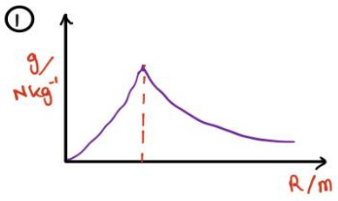
Physics Graphs:

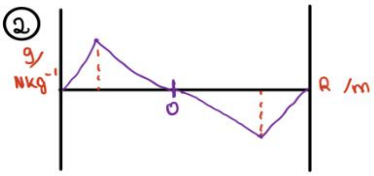
Gravitational Fields:

① 

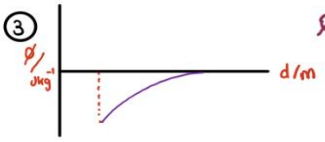
Graph for isolated mass

$g = \frac{GM}{R^2}$ when R is doubled $\Rightarrow$ g is $\frac{1}{4}$

- at the surface g is max
- $g \propto R$ inside sphere

② 

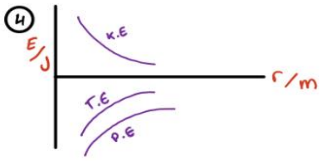
Graph is for g between 2 masses

③ 

$\phi = -\frac{GM}{R}$ when R is doubled $\Rightarrow$ ϕ is $\frac{1}{2}$

when R is infinity $\Rightarrow$ ϕ is 0

- at R ϕ is -ve max
- gradient = g

④ 

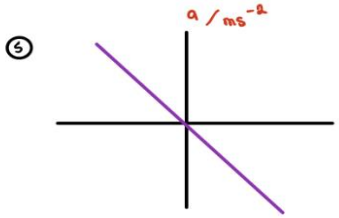
$P.E = \phi m$

$P.E = \frac{GMm}{r}$

$K.E = +\frac{1}{2} m \frac{GMm}{r}$

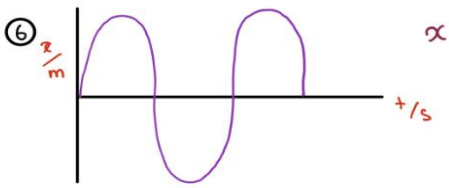
$T.E = -\frac{1}{2} m \frac{GMm}{r}$

Simple Harmonic motion:

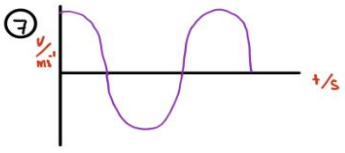
⑤ 

gradient = ω^2

From this graph we can find f & T because $\omega = 2\pi f$ or $\omega = \frac{2\pi}{T}$

⑥ 

$x = x_0 \sin\omega t$

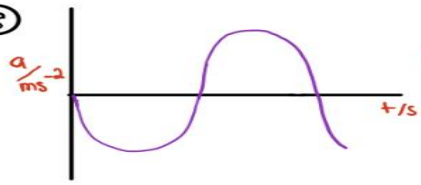
⑦ 

$V_{max} \Rightarrow x = 0$

$V = 0 \Rightarrow x = max$

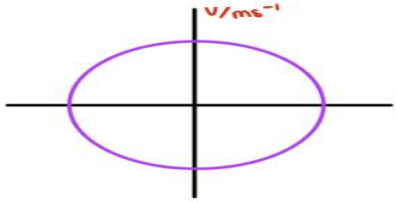
90° out of phase from x-t graph

(8)



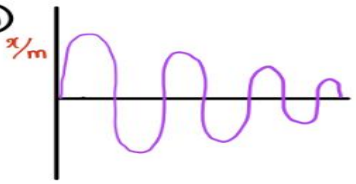
180° out of phase from x–t graph

(9)



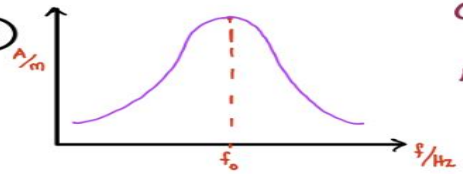
V – x
V – a
} same graph

(10)



Graph for damping
Amplitude ↓
Time period
frequency
} remains the same

(11)

