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PHYSICS

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Paper 1

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SUCCESS EXAMINATIONS BOARD-KAMPALA

Uganda Certificate of Education

MOCK EXAMINATIONS 2024

PHYSICS PAPER 1 SCORING GUIDE

THEORY

Number 1

Number 1.

a. The darkness of the sky is due to the rotation of the earth. At night, the darkness is because that part of the earth is facing away from the sun.

b. Stars have different colours because of their surface temperatures and the chemical composition of the stars. The blue are the hottest, white followed by white, yellows and red. The brightness of the stars is due to their size. and surface temperature. Larger and hotter stars are brighter than smaller ones. (12)

T - 07
A - 07.

c. The moon appears every night due to its regular orbit around the earth.

d. The different appearance of the moon's orbit around the earth and the various angles of sunlight illuminating its surface. As the moon moves through its orbit, different portions of the illuminated half are visible from earth creating a sequence of phases.

d. By using telescopes.
By using satellites.

The satellites are meant for astronomical observation e.g the Hobble space Telescope / James Webb space telescope is launched into specific orbits outside the earth using rockets.

These satellites have spectrometers, cameras, telescopes and detectors for capturing detailed images and data. (2)

Scientists on earth select specific regions to be done research on. The capturing devices are made to face there.

The data is transmitted back to earth using radio signals.

06

$D_1 = 5 \times 1$

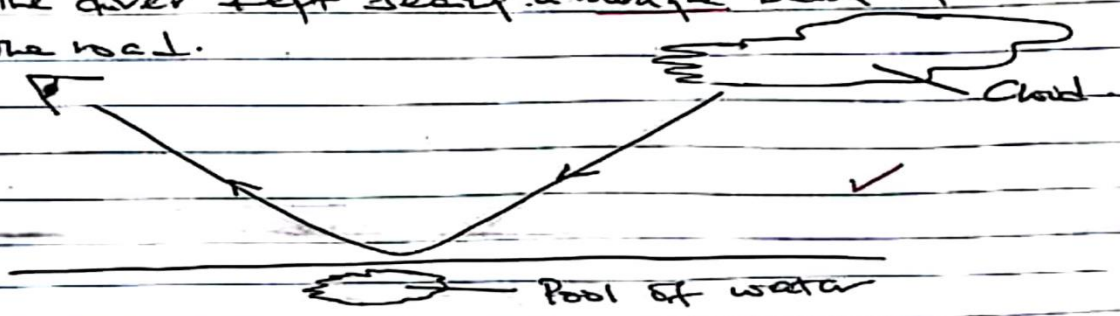
$= 330 \times 2 = 660$ m.

$D_2 = 330 \times 3.5 = 1155$ m.

The workers heard the sound at different times because they were at different distances away from the explosion.

b. The faint sound that was heard was an echo formed as a result of the sound from the explosion being reflected back.

c. The diver kept seeing a mirage being formed on the road.



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During hot days, the layers of air close to the tarmac road are warmer than those above the. At a result, light rays from the cloud are totally internally reflected into the eye of the diver making the cloud looks like it is on the road.

d. At night, the layers of air close to the ground are cooler than those away from the ground. These lead to the sound waves being refracted towards the ground hence travelling further.

During day, the layers of air close to the ground are warmer than those away from the ground. This leads to sound waves being refracted away from the ground hence travelling

