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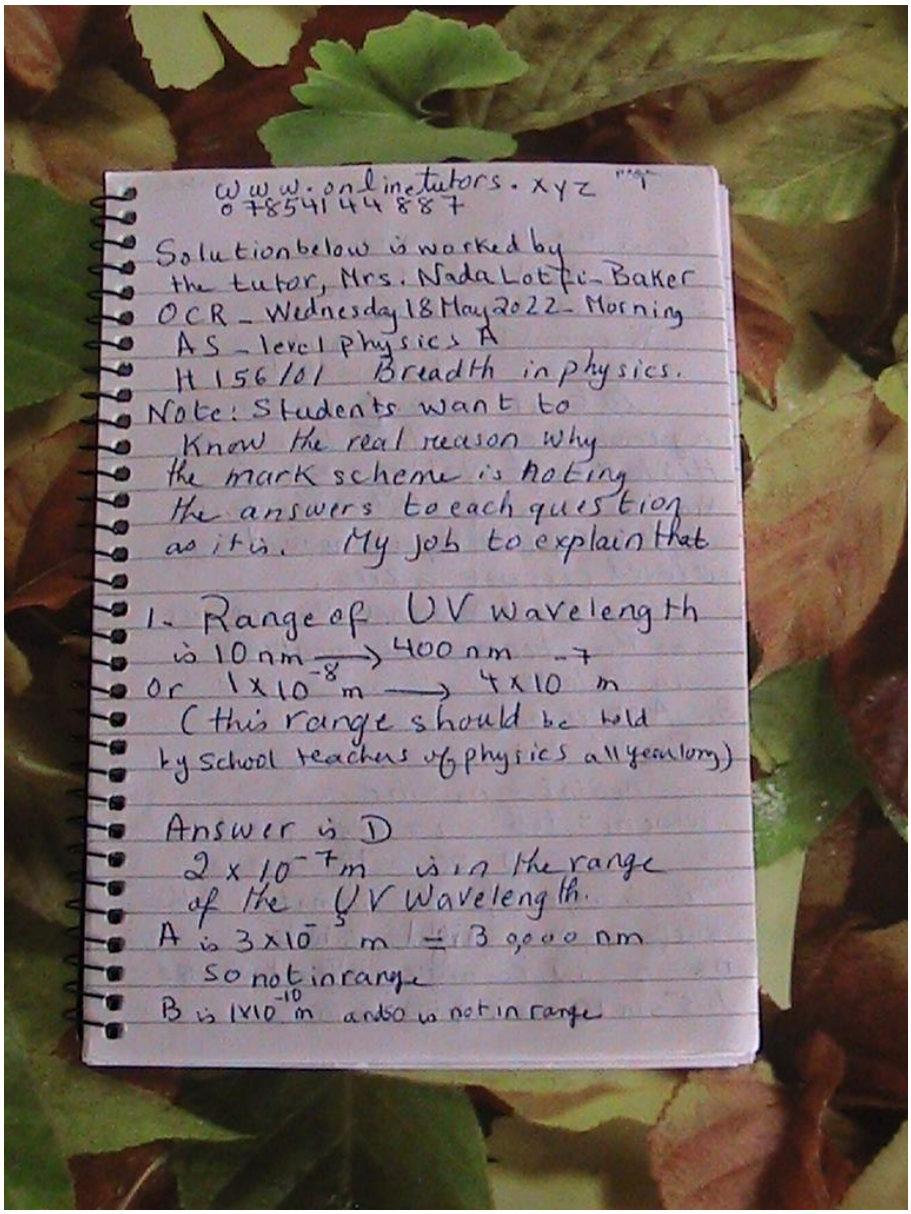
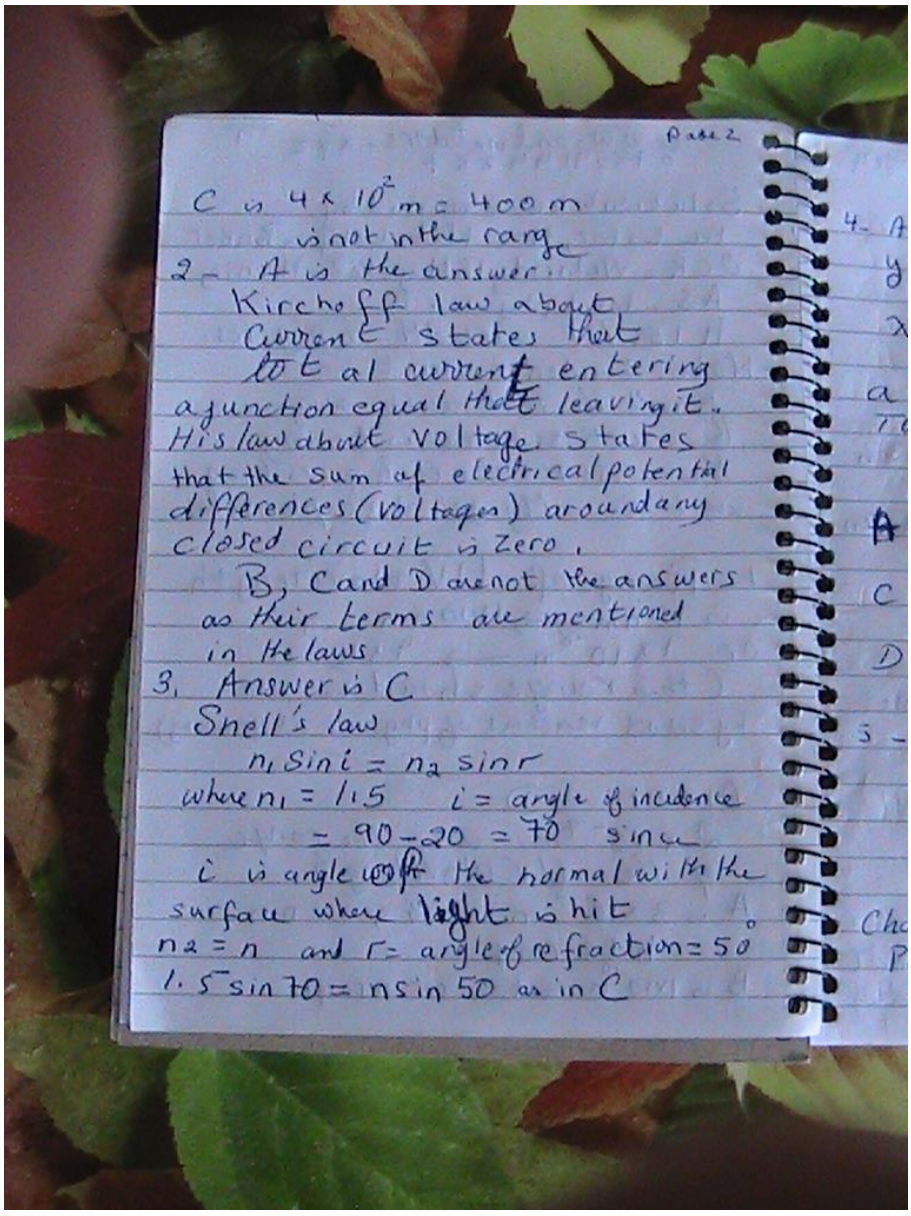
OCR A -Physics A level AS paper 1 -Breadth in physics -2022 Wednesday 18thMay

