

MAR THOMA RESIDENTIAL SCHOOL, THIRUVALLA
FIRST TERMINAL EXAMINATION- 2019- '20

Std-X

Mark-80

PHYSICS
SCIENCE PAPER-1
(Two hours)

Answers to this paper must be written on the paper provided separately.
You will **not** be allowed to write during the first 15 minutes.

This time is to be spent in reading the question paper.

The time given at the head of this Paper is the time allowed for writing the answer.

The intended marks for questions or parts of questions are given in brackets ().

SECTION I (40 Marks)

Attempt **all** questions from this section.

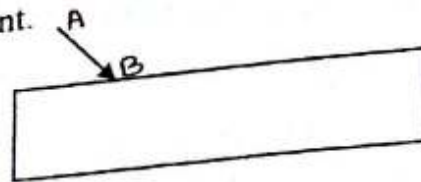
Question-1

- a. i. State the principle of moments.
ii. Name one device based on it. (2)
- b. i. Define centre of gravity of a body. (2)
ii. Name a factor on which the position of centre of gravity of a body depends. (2)
- c. i. Name the force required for circular motion.. (2)
ii. State the direction of the force mentioned in part (i) above. (2)
- d. Two forces each of magnitude 3N act vertically upwards and downwards respectively at the two ends of a uniform rod of length 1m which is pivoted at the mid- point.
i. Draw a diagram of the arrangement.
ii. Find the resultant moment of the forces about the mid-point of the rod. (2)
- e. A rain drop reaches the earth surface with a constant velocity.
i. Name the kind of equilibrium. (2)
ii. Define the above mentioned equilibrium. (2)

Question-2

- a. i. State Snell's law of refraction.
ii. Under what condition a ray of light will pass from medium 1 to medium 2 without any change in its path even when the angle of incidence in medium 1 is not zero. (2)

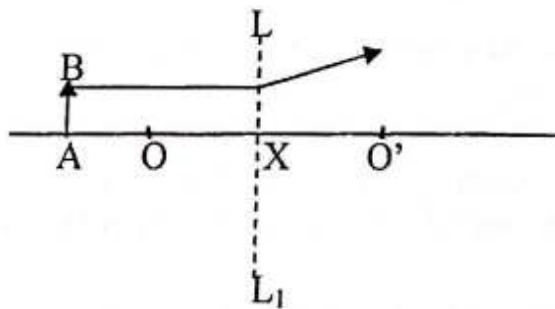
- b. Complete the path of the light ray till it emerges out of a glass block and mark the lateral displacement.



- c. When an illuminated object is held in front of a thick plane glass mirror, several images are seen.
- Which image will be the brightest one?
 - Give reason for your answer.
- d. A light ray incident on an equilateral glass prism at an angle of incidence 48° refracts parallel to the base of the prism.
- What is the angle of emergence?
 - Write an equation for angle of deviation for the above.
- e. A glass slab is placed over a piece of paper on which VIBGYOR is printed with each letter in its corresponding colour.
- The letter of which colour will appear to be raised maximum?
 - Give reason for the answer in part (i) above.

Question-3

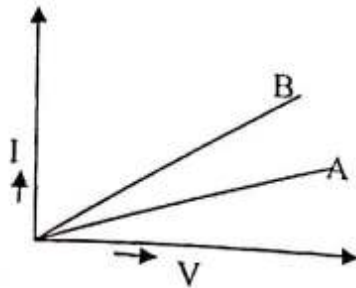
- a. A crack in a glass vessel often shines like a mirror.
- Name the phenomenon responsible for it.
 - State one condition necessary for the above mentioned phenomenon.
- b. Study the diagram given below.



- Name the lens LL_1 .
 - Complete the diagram to form the image of the object AB.
- c. An object of height 4cm is placed at a distance of 24cm in front of a convex lens of focal length 8cm.
- Find the position of the image and
 - the size of the image.
- d. i. How does the intensity of scattered light depend on the wavelength of the incident light?
- State the condition when the above dependence holds.
- e. Give reason why the clouds are seen white?

