GREENLAWN'S SCHOOL, WORLI
First Semester Examination 2024-25
PHYSICS

STD: VIII **Marks: 80**
Date: 08/09/2025 **Time: 2 hrs**

Question 1

a. Choose the correct answers to the questions from the options given. (Do not copy the question, write the correct answers only.) [15]

i. Two coolies A and B do some work in time 1 minute and 2 minutes respectively. The power spent is
a. same by both coolies **b.** more by coolie A than by B
b. less by coolie A than by B **c.** nothing can be said.

ii. When a boy doubles his speed, his kinetic energy becomes
a. half **b.** double **c.** four times **d.** no change

iii. To obtain a given moment of force for turning a body, the force needed can be decreased by
a. applying the force at the pivoted point
b. applying the force very close to the pivoted point
c. applying the force farthest from the pivoted point
d. none of the above

iv. Nose bleeding may occur at a high altitude because
a. the atmospheric pressure decreases
b. the oxygen content of atmosphere decreases
c. the atmospheric pressure increases
d. there are strong air currents at the high altitude.

v. A piece of wood floats on water. The buoyant force on wood will be
a. Zero **b.** more than the weight of the wood piece
c. equal to the weight of the wood piece **d.** less than the weight of the wood piece.

vi. The molecules move only within the boundary of
a. Liquids **b.** gases **c.** solids **d.** none of the above

vii. When an object is placed at the principal focus of a concave mirror, the image will be formed at the
a. focus. **b.** infinity. **c.** pole. **d.** centre of curvature

viii. The image formed when reflected rays only appear to meet but do not actually meet is
a. real. **b.** virtual **c.** inverted. **d.** cannot say

ix. Which of the following mirrors is used by dentists?
a. concave **b.** convex **c.** plane **d.** conical

x. The state of matter, in which the kinetic energy of the molecules is so small that they cannot overcome the intermolecular force of attraction between them, is –
a. solid **b.** liquid **c.** gas d. plasma

xi. For a given rise in temperature, the increase in density is maximum in case of –
a. gases. **b.** liquids, **c.** solids. **d.** none of these

xii. The image formed by a concave mirror is of the same size as the object, if the object is placed:
a. at the focus
b. between the pole and the focus
c. between the focus and the centre of curvature
d. at the centre of curvature

xiii. Whenever mechanical energy changes to other forms, it is always in the form of ..... energy and not in the form of ..... energy.
a. potential, kinetic **b.** heat, potential **c.** kinetic, potential **d.** potential, heat

xiv. **Assertion (A) :** The power spent in doing a work remains the same, even if the same work is done in a lesser time.
Reason (R) : The power spent by a source depends on the time taken by the source to do that work.
a. Both A and R are true and R is the correct explanation of A
b. Both A and R are true and R is not the correct explanation of A
c. Assertion is true but reason is false
d. Assertion is false but reason is true

xv. **Assertion (A) :** If a white light is passed through a prism, it splits into different colours.
Reason (R) : White light is a mixture of colours.
a. Both A and R are true and R is the correct explanation of A
b. Both A and R are true and R is not the correct explanation of A
c. Assertion is true but reason is false
d. Assertion is false but reason is true

b. Fill in the blanks **[5]**

i. A _____ mirror always forms a virtual image.
ii. The potential energy of raindrops …… when they fall.
iii. I H.P. = _____ watts.
iv. Pressure is reduced if _____ increases.
v. **_____** process is just reverse of melting.

Question 2

a. Why are volatile liquids such as alcohol and spirit stored in tightly closed bottles? **[2]**

b. State two differences between power and energy. **[2]**

c. Draw ray diagrams of refraction of light through:
a. a rectangular glass slab
b. a prism **[4]**

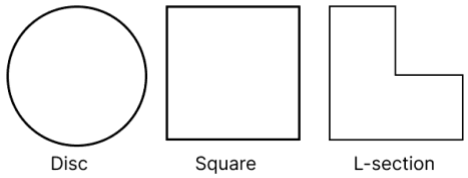
d. Convex mirrors are preferred over plane mirrors as rear-view mirrors in cars. Give reason. **[2]**