Number 3

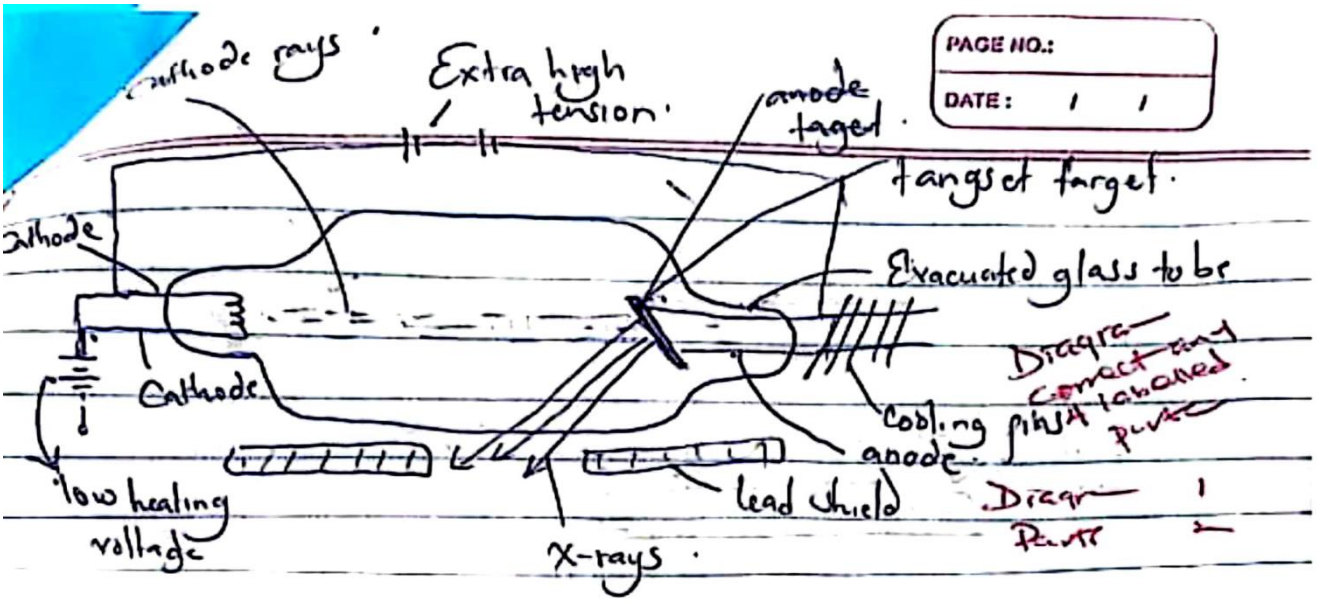

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Diagram correct and labelled parts

Diagram 1
Parts 2

The Electrons are produced by thermionic emission when heated by a low voltage source.

- The electrons are accelerated by the extra high tension voltage to reach the anode.
- When the electrons strike the tangsten target, about 99% of their kinetic energy is converted to heat energy while 1% of the energy is converted to X-rays.
- The heat energy is conducted away by the copper anode to the cooling fins.

The accelerating P.d is reduced such that the cathod rays have lower K.E to produce X-rays of lower penetrating power.

Development of cancer cells.
Lead to skin burns.
Genetic mutation.

Avoiding unnecessary exposure to X-rays.
- Wearing lead jackets ~~shields~~ when operating with X-rays.

Number 4

There was a difference in the time taken to cook because the places had different altitudes hence having different atmospheric pressure.
Since boiling occurs when the saturated vapour pressure inside a liquid is equal to the atmospheric pressure, boiling will occur at different temperatures.
This implies cooking will be longer at point P than Q

b) Conduction of heat to the plate on which the food was served.
Radiation of heat to the environment.
Evaporation of heat to the environment.

c) Placing the food in a food flask (vacuum flask). This reduces heat loss by radiation.
Covering the food so that heat loss by evaporation is reduced.
Serving the food on a plastic/wooden plate to reduce heat loss by conduction.
Eating the food in an area with less wind.
Insulating the plate
Serving the food on a silver plate. This reduces heat loss by radiation.

(21) any 3

d) $P_1 - P_2 = h\rho g$.

$\left(\frac{14.8 - 6.5}{100}\right) \times 13600 \times 10 = h \times 1.25 \times 10$.

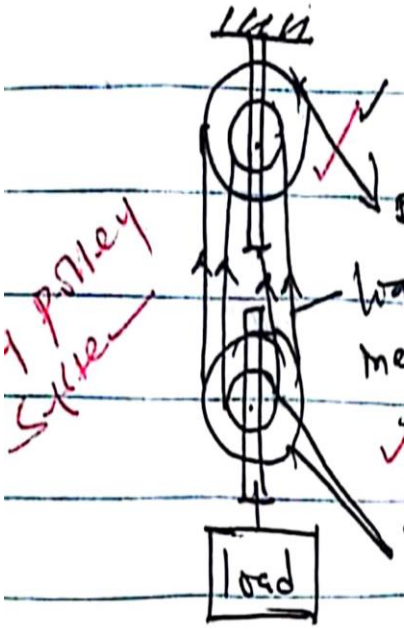
$h = 1066.24\,m$.

