PHYSICS CLASS X

Science paper I

(2 hours)

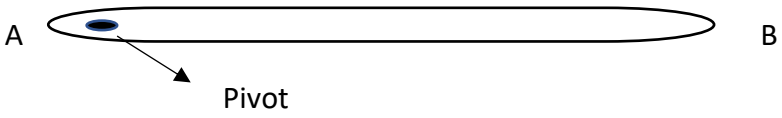
(You will not be allowed to write during first 15 minutes. This time to spent in reading question paper. The time given at head of paper is the time allowed for writing the answers)

Section I (40 marks)

(Attempt all questions from this section)

Question 1

a) The figure alongside shows an axle AB pivoted at a point. Draw diagrams showing the point of application and direction of minimum force to rotate it i) clockwise and ii) anticlockwise [2]



b) State two difference between centripetal and centrifugal force [2]

c) A body is pivoted at a point .A force of 10 N is applied at a distance of 30 cm from the pivot. Calculate the moment of force about the pivot [2]

d) Name a machine for each of the following use
i) to multiply the force ii) to change the direction of force [2]

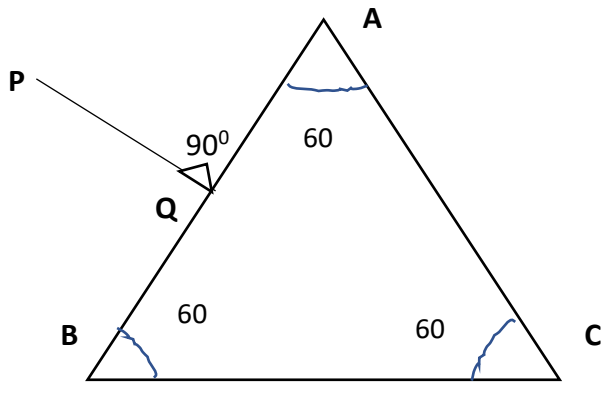
e) State two application of echo [2]

Question 2

a) With reference to the terms mechanical advantage, velocity ratio and efficiency of a machine, name and define the term that will not change for machine of a given design [2]

b) A boy uses blue colour of light to find the refractive index of glass. He then repeats the experiment using red colour of light. Will the refractive index be same or different in two cases? give a reason to support your answer [2]

c) Complete the path of the light ray till it emerge out of the prism .The critical angle of Glass is 42^0 .In your diagram mark angles wherever needed [2]



d) State the condition for resonance to be occur [2]

e) State two ways by which the frequency of transverse vibration of a stretched string can be increased [2]

Question 3

a) Define damped vibration with suitable example [2]

b) A nucleus $^{24}_{11}\boldsymbol{Na}$ is beta radioactive [2]

i) What is 24 and 11 indicate?

ii) Write the equation to represent beta decay

c) Radio activity is a nuclear phenomenon comment your answer [2]

d) Is it possible to deflect Gamma radiation using electric or magnetic field? Give reason [2]

e) A pair of Scissors have its blades 15cm long ,while its handles are 7.5 cm long. What is its mechanical advantage? [2]

Question 4

a) In a Sonar ,Ultrasonic waves are send into the sea water and the reflected waves from a sunken ship are received after 2.0 s. If the velocity of waves in seawater is 1450 m/s. Find the depth of sunken ship. [2]

b) It is easier to turn the steering wheel of a large diameter than that of a small diameter. Give reason [2]

c) Draw a ray diagram to show the refraction of a monochromatic ray through a prism when suffer minimum deviation [2]

d) Light of a single colour is passed through a liquid having a piece of glass suspended in it. On changing the temperature of liquid ,at a particular temperature the glass piece is not seen.

i)When is the glass piece not seen?

ii) Why is the light of a single colour used ?

e) State two difference between forced and resonant vibration [2]

Section II (40 marks)

(attempt any four questions)

Question 5

a) A physical balance has its arm of length 60cm and 40 cm. What weight kept on pan of longer arm will balance an objects of weight 100gf kept on other pan? [3]

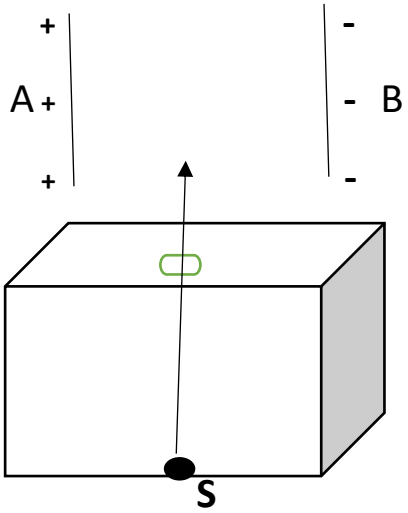
b) Prove that

$$Refractive\ index = \frac{\text{real depth}}{\text{apparent depth}}$$ [3]

c) Figure shows a radioactive source S in a thick led walled container having a narrow opening. The radiation pass through an electric field between the plates A and B.