Question 3

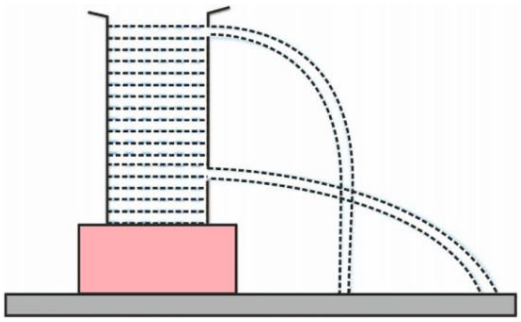
a. Explain why, in hot summer days water remains cool in earthen pots. **[2]**

b. A force of 250 N produces a moment of force of 500 N m. Calculate the moment arm. **[2]**

c. Three different shapes of the same mass are cut from a sheet of iron as shown in the figure given below. Identify the shape with the highest density. Give reason. **[2]**



d. Which fact about liquid pressure does the diagram in figure below illustrate? **[2]**



e. How does the density of a liquid (or gas) vary with temperature? **[2]**

Question 4

a. Why do different colours of light bend to different extents when passed through a prism? **[2]**

b. Why can concave mirrors not be used as rear view mirrors in vehicles? **[2]**

c. Draw the ray diagram of Image formed by a concave mirror when the object is placed between Focus and Pole. **[3]**

d. Name the type of a spherical mirror which always forms a virtual, erect and diminished image. What is the position of such type of images with respect to the mirror? Draw a ray diagram for the same. **[3]**

Question 5

a. A ball of mass 400 g is thrown at a speed of 2 m/s. Determine its kinetic energy. **[2]**

b. How does the kinetic energy of molecules in a substance depend on its temperature? **[2]**

c. Differentiate between the force of cohesion and the force of adhesion. **[2]**

d. Why do the pillars of a bridge have a broader base than the top? **[2]**

e. Calculate the volume of wood of mass 6000 kg if the density of wood is 0.8 g Cm^{-3} **[2]**

Question 6

a. A child climbs a wall of height 4 m. He now possesses a potential energy of 1600 J. What is the mass of the child? **(** take g = 10 m/s^2 **)** **[2]**

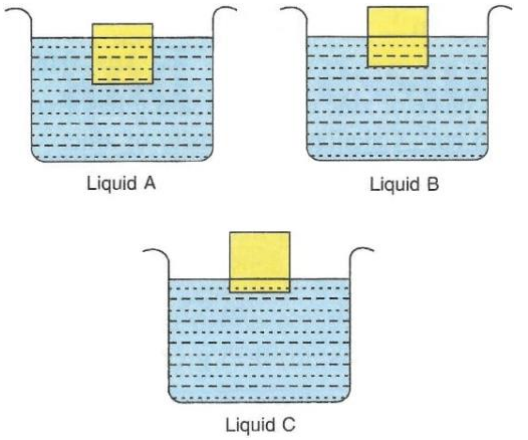
b. Find the area of a body which experiences a pressure of 50,000 Pa by a thrust of 100 N. **[2]**

c. The diagram given below shows a body floating in three different liquids A, B and C at different levels.

(a) In which liquid does the body experience the greatest buoyant force?

(b) Which liquid has the least density?

(c) Which liquid has the highest density? **[3]**



d. **i.** A ray of light falls normally on a glass sla**b.** What is the angle of incidence? **[1]**

ii. Out of air and glass, which is optically rarer? Give reason. **[2]**

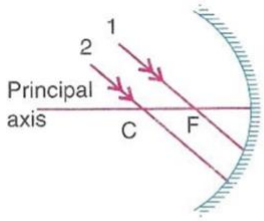
Question 7

a. State the direction of incident ray which after reflection from a spherical mirror gets reflected along its own path. Give a reason. **[2]**

