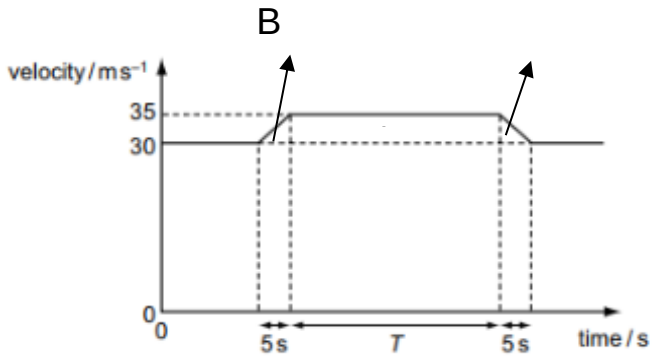
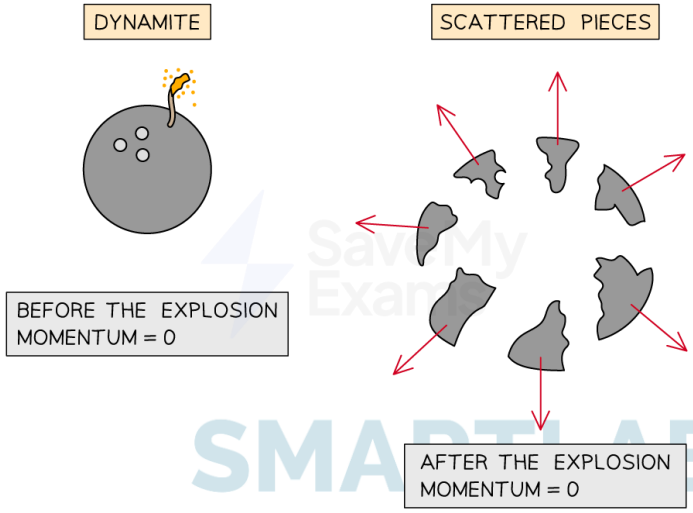
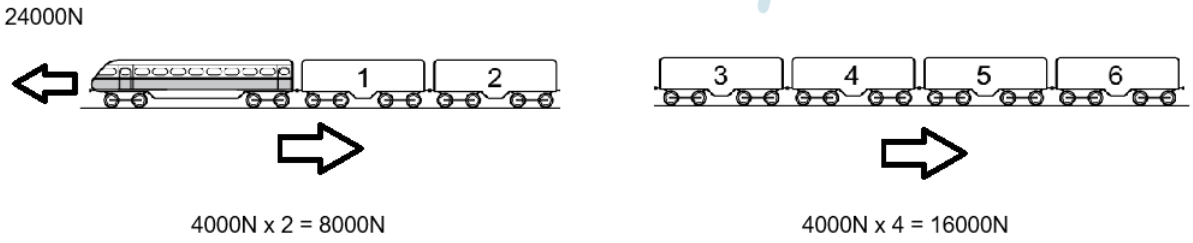
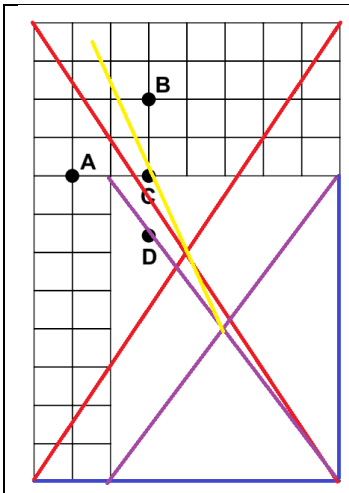
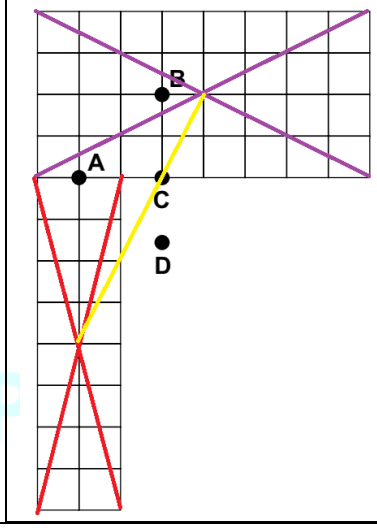
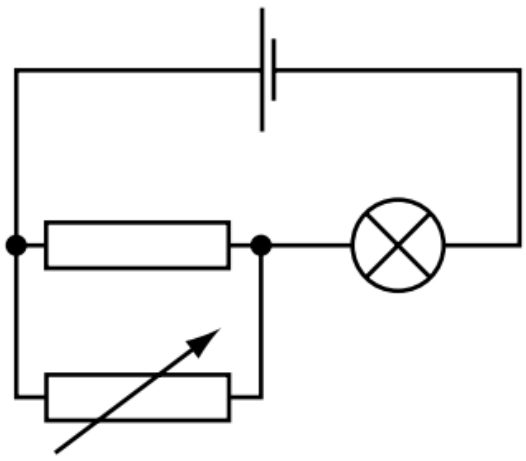
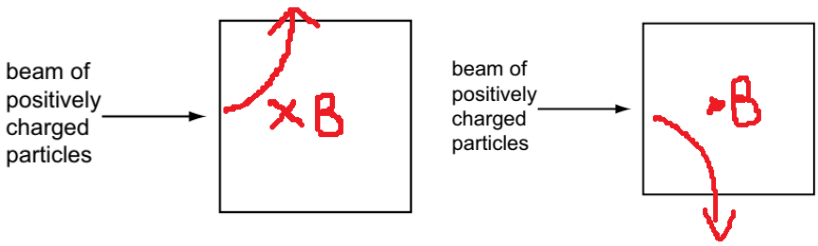
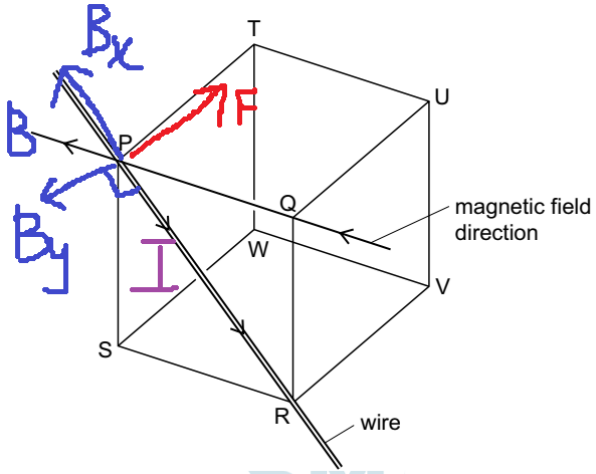
2026 H1 physics Sample P1/Answer