22 minutes $= 22 \times 60 = 1320\,s$.

$S = D/T = \frac{1066.24}{1320} = 0.81\,ms^{-1}$.

$S = D/T = \frac{1000}{1200} = 0.83\,ms^{-1}$.

The students moved with an acceptable speed.



- The load is tied to the lower block of the system
- A light inextensible string is passed over a grooved wheel.
- A force is applied on the string.
- This makes the lower block move upwards.

$$L \times D_L = M_s C_s (\theta_f - \theta_i).$$

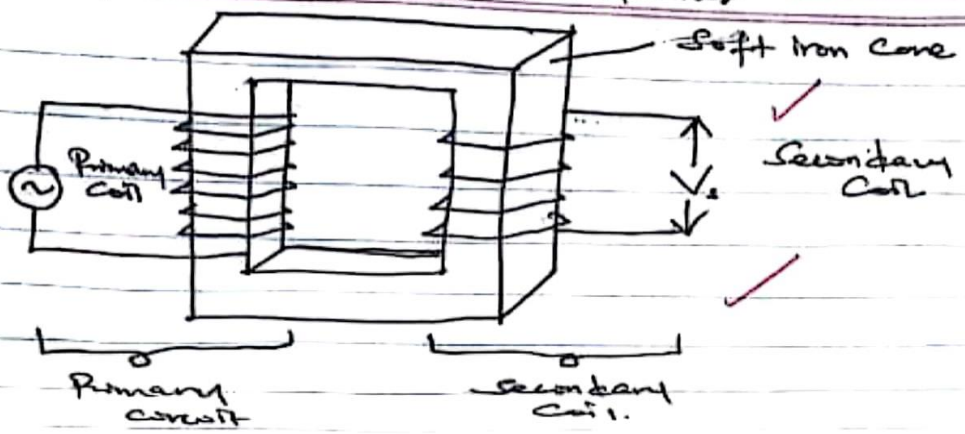
$$(8 \times 10 \times D_L) = 0.25 \times 2500 (\theta_f - 24).$$

If $\theta_f > 50^\circ C$, then the string will break.

Friction

Weight of the moving objects.

By using a step-down transformer



When an alternating voltage moves through the primary coil, it induces a varying current which flows through the coil.
The changing magnetic current induces a changing magnetic flux in the primary coil.
The changing magnetic flux links up with the secondary coil with fewer turns which induces a lower voltage in the secondary coil.

Thick aluminium wires have a lower resistance which reduced the power losses in transmission.

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

$$= 100\% - 20\% = 80\%.$$

$$0.8 = \frac{I_s V_s}{I_p V_p}$$

(05)

$$0.8 = \frac{240 \times I_s}{13000 \times 0.05}$$

$$I_s = 2.17\ A.$$

The television sets won't work.

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Bulbs.	$(4\times25)\times8 = 0.8$ Kwh.	per day
Cooker	$2200\times5 = 11$ Kwh.	per day
Fence.	$2200\times8 = 17.6$ Kwh.	per day.
Flat iron	$1800\times6 = 10.8$ Kwh	per week

Weekly. $(0.8+11+17.6)\times7+10.8 = 216.6$ units

Cost of power = No of units x Cost Per unit

$= 216.6 \times 900$

$=$ Sh. 194,940.

The Sh. 150,000 will not be sufficient.

The sockets should be connected in parallel to ensure that the appliances receive maximum voltage and also to ensure that effective resistance in the circuit reduces.

low resistance wires are used to ensure maximum current flows such that the electric shock that flows through the wires is high enough.

Ensuring the connections are in parallel.
Using appliances with thermostats.
Using energy saving devices.