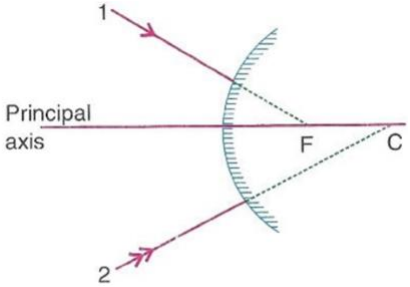
b. Give reason why a hammer drives a nail into the wood only when it is lifted and then struck. **[2]**

c. State the S.I. unit of work and define it. **[2]**

d. Complete the following diagrams given below by drawing the reflected rays for the incident rays 1 and 2 if F is the focus and C is the centre of curvature. **[4]**



(a) Concave mirror



(b) Convex mirror

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Answer key

Question 1

a.

i. **b.** more by coolie A than by B
ii. **c.** four times
iii. **c.** applying the force farthest from the pivoted point
iv. **a.** the atmospheric pressure decreases
v. **c.** equal to the weight of the wood piece
vi. **a.** Liquids
vii. **b.** infinity.
viii. **b.** virtual
ix. **a.** concave
x. **a.** solid
xi. **b.** liquids,
xii. d. at the centre of curvature
xiii. **c.** kinetic, potential
xiv. d. Assertion is false but reason is true
xv. **b.** Both A and R are true and R is not the correct explanation of A

b. **Fill in the blanks** **[5]**

i. A __**covex**_____ mirror always forms a virtual image.
ii. The potential energy of raindrops **decreases** when they fall.
iii. I H.P. = **746** watts.
iv. Pressure is reduced if **Area** increases.
v. solidification process is just reverse of melting.

Question 2

a. Why are volatile liquids such as alcohol and spirit stored in tightly closed bottles? **[2]**

Ans: Rate of evaporation depends on NATURE OF LIQUID i.e. more volatile liquids like ALCOHOL and SPIRIT evaporate easily, hence these are stored in tightly closed bottles to avoid their evaporation**.**

b. State two differences between power and energy. **[2]**

Ans: Energy

- It is the capacity to do work.
- It doesn't depend on time.

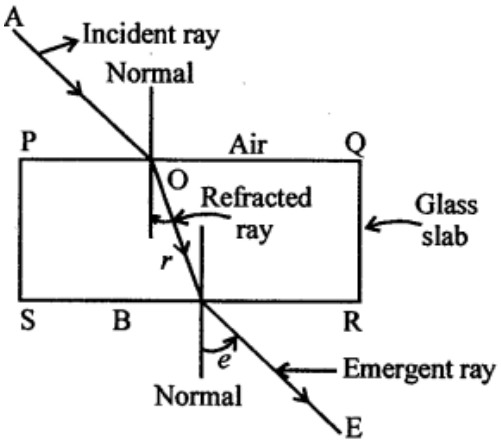
Power:

- It is the amount of energy transferred in unit time.
- It depends on time.

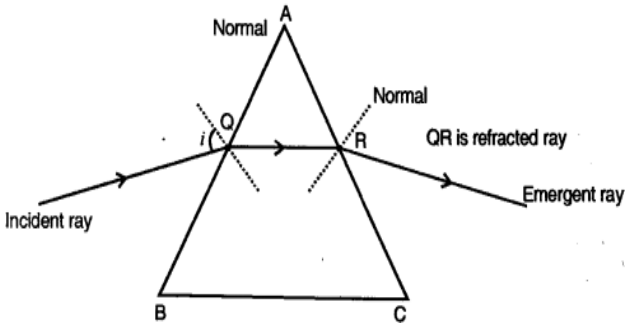
c. Draw ray diagrams of refraction of light through:
a. a rectangular glass slab
b. a prism **[4]**

Answer:

a.



b.



d. Convex mirrors are preferred over plane mirrors as rear-view mirrors in cars. Give reason.

Ans: Convex mirrors are preferred over plane mirrors as rear-view mirrors in cars because convex mirrors always form an erect and diminished image, which gives a wider view of the vehicles coming behind.

