

(SOME) EXPECTED RESPONSES.
PROPOSED SCORING GUIDE FOR UTEs PHY 1
MOCK UCE 2024.

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ITEM 1.

- a) It is ultrasound since they have high frequency of more than 20kHz which the human ear cannot withstand.

Practical use to man.

- Ultrasonic sounds are used in ultrasonic scanning e.g scanning the womb of a pregnant woman.
 - Used in measuring the depth of sea.
 - Used in industrial cleaning.
 - Used in non-destructive testing of materials.
- b) - By using sound proofing materials in the construction of the facility to absorb sound.
- By providing ear protection gears e.g ear plugs or ear muffs for workers
 - Schedule regular maintenance of machinery to reduce noise levels.
 - Implement noise barriers around the machinery.

- c) i) It is a concave mirror. Concave mirrors can produce virtual, erect and magnified images when the object is placed at a distance less than its focal length i.e placed between the focal point and the mirror.

ii)

$$M = \frac{d_i}{d_o}$$

$$2 = \frac{60}{d_o}$$

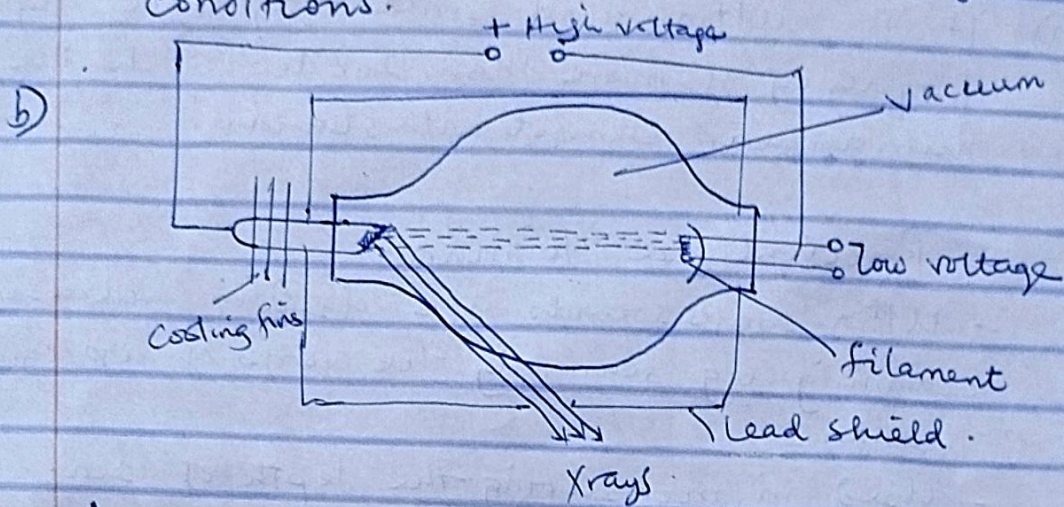
$$2d_o = 60$$

$$d_o = 30 \text{ cm.}$$

The engineer should cut the bend at 30cm from the mirror surface.

ITEM 2.

- a) The installation of an x-ray machine in health facilities plays a crucial role in enhancing diagnostic capabilities.
- It allows accurate detection of medical conditions.



- An x-ray machine operates by emitting a controlled amount of radiation that passes through the body and captures images of internal structures.
 - When the x-ray beam passes through the body, denser tissues e.g. bones absorb the radiation while less dense e.g. flesh allows the radiation to penetrate through it leaving bones appearing white and flesh appear in shades of gray or black on the x-ray film.
 - The resulting images help health care professionals identify fractures, tumors and other abnormalities making it an essential tool in modern medicine.
- c) The "out of bounds" statement at the entrance of the x-ray room is crucial for maintaining safety and ensuring that only authorized personnel operate the machine.
- The restriction is necessary because improper use of the x-ray machine can lead to unnecessary radiation exposure, which poses health risks.

2d) ~~into~~ ~~exposure~~

- Regular training sessions for authorized personnel on the latest xray technology.
- The installed machine should be kept in lead boxes (room) so that radiations can't penetrate through the room to the community.
- Unnecessary exposure ^{to the radiations} should be limited or avoided.

ITEM 3.

The date of Eid-ul-Adha is determined by the sighting of the moon.

- The moon's orbit around the Earth is not perfectly circular, causing variation of time it takes to complete a cycle.
- This variation in the moon's orbit can lead to the sighting of the new moon occurring earlier or later than expected resulting in a shift in the date of Eid-ul-Adha.
- The date has to be changed due to the sighting of the new moon occurring earlier than expected which is caused by the moon's elliptical orbit around the earth.
- Jupiter's larger size and mass compared to that of the earth result in a stronger gravitational pull from the sun.
- Jupiter's longer orbital period is due to its larger size and mass.
- Jupiter's shorter day is due to its rapid rotation caused by its initial angular momentum.
- Its numerous moons are a result of its strong gravitational pull.
- A shooting star is not a star but a small piece of debris typically a meteoroid entering Earth's atmosphere at high speed.
- As the meteoroid enters the atmosphere, friction with the air causes it to heat up and glow brightly, creating a streak of light across the sky.
- This streak of light is what we call a shooting star.

ITEM 4.

- a)
- Increase the temperature of the water to raise the temperature of water more rapidly.
 - Use of lid on the container to reduce heat loss.
 - Pre heat the container, this requires less energy to bring water to boil.
 - Increase the surface area exposed to heat by using a wider container.
 - Use small quantities of water as it takes less time.

- b) Heat to raise water from 15°C to 100°C .

$$Q_1 = 1 \times 4200 \times 85$$

$$Q_1 = 357000\text{J}$$

Heat to change the state from liquid to gas (vapor)

$$Q_2 = mL_v$$

$$= 1 \times 2260000$$

$$= 2260000\text{J}$$

$$\text{Total heat} = Q_1 + Q_2$$

$$= 357000 + 2260000$$

$$= 2617000\text{J}$$

- c) - Wooden handle acts as an insulator preventing heat from the metallic container from transferring to the user's hand.

- The wooden handle allows the user to hold the container without the risk of burns making it safer to handle hot liquids.

- d) Clay cups have better thermal insulation properties compared to metallic cups.

This means they will not conduct heat as quickly.

This allows learners to hold the cup comfortably without burning their hands.

Therefore using clay cups will enable learners to drink their tea without delay as they can handle the cups immediately after serving.