

St. Mary's Convent Inter College, Allahabad
First Terminal Examination 2025 - 26

Time : 2 Hrs

Class 10
 Physics

M.M. : 80

Name : Roll No. Date :

Question paper contains two sections.

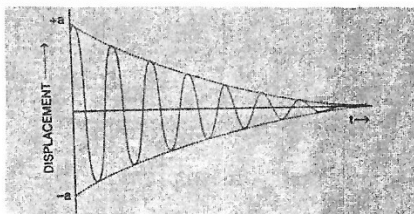
Attempt all questions in Section A and any four questions in Section B.

Section - A (40 marks)

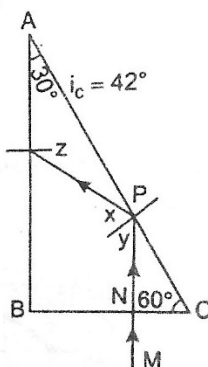
Q-1. Choose the correct answer:

[15x1]

- i) To detect obstacles, bats produce:
 - a) infrasonic waves
 - b) ultrasonic waves
 - c) radio waves
 - d) electromagnetic waves
- ii) The radiation used to detect purity of ghee is:
 - a) Gamma rays
 - b) Ultraviolet
 - c) Infrared
 - d) X rays
- iii) A machine acts as a speed multiplier when:
 - a) $M.A < 1$
 - b) $M.A > 1$
 - c) $\eta = 0$
 - d) $\eta > 1$
- iv) Which type of vibration is shown below:



- a) free
 - b) forced
 - c) resonance
 - d) damped
- v) During dispersion, compared to blue light, green light:
 - a) slows down less and refracts more
 - b) slows down more and refracts less
 - c) slows down more and refracts more
 - d) slows down less and refracts less
- vi) The correct relation between momentum and K.E is:
 - a) $p = 2mK$
 - b) $p = \sqrt{mK}$
 - c) $p = \sqrt{2mK}$
 - d) $p = 2mK^2$
- vii) If sound travels with a speed of 1400 m/s in water then the minimum distance required between a source and observer to hear echo is:
 - a) 17m
 - b) 34m
 - c) 70m
 - d) 140m
- viii) The energy conversion in burning of coal in a thermal power plant is:
 - a) chemical to heat to light
 - b) chemical to heat to mechanical to electrical
 - c) heat to chemical to mechanical
 - d) chemical to heat to light
- ix) The value of angles x and y is:



- a) $x = 90^\circ, y = 90^\circ$
 - b) $x = 30^\circ, y = 60^\circ$
 - c) $x = 60^\circ, y = 60^\circ$
 - d) $x = 45^\circ, y = 45^\circ$

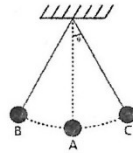
P.T.O

x) **Assertion:** For an object to be in equilibrium, the sum of clockwise moments and the sum of anticlockwise moments should be equal.

Reason: Equilibrium condition only depends on those forces which act vertically on the body.

- a) Both assertion and reason are true and the reason is correct explanation of assertion.
- b) Both assertion and reason are true but the reason is not correct explanation of assertion.
- c) Assertion is true but reason is false.
- d) Assertion is false but reason is true.

- xii) An oscillating simple pendulum is shown in fig. If the total energy at A is E, then the total energies at B and C are:



- a) $E/2, E/2$
- b) $E/2, E$
- c) E, E
- d) $E, 2E$

- xiii) A light ray emerging out of a glass slab moves parallel to the slab. The angle of emergence is:

- a) 0°
- b) 45°
- c) 60°
- d) 90°

- xiii) The center of gravity of a solid cone of height h from the vertex is:

- a) $h/3$
- b) $2h/3$
- c) $h/4$
- d) $3h/4$

- xiv) Two sound waves A and B have same amplitude and waveform with frequencies 60 Hz and 120 Hz respectively, then:

- a) A is louder than B
- b) A is shriller than B
- c) B is shriller than A
- d) Both have different quality

- xv) The focal length of a plane glass plate is:

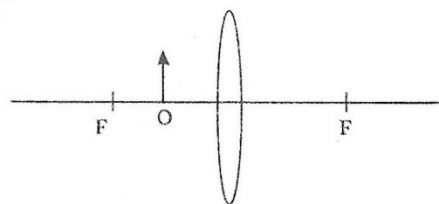
- a) positive
- b) negative
- c) infinite
- d) zero

- Q-2. i) Write three factors affecting the refractive index of a medium.

- ii) Name the energy changes in a) glowing electric bulb

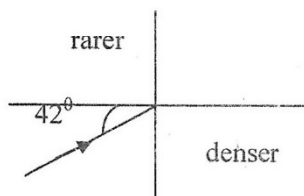
b) photosynthesis

- iii) Complete the ray diagram:



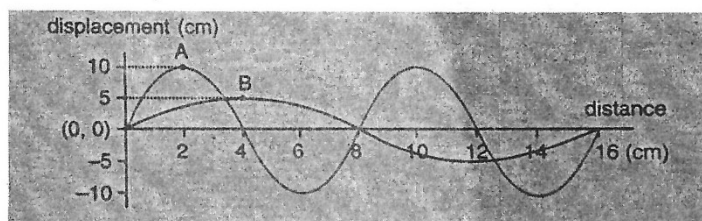
- iv) Write two factors affecting loudness of sound.

- v) Complete the ray diagram: (given $i_c = 42^\circ$)



- vi) The displacement-distance graph of two sound waves A and B is shown in figure below.