[2]

Question 3

a. Explain why, in hot summer days water remains cool in earthen pots. **[2]**

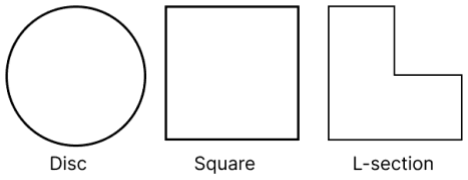
Ans:

Water seeps out through the pores in the earthen pot and it evaporates. The latent heat required for evaporation is taken, from water inside the pot which gets cooled.

b. A force of 250 N produces a moment of force of 500 N m. Calculate the moment arm. **[2]**

Ans: Here,
Force (F) = 250 N
Moment of force 500 N m
Moment arm (d) = ?
By using the formula,
Moment of force = F X d
we get,
500 N m = 250 N x d
d = 500Nm250N = 2m

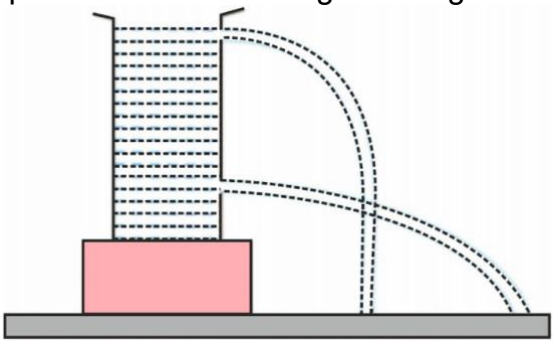
c. Three different shapes of the same mass are cut from a sheet of iron as shown in the figure given below. Identify the shape with the highest density.
Give reason. **[2]**



Ans All three pieces—the disc, the square, and the L-section—have exactly the same density. Density is an intrinsic property of a material. For a given substance (here, iron) it depends only on the material's nature, not on the object's shape or size. Since each piece is cut from

the same sheet of iron, their density remains the constant density of iron, regardless of how that mass is distributed geometrically.

d. Which fact about liquid pressure does the diagram in figure below illustrate? **[2]**



Ans

The diagram demonstrates that liquid pressure at a point increases with the height of the liquid column above it as water flowing out from upper hole falls near the cylinder while water from lower hole falls far from the cylinder.

e. How does the density of a liquid (or gas) vary with temperature? **[2]**

Ans:

Most of the liquids increase in volume with increase in temperature, but water shows anomalous behaviour. Water has maximum volume at 4°C and maximum density at 4°C. Actually, when volume increases density decreases and when volume decreases the density increases.

But water when cooled from a high temperature, contracts upto 4°C because volume decreases and expands when cooled further below 4°C and hence density of water increases when it is cooled upto 4°C while decreases when cooled further below 4°**C.** In other words, the density of water is maximum at 4°C equal to 1 g Cm^{-3} or lOOO kg m^{-3}.

Question 4

a. Why do different colours of light bend to different extents when passed through a prism? **[2]**

Ans: because the speed of different colours is different inside the prism

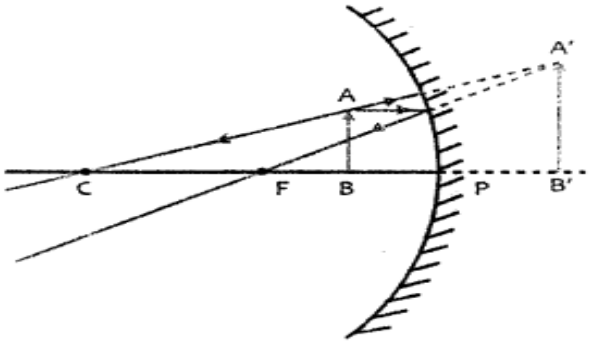
b. Why can concave mirrors not be used as rear view mirrors in vehicles? **[2]**

Answer:

Concave mirror cannot be used as rear-view mirrors in vehicles. This is because if they are used, they will mostly form a real and inverted image of the vehicles behind. Moreover, the size of the image of the vehicles behind will also vary as the distance of the vehicles behind changes from the rear-view mirror. As the vehicles behind
approach the rear-view mirror, their images will keep on magnifying, limiting the field of view of the vehicles coming behind.