Mrs Lotfi - Baker had done handwriting solution to the following paper to help the students understand the answers better than they are in the mark scheme

677416-question-paper-breadth-in-physics.pdf (ocr.org.uk)





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C is 4×10^{2} m = 400 m
is not in the range

2- A is the answer.
Kirchoff law about
Current states that
total current entering
a junction equal that leaving it.
His law about voltage states
that the sum of electrical potential
differences (voltages) around any
closed circuit is zero.
B, C and D are not the answers
as their terms are mentioned
in the laws

3, Answer is C
Snell's law
$n_1 \sin i = n_2 \sin r$
where $n_1 = 1.5$ i = angle of incidence
$= 90 - 20 = 70$ since
i is angle of the normal with the
surface where light is hit
$n_2 = n$ and r = angle of refraction = 50°
$1.5 \sin 70 = n \sin 50$ as in C

4- Answer is B

$y = \frac{\lambda L}{a}$ = seperation between adjacent bright fringes

λ = wavelength, L = distance from slit to screen

a = slit seperation.

To maximize y, we maximize

$\frac{\lambda}{a} = \frac{510}{0.15} = 3400$

A is not the answer since $\frac{450}{0.20} = 2250 > 3400$

C is not the answer since $\frac{550}{0.25} = 2200 > 3400$

D is not the answer since $\frac{610}{0.3} = 2033.33 > 3400$

5 - Answer is C

$K.E(\text{initial}) = \frac{1}{2}mv^2 = \frac{1000 \times 20^2}{2} = 20,000\ J$

$K.E(\text{Final}) = \frac{1000 \times 15^2}{2} = 11250\ J$

Change in $K.E = 11250 - 20,000 = 8750\ J$

$\text{Power} = \frac{\Delta K.E}{\text{Time}} = \frac{8750}{2.4} = 3.6 \times 10$

6- Path difference =

$\theta\lambda$ where θ angle at which 2 waves meet at a certain point (in radians)

