



#	Ans	Workings/Remarks
1	D	From rest, $u = 0$. $a = \frac{v-u}{t} \Rightarrow 2 = \frac{40-0}{20} \Rightarrow v = 40, t = 20$
2	B	Gradient of Speed – Time Graph = Acceleration 0-5s: non-uniform gradient \therefore non-uniform acceleration 5-10s: zero gradient \therefore zero acceleration, constant speed 10-15s: constant gradient \therefore uniform acceleration 15-20s: zero speed \therefore at rest.
3	B	Q is the force in the same direction as car's motion. If Q increases, resultant force, which is in the same direction as car's motion, would increase. Thus, using $F = ma$, acceleration of car increases, implying rate of change of speed increases in the same direction.
4	C	Frictional force (f) is affected by type of surface. Oily surface gives smoother surface and therefore smaller f as compared to dry surface. To slow down a car, resultant force (F) has to oppose direction of car's motion, implying magnitude of f has to be greater than that of forward force. Since, frictional force is smaller on oily surface, time taken for f to be greater than forward force is longer.
5	D	Direction of tension in the rope has to be slanted upwards to the left. This is done so that, when the tension is resolved into its vertical and horizontal components, the vertical component pointing upwards would balance the weight while the horizontal component pointing to the right would balance the pulling force.
6	B	Mass = $\frac{\text{weight}}{g} = \frac{2000}{10} = 20 \text{ kg}$
7	D	Mass = density \times volume $= 8 \times 2^3 = 64 \text{ g}$
8	A	Sum of clockwise moment = Sum of anticlockwise moment $150 \times 0.75 = F \times (0.75 + 0.75)$ $F = 75 \text{ N}$
9	A	
10	D	
11	B	Power = $\frac{\text{Work done}}{\text{Time}} = 80 \times \frac{4}{5} = 64 \text{ W}$
12	B	At higher altitude, atmospheric pressure is lower. When balloon is brought up, the pressure in it has to reach equilibrium with the surrounding. Therefore, the balloon expands and its pressure drops. Exposed surface of mercury of barometer measures the pressure in balloon, which corresponds to h . Since pressure in balloon drops, h would drop too.
13	C	$P = \frac{F}{A} = 80 / (10 \times 5) = 1.6 \text{ W}$
14	B	Brownian motion
15	C	An increase in temperature increases the average kinetic energy of molecules, thus greater speed. Pressure is the result of collision of molecules with the wall of cylinder. Since pressure is constant, rate of collision is the same.





16	A	100°C 250 – 100 = 150 mm 1°C 1.5 mm 60°C 190 – 100 = 90 mm
17	C	At boiling point, there's no change in temperature but a change in state. When liquid changes into gas, the molecular spacing increases. (Kinetic molecular model of matter)
18	D	
19	C	$V = f\lambda$ $= 2.5 \times 0.6$ $= 1.5 \text{ m/s}$ $T = \frac{D}{S}$ $= \frac{3}{1.5}$ $= 2 \text{ s}$
20	D	Light travels slower in glass, therefore it bends towards the normal when it enters glass from air and bends away from normal when it enters air from glass. Light striking the mirror will be reflected.
21	A	When total internal reflection occurs, angle of incidence is greater than critical angle.
22	B	
23	A	$T = \frac{1}{f}$ $= \frac{1}{3600}$ $\text{No. of waves} = \frac{0.50}{\frac{1}{3600}}$ $= 1800$
24	D	Frequency determines pitch of sound. Speed of sound in the same medium is constant.
25	B	A positively charged rod would induce negative charges on left hand side of metal ball and repel positive charges to right hand side of metal ball. Earthing would neutralize the charges on right hand side of metal ball. Neutralized charges are not shown.
26	D	Electric field lines around positive charge radiate outwards while that of negative charge radiate inwards.
27	B	$I = \frac{Q}{t} = \frac{10}{2} = 5 \text{ s}$
28	B	S ₃ must be opened to prevent short circuit.





29	C	Resistance is directly proportional to length of wire. To have a stronger current, a small resistance and thus a shorter wire is required.
30	D	$I_T = I_1 + I_2 + I_3$ $I_1 = 6 - 1 - 3 = 2 \text{ A}$
31	B	Voltage is directly proportional to Resistance. To have the smallest potential difference across the variable resistor, its resistance has to be the smallest. $V = IR$ $I = \frac{6}{(1+2)} = 2 \text{ mA}$ $V = IR$ $= 2 \text{ mA} \times 1 \text{ k}\Omega$ $= 2 \text{ V}$
32	B	$f = \frac{1}{T} = \frac{1}{0.008} = 125 \text{ Hz}$
33	A	Low temperature and low light intensity gives high resistance
34	C	$\text{Cost} = 0.16 \times \left(\frac{2000}{1000} \times 2 \right) = \0.64
35	A	The fuse has to be fixed in the live lead before the appliance (light bulb)
36	A	Alternating current is used in demagnetization. Iron has to be inserted in the core of solenoid so that magnetic field lines can be trapped inside the iron, producing a stronger electromagnet.
37	B	Magnetic field lines are trapped in the core of solenoid by the iron. Closer field lines imply stronger magnetic effect.
38	D	Fleming's left hand rule
39	A	
40	A	$V = IR$ $I = \frac{12}{8}$ $= 1.5 \text{ A}$ $\frac{V_p}{V_s} = \frac{I_s}{I_p}$ $I_p = 0.075 \text{ A}$

