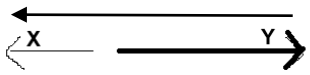
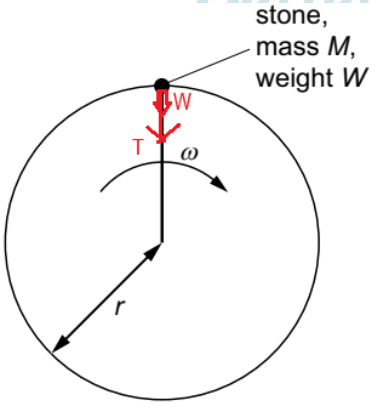
2026 A level H2 Phy Sample P1 Ans

1.	**Ans: D**
2.	**Ans: A** **X-Y**  Magnitude is highest at 0° & lowest at 180°
3.	**Ans: A** Obeys Hooke's Law up to 20mm Work done = ½ x F x e = ½ x 28 x 20 x10^{-3}
4.	**Ans: C** Let graph be s = mt; m is the gradient Area from 0-6s = ½ x 6 x m x 6s = ½ x 6 x 6m Area from 6-12 = 6 x ½ (12m+6m) = 6 x 9m
5.	**Ans: A** KE = ½ mv^2 = ½ (800)$(20)^2$ [not required for calculation] Energy required for 1km = 400N x 1000m = 400 kJ Efficiency is 16%; total energy required = 400 ÷ 0.16 = 2,500 kJ = 2.5 MJ Mass of fuel x 48 MJ = total energy = 2.5 MJ Mass of fuel = 2.5/48 = 0.05208 kg
6.	**Ans: B** Acted by downward force weight (arrow labelled as C) + resistive force directed horizontally against motion (arrow labelled as A) Vector sum of the 2 forces above is the resultant force acting on the ball
7.	**Ans: C** Impulse = area under F-t graph = R+Q
8.	**Ans: A**  $T + W = Mr\omega^2$
9.	**Ans: D** $\Phi_M = \frac{-GM}{0.5d} = \frac{-2GM}{d}$ $\Phi_{4M} = \frac{-G(4M)}{0.5d} = \frac{-8GM}{d}$ $\Phi_P = \Phi_M + \Phi_{4M}$
10.	**Ans: C**

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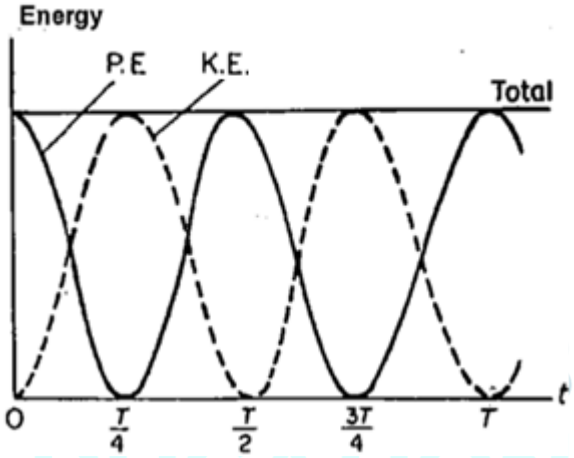
	$F = \frac{mv^2}{R} = \frac{GMm}{R^2}$ $(R\omega)^2 = \frac{GM}{R}$ $R^3 = \frac{GM}{\omega^2}$ R is independent of mass of satellite Orbital period is not dependent on mass of the satellite Speed at the point of earth is less than speed of satellite as v = **R**ω (ω is constant)
11.	**Ans: C**  ½ T = 2s → T/full period = 4s v is minimum when PE is max at time t = 0s.
12.	**Ans: D** $c = 3 \times 10^8 = f\lambda = 5.0 \times 10^{14} \times \lambda \rightarrow \lambda = 6.0 \times 10^{-7} = 0.60\ \mu m$ $\phi_c = \frac{1.5\ \mu m}{0.60\ \mu m} \times 2\pi = 2.5 \times 2\pi = 5\pi = \phi + 2n\pi = \pi + 2(2)\pi$ $\Phi = \pi$
13.	**Ans: B** c = f λ; if c is halved → either f or λ is halved however when waves move from one boundary to another, its frequency does not change; hence λ is halved Intensity ∝ Amplitude^2 ; if A is halved → intensity is ¼
14.	**Ans: C** Brightest at zero order. Brighter at 1st order as it is closer to the source. $\sin\theta = \frac{n\lambda}{D}$ $2\theta_1 \neq \theta_2$ due to sinusoidal relationship
15.	**Ans: C** PV = nRT $T = \frac{PV}{nR}$ T/^oC is Y-axis which explains T can be negative and positive in values Otherwise all other values stated are positive values only
16.	**Ans: B**