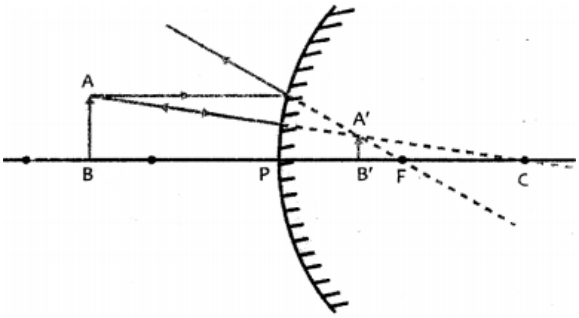
c. Draw the ray diagram of Image formed by a concave mirror when the object is placed between Focus and Pole. **[3]**

Ans.



d. Name the type of a spherical mirror which always forms a virtual, erect and diminished image. What is the position of such type of images with respect to the mirror? Draw a ray diagram for the same. **[3]**

Ans: Convex mirror always form a virtual, erect and diminished image. The image is always formed between the focus and the pole of the mirror, irrespective of the position of the object in front of the mirror.



Formation of image by a convex mirror

Question 5

a. A ball of mass 400 g is thrown at a speed of 2 m/s. Determine its kinetic energy. **[2]**

Ans:

Mass of the ball, m = 4000 g
Speed of the ball, v = 2 m/s
Kinetic energy of the ball, K.E. = 1/2 mv2
= 1/2 (400 g) x (2 m/s)2 = (200) x (4)
= 800 J

b. How does the kinetic energy of molecules in a substance depend on its temperature? **[2]**

Ans: The kinetic energy of molecules is directly proportional to the temperature of the substance.

c. Differentiate between the force of cohesion and the force of adhesion. **[2]**

Ans: The force of attraction between molecules of the same kind (within a substance) is called the force of cohesion whereas the force of attraction between molecules of different kinds (of different substances) is called the force of adhesion.

d. Why do the pillars of a bridge have a broader base than the top? **[2]**

Ans: Pillars of a bridge have a broader base than the top. This is done to reduce the pressure

exerted on the ground by the enormous weight of the bridge. As pressure is inversely proportional to the area of contact, so if the base is broader, the area of the contact increases, reducing the pressure on the ground due to the weight of the bridge.

f. Calculate the volume of wood of mass 6000 kg if the density of wood is 0.8 g Cm^{-3} **[2]**

Ans:

Volume of wood (V) = ?
Mass of wood (M) = 6000 kg
Density of wood D = 0.8 g/ Cm^3
D=O.8g/Cm^3=o.8 × IOOO = 800kg /m^3

$$D = \frac{M}{V} \qquad \therefore V = \frac{M}{D} = \frac{6000}{800} = 7.5\ m^3$$

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Question 6

a. A child climbs a wall of height 4 m. He now possesses a potential energy of 1600 J. What is the mass of the child? **(** take g = 10 m/s^2 **)** **[2]**

Answer:

Mass of the child, m = ?
Height of the child, h = 4 m
g = 10 m/s2
Potential energy of the book with respect to the floor, P.E. = 1600 J
From the formula,
P.E. = mgh or 1600
J = m x (10 m/s2) x (4 m)
or m = 40 kg

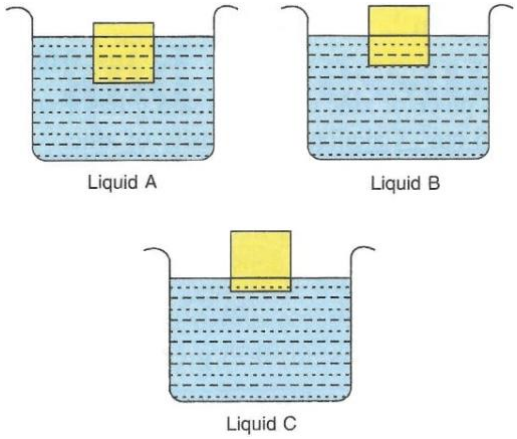
b. Find the area of a body which experiences a pressure of 50,000 Pa by a thrust of 100 N. **[2]**

Ans: Given:
Pressure = 50,000 Pa
Thrust = 100 N
Area = ?
Pressure=ThrustAreaArea=ThrustPressure=10050000=0.002 m2Pressure=AreaThrust
Area=PressureThrust=50000100=0.002 m2
So Area of body = 0.002 m^2 or 2 x 10^{-3} m^2.

c. The diagram given below shows a body floating in three different liquids A, B and C at different levels.