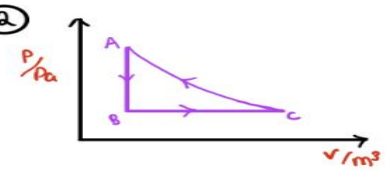


Graph for resonance

Amplitude (A) is max when forced frequency matches the natural frequency

Ideal Gases :

(12)



ΔU = 0
work B → C
pΔV
expansion by the gas

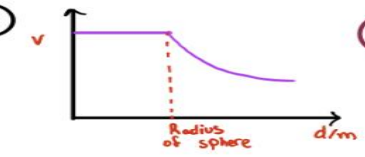
Electric field :

(13)

inside sphere
E = 0
$E = \frac{kq}{r^2}$

when r is doubled ⇒ E is ¼

(14)

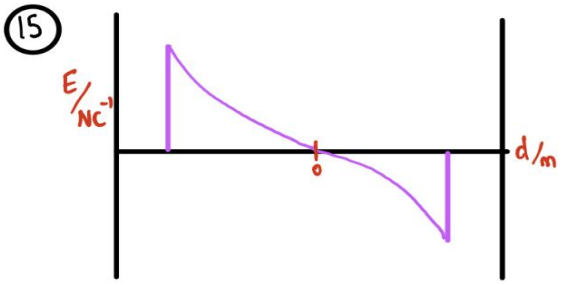


inside sphere
E = 0
inside no work is done
$V = \frac{kq}{r}$ when r is doubled ⇒ V is ½

-ve gradient = E

To be a point charge, the product of V and d must be constant

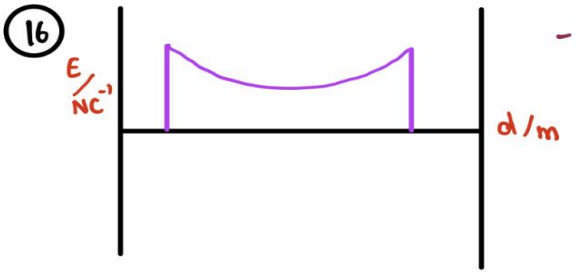
15



Recall g between 2 masses

- Graph for similar charges

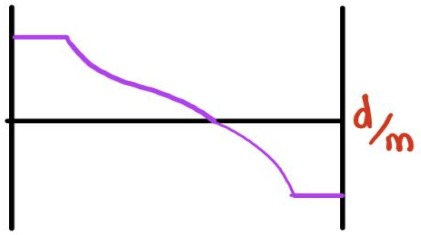
16



- Graph for opposite charges

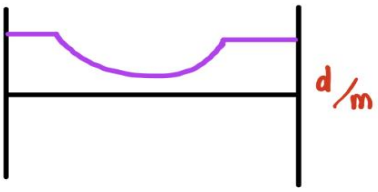
E is never 0

17



Graph for opposite charges

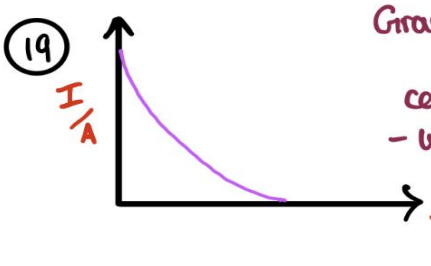
18



Graph for similar charges

Capacitance :