Compare a) the wavelengths b) the amplitudes



- vii) A boy lifts a bucket of weight 20 kgf upto a height of 3 m in 3 minute while his father does the same work in 1 minute. Find the ratio of the work done by them. [2]

Q-3. i) Fill in the blanks: [6]

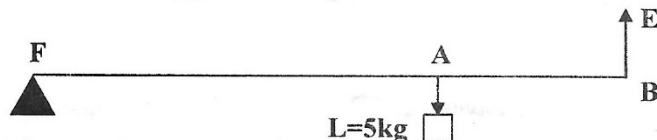
- A _____ (class I/class II/class III) lever always has a M.A < 1 .
 - In a block and tackle system, on increasing the weight of the movable part, the efficiency _____. (increases/ decreases/ remains same)
 - If half part of a convex lens is blackened then its focal length _____ (increases/decreases/remains same) and the intensity of image formed _____ (increases/decreases/remains same).
 - The characteristic of sound affected by the change in its waveform is _____. (pitch/quality/loudness).
 - The rotation of earth is an example of _____ (static/dynamic) equilibrium.
- ii) A body is thrown vertically upwards. Draw the graph of its potential energy. [2]
- iii) Name the wave used for echo depth sounding. Write one reason for its use. [2]

Section-B

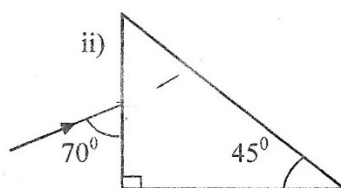
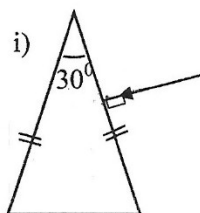
(Attempt any four from this section) (40 marks)

- Q-4. a) An object is placed at a distance of 1 m from a screen. A convex lens is used to form an image by keeping it at a distance of 75 cm from the screen. Find [3]
- focal length of the lens
 - magnification.
- b) Write three common properties of electromagnetic waves. [3]
- c) An object is placed between F and $2F$ of a convex lens. Draw a ray diagram to show the position of the image formed. Also write the nature and size of the image. [4]

Q-5. a) A lever is shown in the figure below: [3]



- To which class does this lever belong?
 - If $FA = 80\text{cm}$, $FB = 100\text{cm}$, find the mechanical advantage.
 - Calculate the effort E .
- b) Write three differences between a single fixed pulley and a single movable pulley. [3]
- c) i) Draw a diagram to show a block and tackle pulley system having a V.R= 3 marking the direction of load L , effort E and tension T . [3]
- ii) The pulley system drawn lifts a load of 150 N when an effort of 60 N is applied. Find its mechanical advantage. Is the above pulley system an ideal machine or not? [4]
- Q-6. a) i) The refractive index of water with respect to air is $4/3$ and that of glass is $3/2$. Find the refractive index of glass with respect to water. [3]
- ii) Calculate the frequency of yellow light of wavelength $6 \times 10^{-7}\text{m}$. (speed of light = $3 \times 10^8\text{m/s}$) [3]
- b) Write the three factors on which lateral displacement in a glass slab depends. [3]
- c) Complete the given ray diagrams: (given critical angle = 42°) [4]

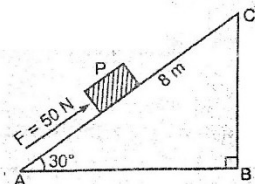


Q-7. a) State and prove the **Work-Energy theorem**. [3]

b) For each given condition state whether the work done is positive, negative or zero. [3]

- A person climbing a ladder
- A person walking on a leveled road.
- A football kicked by a player.

c) A block of mass 5 kg is pushed along an inclined plane of length 8 m by applying a force of 50 N. The plane makes an angle of 30° with the horizontal as shown in figure. [4]



- What is the work done in pushing the block along the plane?
- What is the gain in potential energy of the block?

Q-8. a) Define echo. Write any two conditions for an echo to occur. [3]

b) When a vibrating tuning fork is brought near the mouth of a long tube filled with water it is observed that when the length of the air column is 5 cm a loud sound is heard. [3]

- Name the phenomenon due to which the sound gets louder.
- Why is the loud sound heard at this particular length?

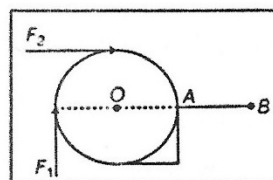
iii) If the tuning fork is replaced by another tuning fork with higher frequency, will the length of the air column increase or decrease to produce the loud sound again?

c) i) Draw a curve showing the variation in the angle of deviation with the angle of incidence at a prism surface. [4]

ii) A does 500J of work in 10 minutes and B does 600J of work in 20 minutes. The power delivered by A and B is P_1 and P_2 respectively. Find the relation between P_1 and P_2 .

Q-9.

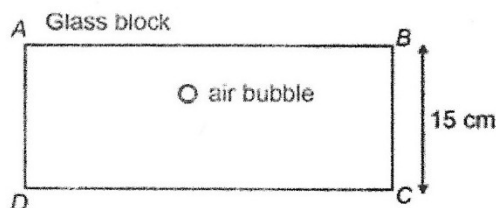
a) A roller with a diameter of 0.2 m is raised over a pavement AB by applying force F_1 and F_2 as shown in the diagram. If the magnitudes of both the forces are 20 N, then compare the magnitudes of the torques in produced by both the forces. [3]



b) A lens of power +5D has an object placed at a distance of 50 cm in front of the lens. [3]

- Name the type of lens.
- State the nature of the image formed.
- What is the definite distance, towards or away from the lens, the object should move so that the image is not seen

c) A rectangular glass block ABCD of refractive index 1.5 has an air bubble trapped inside it as shown in the diagram. When seen from the surface AB, it appears to be 4 cm deep.



- Calculate the actual depth of the air bubble from the surface AB.
- For which colour of light, blue or yellow, the apparent depth will be greater?
- Turning the glass block upside down, DOES NOT change the apparent depth of the air bubble. State True or False. [4]