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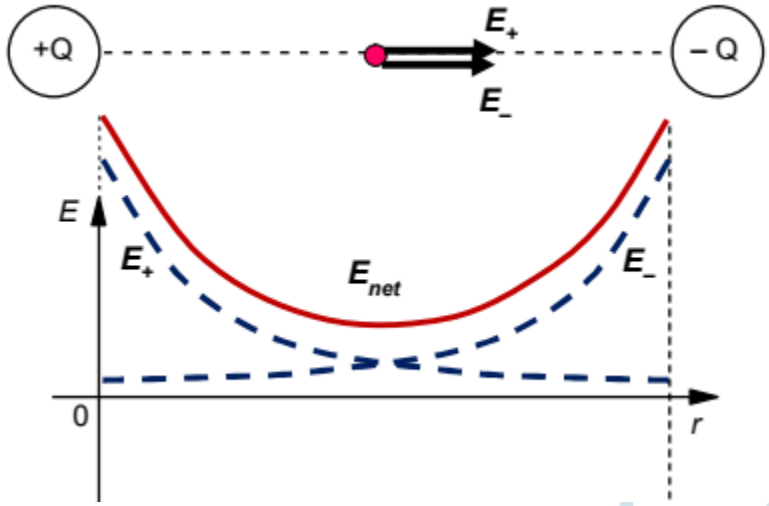
	50% of KE = ½ x ½ mv^2 = increases in internal energy store = m x c x ΔT
17.	**Ans: C** $V = \frac{Q}{4\pi\varepsilon_O d}$ $V' = \frac{Q}{4\pi\varepsilon_O (0.5d)}$
18.	**Ans: A**  **Enet = $E_+ - E_- = \frac{Q}{4\pi\varepsilon_o r_1^2} - \frac{-Q}{4\pi\varepsilon_o r_2^2}$**
19.	**Ans: A** $I = nAqv = n(\frac{1}{4}\pi d^2)qv$ I, n, q are constants $v = \frac{4I}{n q \pi d^2}$
20.	**Ans: C** Power input = 280 V x 5.7 A Power output = 90% Power input = 0.90 x 280 V x 5.7 A = 230 V x I_{rms}
21.	**Ans: C** $R = \frac{\rho L}{A} = \frac{\rho L}{\frac{1}{4}\pi D^2}$ As d increases, Area(A)/Diameter(D) decreases, R increases $\frac{\Delta R}{R} = 2\frac{\Delta D}{D}$ Hence increase **ΔR is significantly larger with each decrease in D**
22.	**Ans: A** Emf = 3 x 1.5 = 4.5V Reff = $(1/(3r) + 1/(3r))^{-1} = {}^3/_2\, r = 1.5 \times 0.2 = 0.3\Omega$
23.	**Ans: D** $R_{rheostat} = 0 \rightarrow$ pdf across voltmeter = Emf $R_{rheostat} = 1.0k\Omega \rightarrow$ pdf across 1.0kΩ in series = $\frac{Emf \times 1.0k\Omega}{1.5\ k\Omega}$
24.	**Ans: A** Q = 6μC = CVx