Question-4

- a. i. Define specific resistance.
ii. An electric bulb is rated '100W, 220V'. What information does this convey? (2)
- b. i. Name a material used for making standard resistor.
ii. Give a reason for using the material mentioned in part (i) above (2)
- c. A given wire of resistance 3Ω is stretched to increase its length thrice. What will be its new resistance? (2)
- d. The I-V graph for a series combination and for parallel combination of two resistors is shown below.



- i. Which of the two A or B represents the parallel combination?
ii. Give a reason for your answer.
- e. i. Name two factors on which the heat produced in a wire depends when current is passed in it. (2)
ii. State how does it depend on the factors stated by you. (2)

SECTION II (40 Marks)

(Attempt any four questions)

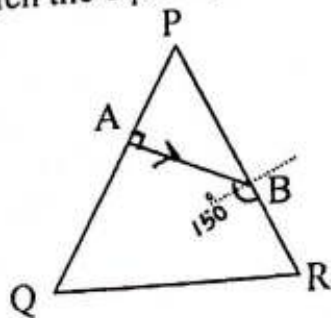
Question-5

- a. Name the radiation used for
i. sterilising purpose
ii. photography in fog
iii. analysis of atomic and molecular structure. (3)
- b. i. How are ultraviolet radiations detected?
ii. State one harmful effect of ultraviolet radiation
ii. Name the material of prism required for obtaining ultraviolet spectrum. (3)
- c. A uniform metre rule of mass 100g is balanced on a fulcrum at mark 35cm by suspending an unknown mass 'm' at the mark 30cm.
i. Find the value of m.
ii. What is the resultant moment if the mass 'm' is moved to 10cm mark?

- iii. How can it be balanced by another mass of 150g?

Question-6

- a. A ray of light incident on the side PQ of the prism is refracted along AB such that the angle it makes with side PR is 150° as shown below. The critical angle for material of which the equiangular prism PQR is made, is 60° .



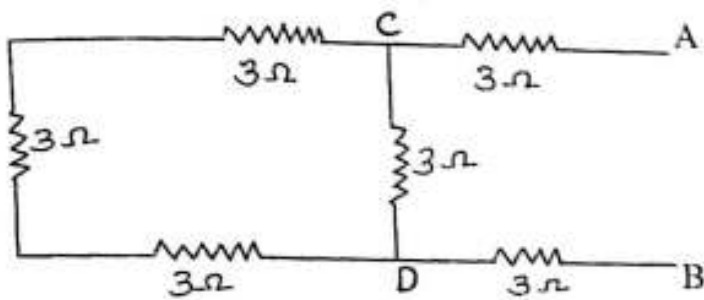
- i. Draw the path of the incident ray on the side PQ and
 - ii. the path which the ray AB travels from point B onwards.
 - iii. mark the angles wherever necessary.
- b. i. What is meant by the statement 'the critical angle for water is 49° '?
- ii. How is the critical angle related to the refractive index of a medium?
- iii. State how does the temperature affect the critical angle for a given pair of media.
- c. i. A coin kept inside water of refractive index $4/3$, when viewed from air in a vertical direction, appears to be raised by 2mm. Find the depth of coin in water.
- ii. Name a factor on which shift depends.
- iii. State how the above mentioned factor affect shift.

Question-7

- a. State the condition for each of the following.
- i. A lens is called equiconvex.
 - ii. A lens has both its focal length equal.
 - iii. A ray passes undeviated through the lens.
- b. A lens forms inverted, magnified image of an object.
- i. Name the kind of lens.
 - ii. State the position of the image.
 - iii. Give an application of the lens to form such an image.
- c. i. What is a magnifying glass?
- ii. State its principle.
- ii. Draw a ray diagram to show the formation of image by a magnifying glass.

Question-8

- i. State Ohm's law.
ii. Draw a neat labelled diagram to verify it.
A cell is used to send current to an external circuit. (3)
- i. How does the voltage across its terminals compare with its e.m.f. ?
ii. Under what condition is the e.m.f of the cell equal to its terminal voltage?
iii. Why is the potential difference across the terminals of a cell more in an open circuit and reduced in a closed circuit. (3)
- i. Find the equivalent resistance between the point 1) C and D, and 2) A and B



- ii. Three resistors of 6Ω , 3Ω and 2Ω are connected together so that the total resistance is greater than 6Ω , but less than 8Ω . Draw a diagram to show this arrangement and calculate its total resistance. (2)