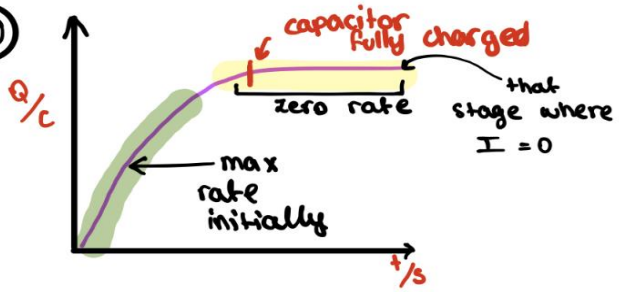
19



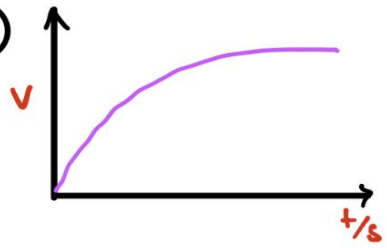
Graph is for charging of capacitor

- when fully charged I = 0

20

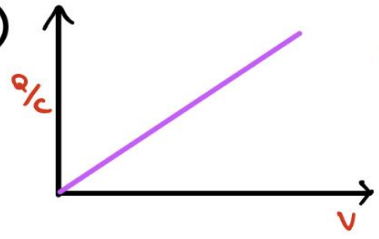


21



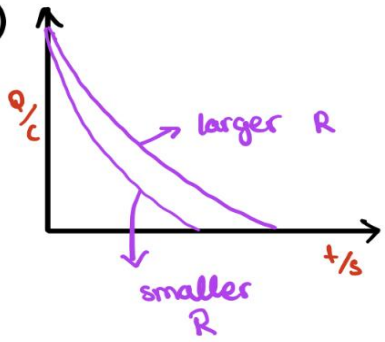
- Graph for charging of capacitor

22



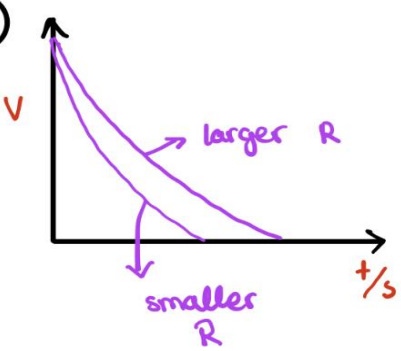
gradient = capacitance

23



Discharging graphs

24

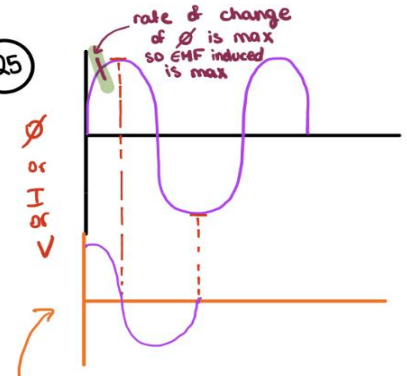


Discharging graph

AHJ

Magnetic Fields & Electromagnetic Induction:

(25)

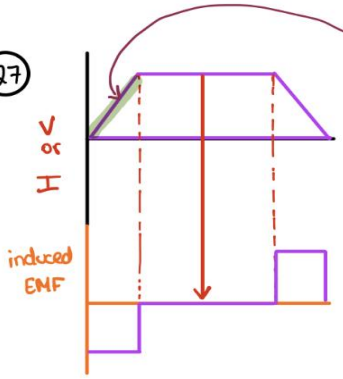


$\emptyset \propto I \propto V$

so graph will be same with Ø, I, & V

(26) induced EMF graph

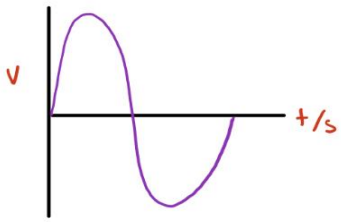
(27)



$-V \propto I \propto \emptyset \propto B$

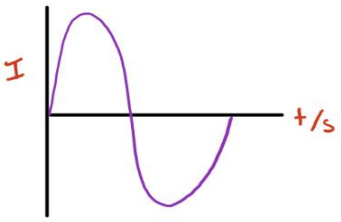
Alternating Current:

(28)



$$V_{r.m.s.} = \frac{V_0}{\sqrt{2}}$$

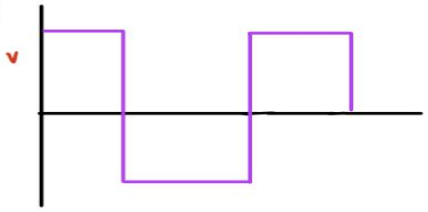
(29)



