

I -TERM EXAMINATION : 2021-22

CLASS : X (ICSE)

Time : 2 hrs.

Science Paper-1 (Physics)

M.M.: 80

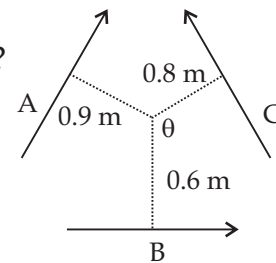
- You will not be allowed to write in the first 15 minutes. This time is to be spent in reading the question paper.
- The time given at the head of this paper is the time allowed for writing the answers.
- SECTION-I is compulsory. Attempt ANY FOUR questions from SECTION-II
- The intended marks for questions or parts of questions are given in brackets [] .

SECTION-I [40 Marks]

(Attempt all questions)

- Q. 1. (a) Define 1 Joule and express it in terms of the C.G.S. unit of the physical quantity. [2]
 (b) What is the principle of Moments ? [2]
 (c) Give 2 ways by which you can change the sense of rotation. [2]
 (d) Identify the type of equilibrium : [2]
 (i) A raindrop reaching the earth surface with a constant velocity.
 (ii) In a beam balance when the beam is in horizontal position.

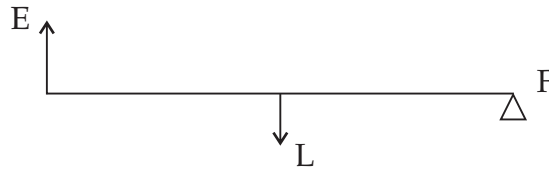
- (e) A, B and C are three forces each of magnitude 4N : [2]
 (i) Which force has the least moment about point 'O' ?
 (ii) Name the force producing clockwise moment ?



- Q.2. (a) A force causes displacement in a body. Can work done be zero in this case ? Give the reason for your answer. [2]
 (b) A man exerts a force of 250 N in pulling a cart at a constant speed of 16 ms^{-1} . Calculate the power spent by the man. [2]
 (c) State whether work is done or not : [2]
 (i) ~~A man pushes a truck~~
 (ii) A boy climbs up 20 steps on a stair
 (d) In what way does the temperature of water at the bottom of a water fall differ from the temperature at the top ? Explain. [2]
 (e) Give one characteristic of light that changes and one which do not change during refraction of light. [2]

- Q.3. (a) Name the material of prism required for obtaining the spectrum of (i) Ultraviolet light (ii) Infrared radiation [2]
 (b) State the energy change in the following cases while in use : [2]
 (i) An electric iron
 (ii) A ceiling fan
 (c) With reference to the terms mechanical advantage, velocity ratio and efficiency of a machine, name and define the term that will not change for a machine of a given design. [2]
 (d) A body of mass 50 kg has a momentum 3000 kg ms^{-1} calculate its kinetic energy. [2]
 (e) An electromagnetic wave has wavelength 50 \AA . [2]
 (i) Name the wave
 (ii) State its speed in vacuum.

- Q.4. (a) The refractive index of water is $\frac{4}{3}$ and of glass is $\frac{3}{2}$. What is the refractive index of glass with respect to water? [2]
- (b) The diagram shows a lever in use : [2]
- (i) To which class of lever does it belong ?
- (ii) Without changing the dimension of lever if the load is shifted towards the fulcrum what happens to the mechanical advantage of the lever ?

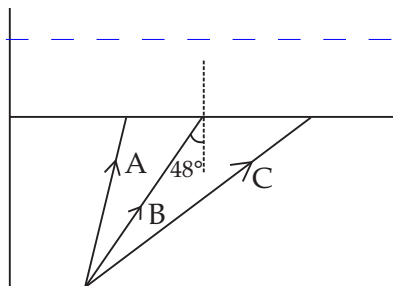


- (c) There is no gain either in M.A. or in speed why is then single fixed pulley used? [2]
- (d) Name the phenomenon involved : [2]
- (i) A tank appear shallow than its actual depth
- (ii) The sky appears blue.
- (e) Draw a diagram to show the minimum deviation of a ray through an equilateral prism. [2]

SECTION- II {40 Marks}

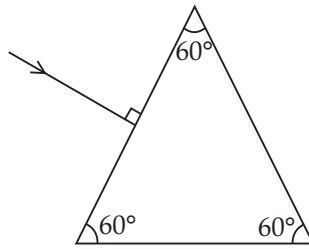
[Answer any four.]

- Q.5. (a) A uniform half metre rule balances horizontally on a knife edge at 29 cm mark when a weight of 20 gf is suspended from one end : [1+2]
- (i) Draw a diagram of the arrangement.
- (ii) What is the weight of the half metre rule ?
- (b) Why uniform circular motion is an accelerated motion ? Name the force responsible to cause this acceleration. What is the direction of force at any instant. [3]
- (c) (i) Draw the following diagram and complete the path of rays A, B & C. The critical angle for water air surface is 48° . [4]



- (ii) Name the phenomenon which the rays A, B and C exhibit.
- Q.6. (a) Derive a relationship M.A., V.R. and Efficiency. [3]
- (b) A ray of light is passing from one transparent medium to the other which have different optical densities, bends : [3]
- (i) Name the phenomenon
- (ii) State whether the ray of light will bend or not if path the medium have same optical density.
- (iii) Write relation between angle of incidence and angle of refraction.
- (c) Write two similarities and two dissimilarities between centripetal and centrifugal force. [4]

- Q.7. (a) (i) Give two reasons why the efficiency of a single movable pulley is not 100% .
(ii) What is the ratio between M.A. and V.R. if its efficiency is 100% (assumed). [2+1]
(b) Complete the ray diagram (Mark all the necessary \angle s) [3]
i_e (Glass-Air)=48°



- (c) State the factor on which the position of centre of gravity depends. What is the position of C.G. of a : [4]
(i) Circular lamina
(ii) Solid cone
(iii) Hollow cylinder
- Q.8. (a) State two conditions necessary for total internal reflection. Which has higher critical angle red light or green light. [3]
(b) Draw a labelled diagram of an arrangement of block and tackle system has VR=3. Mark the direction of tension, load and effort. [3]
(c) Classify the following into levers of Class I, Class II and Class III. [4]
(i) Catapult (Gulail) (ii) Fishing rod
(iii) Stapler (iv) Crowbar
- Q.9. (a) Derive the relation between momentum and kinetic energy of a body. [3]
(b) A coin kept inside water ($n = \frac{4}{3}$) when viewed from air in a vertical direction, appears to be raised by 2.0 mm. Find the depth of the coin in water. [3]
(c) Define the term dispersion of light. Show the dispersion of sunlight with the help of a diagram. [4]
- Q.10. (a) The given figure shows a firetong. Mark the position of load (L) Effort (E) and Fulcrum (F). [3]



- (i) Name the class of lever.
(ii) If load arm is 15 cm and effort arm is 5 cm, what is its mechanical advantage ? [3]
(b) The danger signal is red why ? [3]
(c) The bob of a single pendulum is imparted a velocity of 5ms^{-1} when it is at its mean position. To what maximum vertical height will it rise on reaching at its extreme position if 60% of its energy is lost in overcoming the friction of air (Take $g = 10\text{ms}^{-2}$) [4]

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