vb > junction voltage</td></tr><tr><td>npn type is used</td><td>Forward biased connection of the cell</td></tr><tr><td>Relay switch</td><td>To switch on the secondary circuit</td></tr><tr><td>P</td><td>The circuit has 2 resistors in series
Position of LDR is below,
npn type is used
Relay switch is used</td></tr></table></td><td>10</td></tr>
<tr><td colspan="4">TOTAL</td><td>20</td></tr>
</table>