(a) In which liquid does the body experience the greatest buoyant force?
(b) Which liquid has the least density?

(c) Which liquid has the highest density? **[3]**



Ans: (a) The buoyant force is same in each case as the weight of the body is same in each case and the buoyant force is equal to the weight of the liquid displaced by the immersed part of the body which balances the weight of the body.
(b) Liquid A has the least density as the maximum part of the body is immersed in liquid A.
(c) Liquid C has the highest density as the body immerses the least in liquid C.

d. **i.** A ray of light falls normally on a glass sla**b.** What is the angle of incidence? **[1]**
ii. Out of air and glass, which is optically rarer? Give reason. **[2]**

Ans: i. When a ray of light falls normally on a glass slab the angle between incident ray and normal is 0°. So, the angle of incidence is 0°.
ii. Air is optically rarer than glass as speed of light is more in air (3×10^8 m s^{-1}) than the speed of light in glass (2×10^8 m s^{-1}).

Question 7

a. State the direction of incident ray which after reflection from a spherical mirror gets reflected along its own path. Give a reason. **[2]**

Ans: A ray passing through the centre of curvature of a spherical mirror is reflected along its own path.
A line joining the centre of curvature to any point on the surface of mirror is always normal to it. Thus, a ray passing through the centre of curvature is incident normally on the spherical mirror. Its angle of incidence is zero, therefore, the angle of reflection is also zero. It means that the ray gets reflected along its own path.

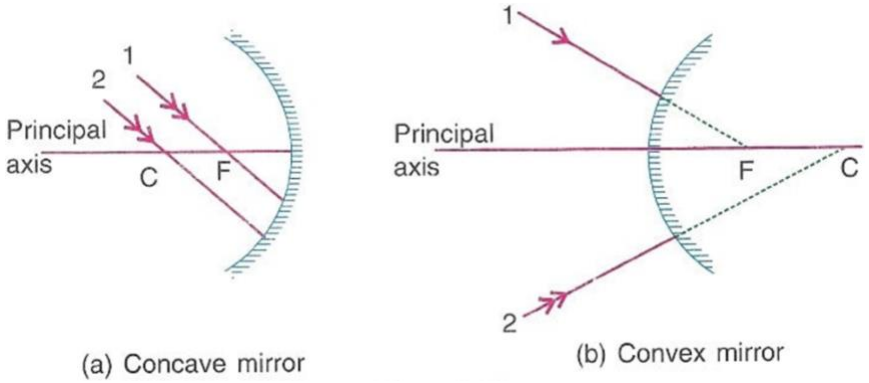
b. Give reason why a hammer drives a nail into the wood only when it is lifted and then struck. **[2]**

Ans: When a hammer is lifted it has potential energy due to its raised position and then when it is struck it drives the nail into the wood due to its potential energy.

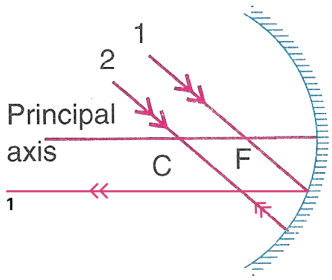
c. State the S.I. unit of work and define it. **[2]**

Ans: The S.I. unit of work is joule (J). One joule of work is said to be done if one newton force when acting on a body moves it by 1 metre in the direction of force**.**

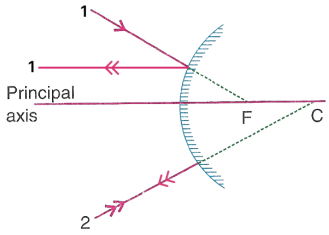
d. Complete the following diagrams given below by drawing the reflected rays for the incident rays 1 and 2 if F is the focus and C is the centre of curvature.



Ans: Ray 1 passing through the focus of a concave mirror gets reflected parallel to the principal axis.
Ray 2 passing through the centre of curvature of a concave mirror is reflected along its own path.



Ray 1 appearing to pass through the focus of a convex mirror gets reflected parallel to the principal axis.
Ray 2 directed in the direction of centre of curvature of a convex mirror is reflected along its own path.



[3]