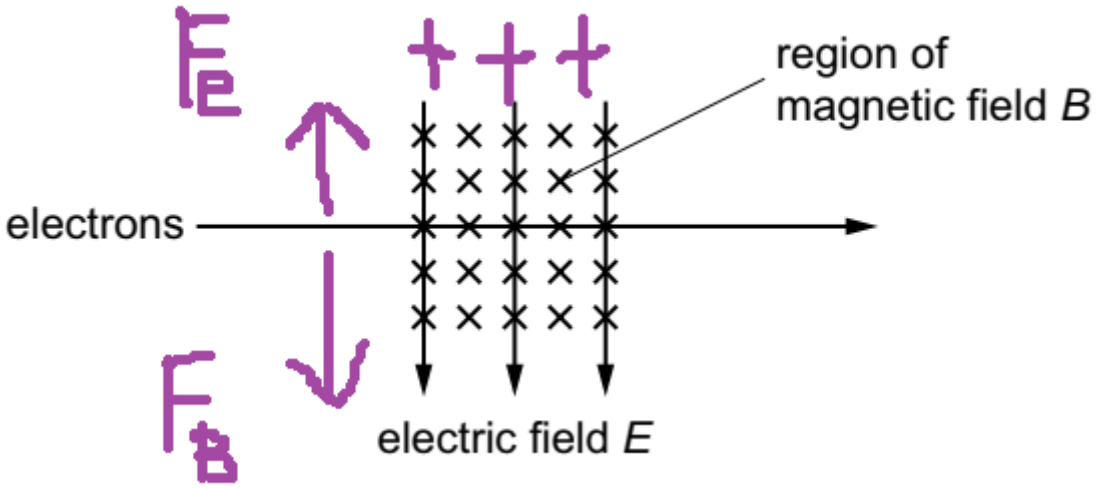
1.	**Ans: D** **Precision relates to random error** **Accuracy relates to systematic error**
2.	**Ans: B** **Power = Rate of energy used/ rate of work done = 100 TJ/10μs = 10^{19} W =10^{13} MW**
3.	**Ans: A** **tanθ = (Magnitude of y vector)/(magnitude of x vector) = y_m/x_m , hence $\theta_Q > \theta_P$,** **$\|M\| = \sqrt{(y^2 + x^2)}$, hence $\|Q\| > \|P\|$**
4.	**Ans: A** **percentage uncertainty of Q = 0.1/20*100 = 0.50%** **percentage uncertainty of R = 0.1/10*100 = 1.0%** **percentage uncertainty of P = 0.4/60*100 = 0.67%**
5.	**Ans: C** **h = height released above ground** **displacement s = (h - 0.5)** **u = 0 m/s** **v = 1.8 m/s** **g = -1.6 m/s^2** **$v^2 = u^2$-+ 2gs** **$v^2 = u^2$-+ 2g(h-0.5)** **h = $(v^2 - u^2)/2g$ + 0.5 = 1.5 m**
6.	**Ans: B**  **areas A + B + C= 5T+25 = 100, T = 15s**
7.	**Ans: B**

