MT

Seat No. ⬜⬜⬜⬜⬜⬜⬜

MT - SCIENCE & TECHNOLOGY - I (72) - SEMI PRELIM - II : PAPER - 4

Time : 2 Hours   **(Pages 4)**   **Max. Marks : 40**

Note :

(i) All questions are compulsory.

(ii) Draw neat and labelled diagrams wherever necessary.

Q.1. (A) Solve the following questions :   **[5]**

(1) **Fill in the blank :**
The focal length of a .... lens is positive.

(2) **Name the following:**
Fuel formed when organic waste is decomposed by micro-organism.

(3) **Find the odd word out:**
Presbyopia, colour-blindness, myopia, hypermetropia.

(4) **State whether the following statement is 'True' or 'False'. If false; write the correct statement for the same :**
La stands for Lutetium.

(5) What would happen to the gravitational force, if the value of G was twice as large?

Q.1. (B) Choose the correct alternative and rewrite the sentences :   **[5]**
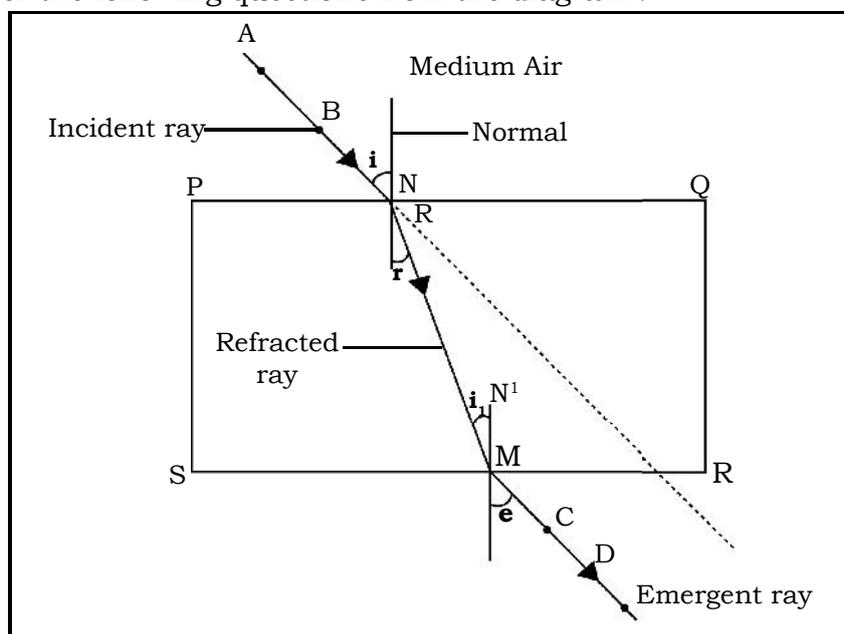
(1) What is rust?
(a) Sodium oxide   (b) Iron oxide
(c) Copper oxide   (d) Silver oxide

(2) A ray of light incident from a denser medium passes through a rarer medium in a straight line. What should be angle of incidence ?
(a) 0°   (b) 30°   (c) 60°   (d) 120°

(3)   The weight of body gradually decreases from ....
       (a) equator to poles   (b) poles to equator
       (c) pole to pole   (d) height to surface

(4)   Molecular formula of the chloride of an element X is XCl. This compound
       is a solid having high melting point. Which of the following elements be
       present in the same group as X.
       (a) Na   (b) Mg   (c) Al   (d) Si

(5)   To obtain an image of the same size as the object with the help of a
       convex lens, the object should be placed ....
       (a) at infinity   (b) beyond F_1
       (c) between F_1 and $2F_1$ (d) at $2F_1$

Q.2. Solve the following questions : (Any 5)   **[10]**

(1)   **Explain what happens when following reaction takes place and give
       the balanced chemical equation:**
       Copper reacts with dilute nitric acid.

(2)   Answer the following questions from the diagram :

       (a) How many times does the light undergo refraction?
       (b) Which two angles are equal?

(3)   **Distinguish between:** Groups and Periods of Modern Periodic Table

(4)   Let the period of revolution of a planet at a distance R from a star be T. Prove that if it was at a distance of 2R from the star, its period of revolution will be $\sqrt{8}$ T.

(5)   **Give scientific reason :**
It takes time for pieces of Shahabad tiles to disappear in HCl, but its powder disappears rapidly.

(6)   **Write down the electronic configuration of the following elements from the given atomic numbers. Answer the following question with explanation.**

$_{19}K$, $_{11}Na$, $_4Be$
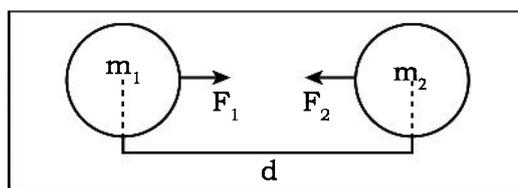
Which of these atoms has smallest atomic radius?

(7)   **Give scientific reason :**
Simple microscope is used by watch repairers.

Q.3. Solve the following questions : (Any 5)   **[15]**

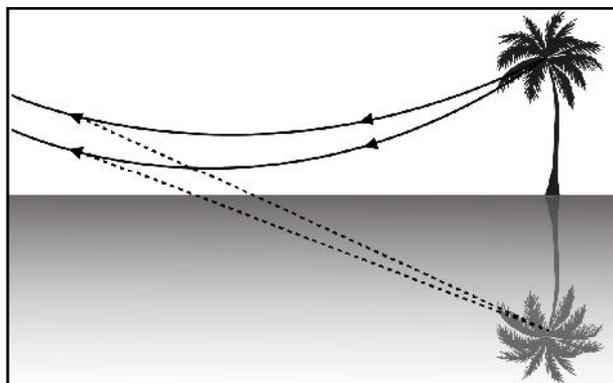(1)   Observe the figure and answer the following question:

(i)   What is the relationship between gravitational force and masses?
(ii)   What is the relationship between gravitational force and distance ?
(iii) If the value of G on earth is $6.67 \times 10^{-11}\ Nm^2/kg^2$, what is its value on the moon?

(2)   (a)   Define Optical centre.
(b)   Give scientific reason :
We cannot clearly see an object kept at a distance less than 25 cm from eye.

(3)

    (a) Which phenomena does the diagram show?
    (b) Which law obeyed by light makes this phenomena occur?
    (c) Name one more phenomena in nature where the above law is observed.

(4)   What is rancidity? Mention only two ways by which rancidity can be prevented.

(5)   An iron ball of mass of 3 kg is released from height of 125 m and falls freely to the ground. Assuming that the value of g is 10 m/s^2, calculate
    (i)   time taken by the ball to reach the ground
    (ii) velocity of the ball on reaching the ground
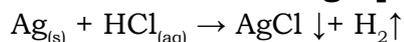   (iii) the height of the ball at half the time it takes to reach the ground

(6)   Write a note on Oxidation Reaction.

(7)   State the merits of Mendeleev's Periodic Table.

Q.4. **Solve the following questions : (Any 1)**   **[5]**

(1)   (a) **Balance the following equation stepwise :**
         $Ag_{(s)} + HCl_{(aq)} \rightarrow AgCl \downarrow + H_2 \uparrow$

    (b) What are the factors which affects the rate of a chemical reaction.

(2)   Write three laws of Kepler. State Newton's universal law of gravitation.

Best Of Luck👍