$$I_{r.m.s.} = \frac{I_0}{\sqrt{2}}$$

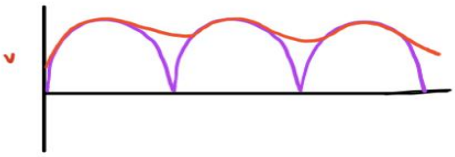
AHJ

30



$V_{r.m.s} = V_0$

31

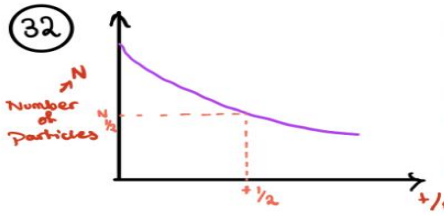


Rectification graph

increased capacitance or resistance causes the ripple depth to decrease

Nuclear Physics

32

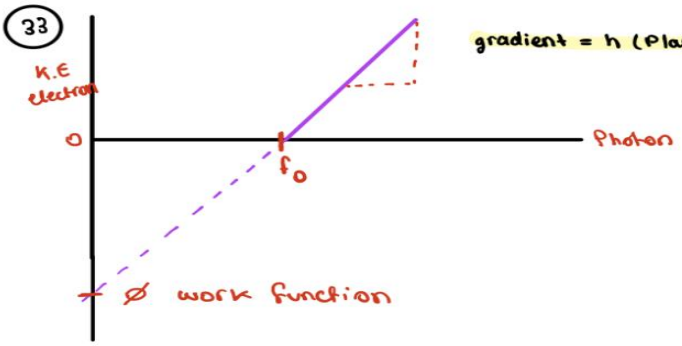


This graph can be used to find:

1. half-life ($t_{\frac{1}{2}}$)
2. λ as $\lambda = \frac{0.693}{t_{\frac{1}{2}}}$
3. A as $A = \lambda N$

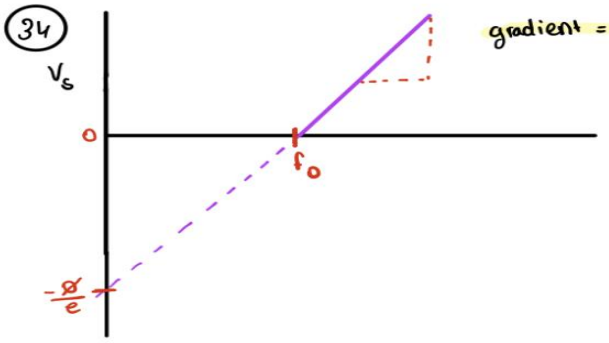
Quantum Physics

33



gradient = h (Plank's constant)

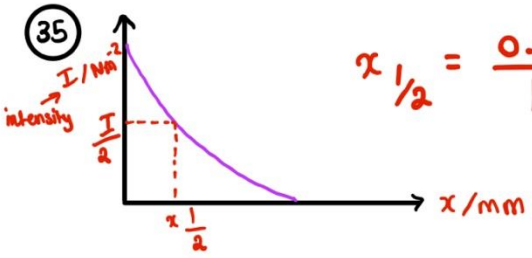
34



gradient = $\frac{h}{e}$

Medical Physics:

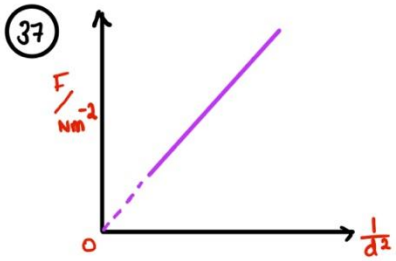
35



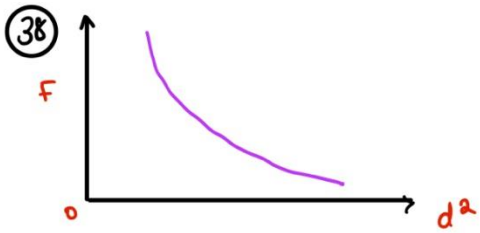
$$x_{1/2} = \frac{0.693}{\mu}$$

Astronomy & Cosmology:

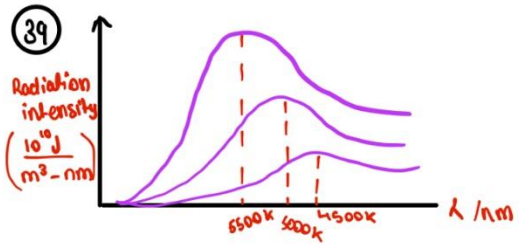
37



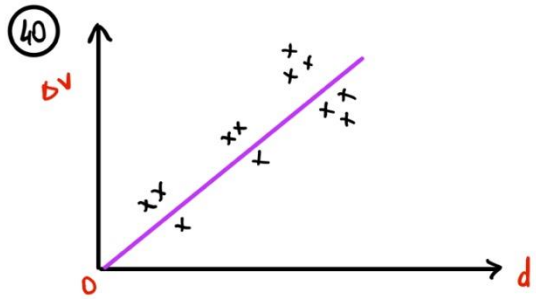
38



39



40



AHJ