λ = Wavelength

Answer is C

Path difference $= \frac{270}{360} \times 4cm = 3cm$

Looking at C, $a - b = 18 - 15 = 3cm$

7- Answer is B

$$\frac{1}{R_{Total}} = \frac{1}{R_1} + \frac{1}{R_2}$$

(since R_1 & R_2 are in Parallel

$$\frac{1}{4} = \frac{1}{12} + \frac{1}{R_2}$$

$$\frac{1}{R_2} = \frac{1}{4} - \frac{1}{12}$$

$$\frac{1}{R_2} = \frac{3-1}{12}$$

$$\Rightarrow \frac{1}{R_2} = \frac{2}{12} \Rightarrow R_2 = 6\Omega$$

8- A

9-

8- Answer is C

$$I = \frac{V}{R} = \frac{0.9}{6} = 0.15A$$

$$\mathcal{E} = emf = V + IR$$

$$\Rightarrow r = \frac{\mathcal{E} - V}{I}$$

$$= \frac{1.2 - 0.9}{0.15} = 2\Omega$$

9- Answer is A

angle at A is 90° and is the right triangle

moment = Force x distance x $\sin\theta$

where θ is angle at which force is acting at a certain distance.

Therefore moment = force x distance x $\sin 90$

= force x distance

since $\sin 90° = 1$

10. Answer is C

$I = \frac{Q}{t} = \frac{ne}{t}$ where n is number of electrons and e is charge of one electron

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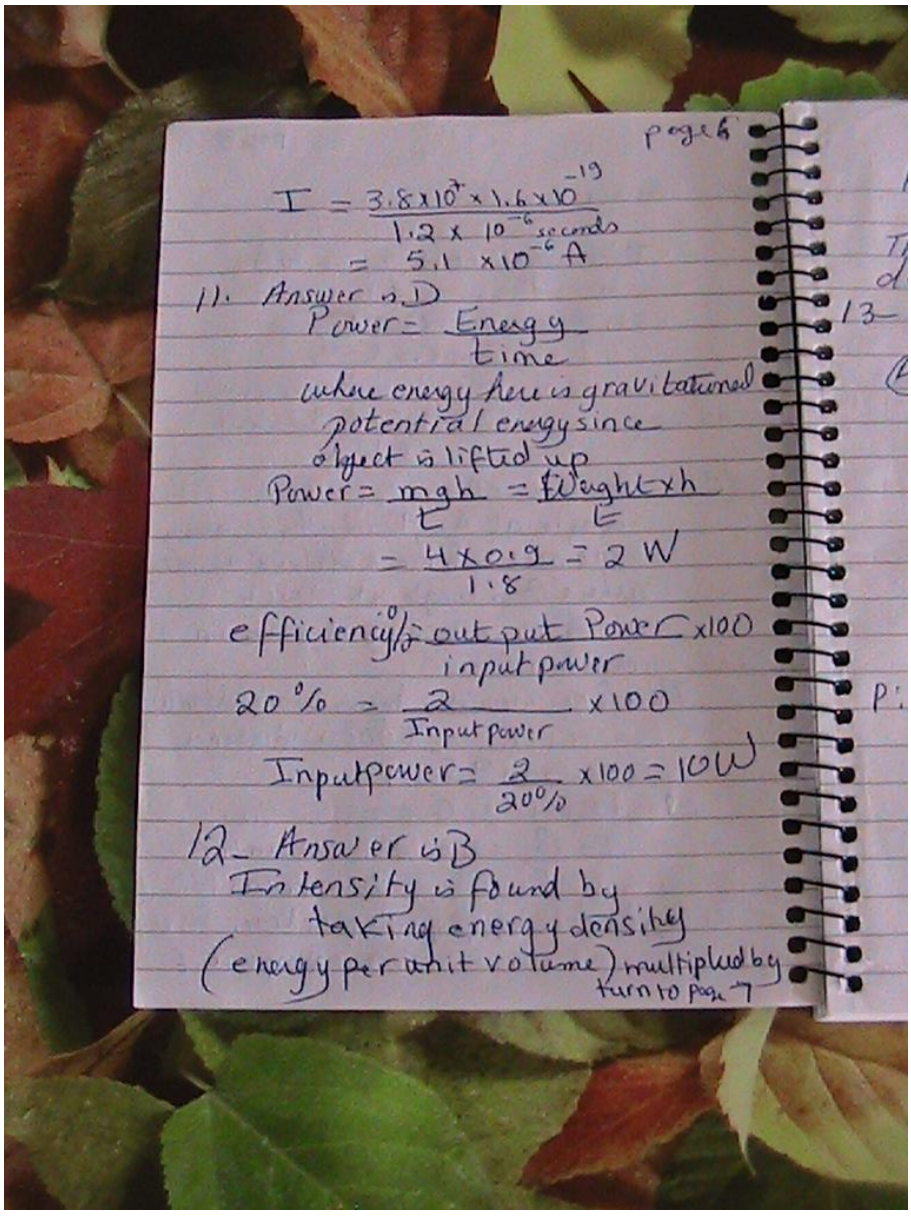