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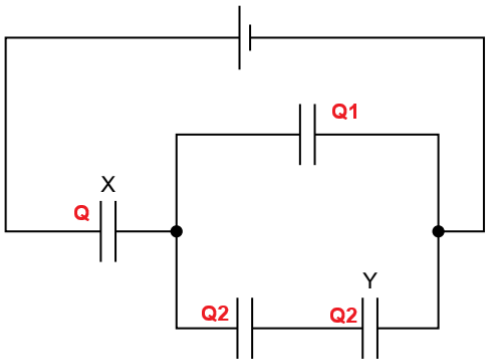
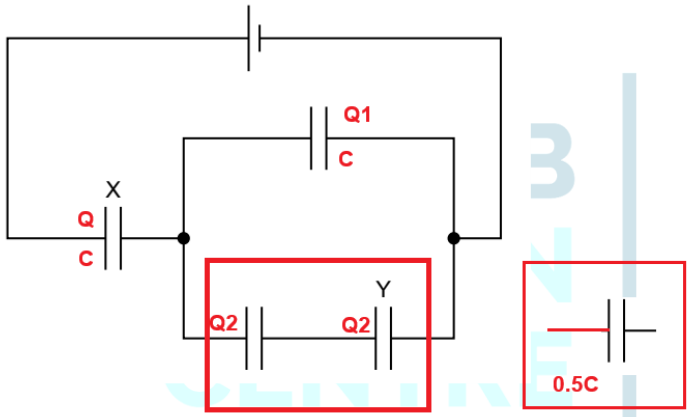


Q2 = CVy
Q1 = C(2Vy)

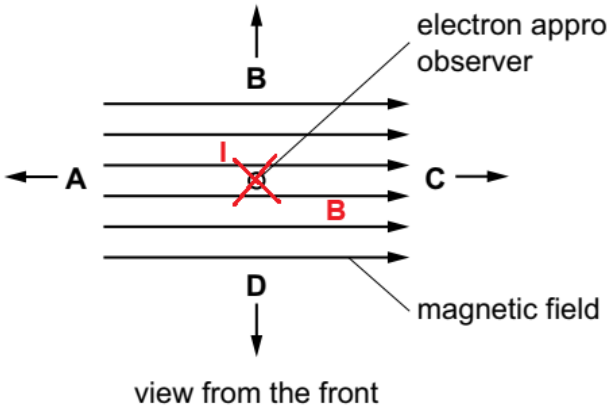
Q = 6μC = Q1 + Q2 = 3 CVy → CVy = 2μC



Pdf across capacitors in parallel are equal = $\frac{Q1}{C} = \frac{Q2}{0.5C}$

Q1 = 2xQ2
Q1+Q2 = 3Q2 = 6μC
Q2 = 2μC

25. **Ans: D**



Direction of the current goes into the paper
By Fleming's LHR, force is downward

26.	**Ans: A** **$E = -\frac{d\phi}{dt} = -\frac{d(NBA)}{dt} = -NA\frac{dB}{dt} = -\frac{(3000)(\frac{1}{4}\pi(0.020)^2)(0-1.8)}{0.060s} = 0.236V$**
27.	**Ans: D** **n = 3** energy states for quantum particle in a box $E_n = \frac{h^2}{8mL^2}n^2$
28.	**Ans: B** Decreases by 2 protons → proton number goes from 94 to 92 Decreases by 2 neutrons → neutron number goes from 145 to 143
29.	**Ans: C** Mass defect = Mass of protons + Mass of neutrons – Mass of nuclei = 83 x Mp + (212-83) x Mn – M = 83 x Mp + 129 x Mn – M
30.	**Ans: B** Mass defect = Mass of Caesium - Mass of Barium + Mass of β = 7.11×10^{-4} u $E = \Delta m \times c^2 = 7.11 \times 10^{-4}$ u

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