	vertical distance ∝ t^2, **horizontal distance ∝ t,** **<u>If t doubles,</u>** **vertical distance increases by 2^2 , 4 times,** **and horizontal distance increases by 2 times**
8.	Ans: C Conservation of momentum applies as no external force applies. KE increases as the speed of the pieces >>0  https://www.savemyexams.com/igcse/physics/oxford-aqa/16/revision-notes/forces-and-their-effects/momentum/conservation-of-momentum/
9.	Ans: B Total resistive force exerted by locomotive = 4000*2 = 8,000 N Net force = 24,000N – 8000N = 16,000N = ma = $(24 \times 10^4 + 2 \times 6.0 \times 10^4)a$ 
10.	**Ans: A** **plot force (y-axis) against extension (x-axis)** **area under force - extension graph = elastic potential energy**
11.	**Ans: D** **A is correct as the lines of action of forces will act through a point** **B is correct as the object is in equilibrium hence the three forces will form the sides of a triangle taken in order** **C is correct as the total net moment must be zero for an object at equilibrium**

	D is incorrect as the <u>direction of the resultant of any 2 forces is opposite to the third force,</u> and their magnitudes are equal
12.	**Ans: C**  **Option 1:** **CG of empty white small rectangle + L shaped = CG of big rectangle** **Step 1: Identify CG of empty white small rectangle/Purple line – CG1** **Step 2: Identify CG of big rectangle/red line – CG2** **Step 3: draw yellow/pale line btw CG1 and CG2 to identify CG of L shaped which must sit on that line**  **Option 2:** **CG of empty top rectangle + bottom rectangle = CG of L shaped** **Step 1: Identify CG of top rectangle/Purple line – CG1** **Step 2: Identify CG of bottom rectangle/red line – CG2** **Step 3: draw yellow/pale line btw CG1 and CG2 to identify CG of L shaped which must sit on that line**
13.	**Ans: C** **$mR\omega^2$ = Maximum frictional force** **m = 10/1000 kg = 0.0100 kg** **R = 5/100 m = 0.0500 m** **Maximum frictional force = 0.2N** **ω = √[Maximum frictional force/(mR)] = 20 rads/second**
14.	**Ans: A** **Work done = Change in KE , change in KE is bigger for an object that increases speed to 3m/s from 1 m/s, than the change in KE for the same object that increases speed to 2 m/s from 1 m/s.**
15.	**Ans: B** **Option A, transfer of energy by sound waves, and to internal store occurred** **Option B, the energy transfer is mainly from electric current to internal energy**

	Option C, lamp transfers electrical current to the internal store too. **Option D, a rocket transfers energy to the internal store too and energy is transferred out of the system to sound/light waves.**
16.	**Ans: A** **rate of electrons arrival per unit area = Beam current÷elementary charge÷ Area A of target= I/(eA)**
17.	**Ans: B** **Emf is the work done to move a unit charge through a complete circuit. Hence it is the energy transferred to an electric circuit to move an unit charge through it.**
18.	**Ans: D** **Electrons move from right to left as conventional current moves from left to right through the microammeter.** **number of electrons flowing through in 1 second = I/e = 0.8μA/(1.60 x 10^{-19}C) = 5 x 10^{12}**
19.	**Ans: A** **Mean Voltage = 2.50 V** **Mean power = (Mean Voltage)^2/Resistance = 2.50^2/100 W = 0.0625 W**
20.	**Ans: B** **$R_{effective}$ = $1/(1/R_1 + 1/R_2) = (R_1R_2)/(R_2+R_1)$** **when $R_2 \ggg R_1$, $R_{effective} \cong R_1$, and is smaller**
21.	**Ans: A**  **Only this set up above will vary the voltage across the lamp and the brightness across it** **The other setups are in parallel to the lamp and cell and will not change the pdf across the lamp when the variable resistance is changed**

22.	**Ans: C**  B = 0, it will not change its direction of movement
23.	**Ans: A**  **Resolved the B field into Bx and By** **Use By which is perpendicular to I to determine the direction of F**
24.	**Ans: C** **drift velocity of electrons in copper*density of electrons in copper = drift velocity of electrons in semiconductor*density of electrons in semiconductor** **drift velocity of electrons in semiconductor = 1.16 x 10^4 m/s**
25.	**Ans: B** **Option A, resistance = 0.9 ohms** **Option B, resistance = 2.5 ohms** **Option C, resistance = 2.1 ohms** **Option D, resistance = 2.4 ohms**
26.	**Ans: A** **$F_B = Bqv$** **$F_e = Eq$**

	 $F_B > F_e$
27.	**Ans: D** **for beta emission, proton number increases by 1 , neutron number decreases by 1**
28.	**Ans: D** Total Mass before binding is mass of protons + neutrons = Y Total Mass after binding is nucleus = X During binding, bonds are formed and energy is released **Nuclear Binding Energy of a nucleus is the energy that must be supplied to separate a nucleus apart into its individual particle = mass defect x c^2**
29.	**Ans: D**
30.	**Ans: A** **proton number decreases by 1, so it is an alpha (decreases by 2 protons) and a beta particle (increases by 1 proton), so overall decreases by 1 proton**