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$$I = \frac{3.8 \times 10^{7} \times 1.6 \times 10^{-19}}{1.2 \times 10^{-6} \text{ seconds}}$$

$$= 5.1 \times 10^{-6} \text{ A}$$

11. Answer is D

$$\text{Power} = \frac{\text{Energy}}{\text{time}}$$

where energy here is gravitational potential energy since object is lifted up

$$\text{Power} = \frac{mgh}{t} = \frac{\text{Weight} \times h}{t}$$

$$= \frac{4 \times 0.9}{1.8} = 2 \text{ W}$$

$$\text{efficiency\%} = \frac{\text{output Power}}{\text{input power}} \times 100$$

$$20\% = \frac{2}{\text{Input power}} \times 100$$

$$\text{Input power} = \frac{2}{20\%} \times 100 = 10 \text{ W}$$

12. Answer is B

Intensity is found by taking energy density (energy per unit volume) multiplied by

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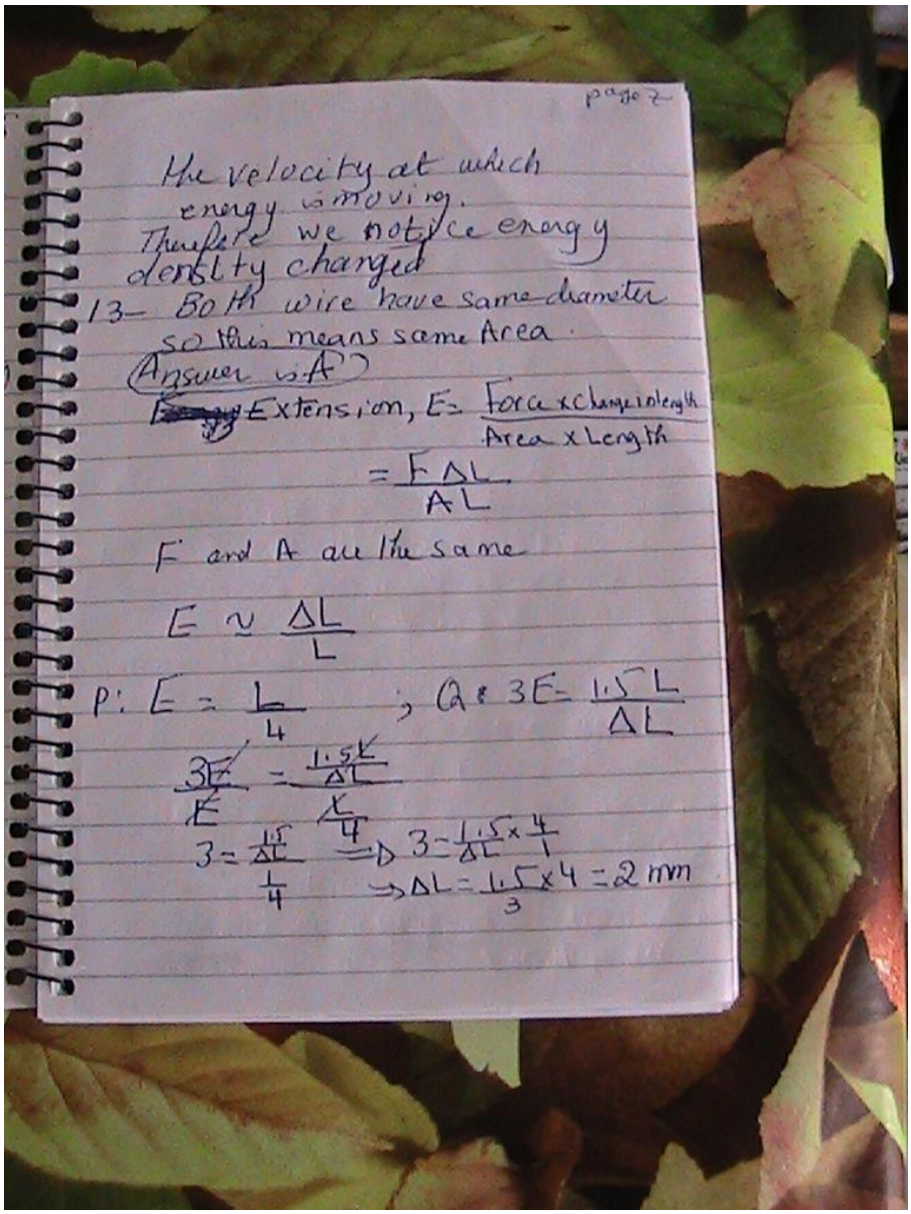

The rest of questions will be given once you book a lesson with me at 07854144887