i) Complete the diagram to show the path of radiations

ii) Why is the source S kept in thick lead walled container with a narrow opening [4]



Question 6

a) i) What are damped vibration [4]

ii) Give an example of damped vibration

iii) Name the phenomenon that cause a loud sound when a stream of vibrating tuning fork is kept pressed on the surface of a table

iv) How frequency of sound given by a stretched string depend on length?

b) i) What you mean by echo [3]

ii) What are the condition for hearing an echo

c) Complete the following nuclear change [3]

i) $^{238}_{92}P \xrightarrow{\alpha}$ Q $\xrightarrow{\beta}$ R $\xrightarrow{\beta}$ S

ii) $^{238}_{92}U \longrightarrow {}^{234}_{90}Th$ +---------+Energy

Question 7

a) i)What you mean by couple

iii) Prove that

moment of couple = F x couple arm [3]

b) Define the term efficiency of a machine. Give two reasons for a machine not to be 100 % efficient [3]

c) i) Define critical angle. How does it depend on wavelength of incident light [4]

ii) what is the value of μ for water and glass

Question 8

a) Write any four properties of Beta particles [4]

b) What changes occur in the nucleus of radioactive element when it emits Alpha particle ,beta particle and Gamma radiation [3]

c) What are the two kinds of equilibrium explain with an example [3]

Question 9

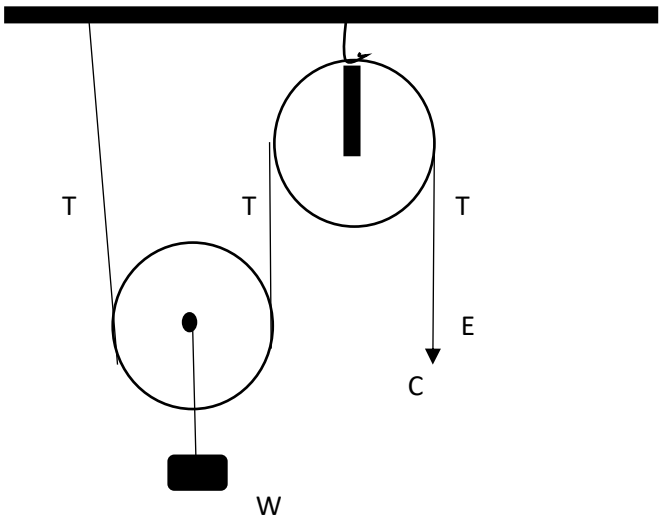
a) The diagram shows the combination of two pulleys P1 and P2 used to lift up a load W. [4]

i) State the kind of pulleys P1 and P2

ii) State the function of pulley P2

iii) If the free end C of the string move through a distance x ,by what distance is the load W raised?

iv) What effort E has to be applied at C to just raise the load W= 20 kgf ? Neglect both the weight of pulley P1 and the friction

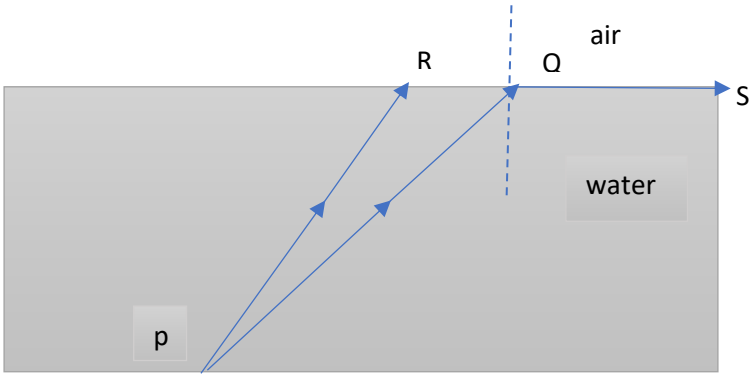


b) Describe a simple experiment to verify the principle of moment, if you are supplied with a metre rule, a fulcrum and two springs with slotted weights [3]

c) i) Define the term centre of gravity of a body ii) find the centre of gravity of a triangular lamina [3]

Question 10

a) In the figure, PQ and PR are the two light rays Emerging from an object P. The ray PQ is refracted as QS [4]



i) State the special name given to the angle of incidence < PQN of the ray PQ

ii) What is angle of refraction for the refracted ray QS ?

iii) Name the phenomenon that occur if the angle of incident <PQN is increased

iv) The ray suffer partial reflection and refraction on water- air surface give reason

b) Write a short note about harmful effect of radiation [3]

c) What is lateral displacement ? What are the factors depends on lateral displacement? [3]