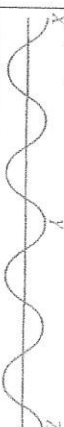


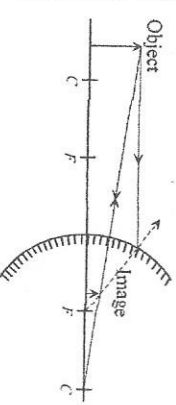
Section A

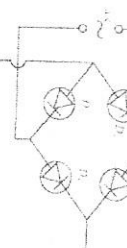

1	(a)	(i) ammeter	1
		(ii) voltage / potential difference	1
	(b)	(i) 9 V	1
		(ii) the same as	1

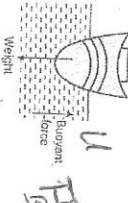
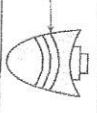
2	(a)	Up and down / move vertically	1
	(b)		2
	(c)	$f = \frac{20}{60} \text{ s}^{-1}$ $v = f\lambda = 20 \left(\frac{1}{3}\right) = 6.67 \text{ m s}^{-1}$	1

3	(a)	Elastic potential energy	1
	(b)	$k = 3.6 / 0.04 = 90 \text{ N m}^{-1}$ @ $= 3.6 / 4 = 0.9 \text{ N cm}^{-1}$	1
	(c)	$E_e = \frac{1}{2} Fx = \frac{1}{2} (3.6) (0.04)$ @ $= \frac{1}{2} kx^2 = \frac{1}{2} (90) (0.04)^2$ $= 0.072 \text{ J}$	1
	(d)	$10 = 2(90)x$ $x = 0.0556 \text{ m} // 5.56 \text{ cm}$ <i>Length of springs = 6.44 cm</i> $x = 12 - 5.56 = 6.44$	1

4	(a)	$m = 20 \text{ cm}^3 \text{ s}^{-1} (10 \times 60 \text{ s}) (1 \text{ g cm}^{-3})$ $= 12000 \text{ g} // 12 \text{ kg}$	1
	(b)	$E = mc\theta = 12 (4200)(33 - 23)$ $= 504000 \text{ J} // 504 \text{ kJ}$	1
	(c)	$P = E/t = 504000 / (10)(60)$ $= 840 \text{ W}$	1
	(d)	(i) decreases (ii) decreases	1 1

5	(a)	convex mirror	1
	(b)	wider view than a plane mirror	1
	(c)	(i) 	2
		(ii) <ul style="list-style-type: none">VirtualUprightdiminished (smaller than object)	1 1 1
	(iii)	Shaving mirror produces a magnified image for a near object but image that is produced by convex mirror is diminished	1

6	(a)	(i) Diagram 6.1 : anode of diode is connected to positive terminal of dry cell	1
		(ii) Bulb in diagram 6.1 lights up, bulb in Diagram 6.2 doesn't light up The bulb doesn't light up when positive diode is connected to negative battery // reversed biased The bulb lights up when positive diode is connected to positive battery // forward biased	1
		• AC power supply • Arrangement of diodes	2
	(b)	(i) 	1
		(ii) 	1
		(iii) capacitor	1

7	(a)	(i) Ensure the maximum load limit of the ship is not exceed	1
		(ii) 	1+1
		(iii) Buoyant force = weight of the ship = ρVg $3000 (10) = 1010 \times V \times 10$ $V = 0.297 \text{ m}^3$	1
		(iv) 	1
		(v) Density of seawater is denser than the density of freshwater // Volume of water displaced increases when density of liquid decreases	1
	(b)	(i) Weight of hot air balloon = buoyant force acting on hot air balloon	1
		(ii) Move downwards	1
		(iii) Weight of air in balloon is increased. Thus, buoyant force is smaller than weight of hot air balloon	1

8	(a)	Step up or step down an input voltage / potential difference	1
	(b)	(i) Number of turns in primary coil : more To step down / decrease the voltage	1
		(ii) Laminated soft iron core	1
		(iii) Aluminum	1
		(iv) Low resistance	1
		X	1
	(c)	(i) Efficiency = $\frac{92}{240(0.1)} \times 100\%$ $= 75\%$	1
		(ii) $P_{\text{loss}} = 24 - 18 = 6 \text{ W}$	1, 1

6.2 lights up
Reverse (negative) forward (positive)

$F_a(III)$
 $= 2.97 \text{ m}$

3

5.1
1.1