



# PHYSICS

## BOOKS - SELINA PHYSICS (ENGLISH)

### SAMPLE PAPER 2017

#### Section I

1. A ball is hanging by string from the ceiling of the roof. Draw a neat labelled diagram showing the forces acting on the ball and the string.

[Watch Video Solution](#)

2. The distance between two bodies is doubled. How is the magnitude of gravitational force between them affected ?



**Watch Video Solution**

3. A jack screw is provided with a long arm. Explain why?



**Watch Video Solution**

4. If the power of a motor be 100 kW, at what speed can it raise a load of 50,000 N ?



**Watch Video Solution**

5. Which class of lever will always have  $M. A. > 1$  and why ?



**Watch Video Solution**

6. Define heat capacity and state its SI unit.



**Watch Video Solution**

7. Why is the base of a cooking pan made thick and heavy ?



**Watch Video Solution**

8. A mass of 50 g of a certain metal at  $150^{\circ}\text{C}$  is immersed in 100 g of water at  $11^{\circ}\text{C}$ . The final temperature is  $20^{\circ}\text{C}$ . Calculate the specific heat capacity of the metal. Assume that the specific heat capacity of water is  $4.2\text{ g}^{-1}\text{K}^{-1}$



**Watch Video Solution**

**9.** How is the refractive index of a medium related to the real and apparent depths of an object in that medium ?



**Watch Video Solution**

**10.** Define the term refractive index of a medium in terms of velocity of light.



**Watch Video Solution**

**11.** State the conditions required for total internal reflection of light to take place.



[Watch Video Solution](#)

**12.** Draw a ray diagram to show the refraction of a monochromatic ray through a prism when it suffers minimum deviation. How is the angle of emergence related to the angle of incidence in the position.



[Watch Video Solution](#)

**13.** The human ear can detect continuous sounds in the frequency range from 20 Hz to 20000 Hz. Assuming that the speed of sound in air is  $330 \text{ ms}^{-1}$  for all frequencies, calculate the wavelengths

corresponding to the given extreme frequencies of the audible range.



**Watch Video Solution**

**14.** An enemy plane is at a distance of 300 km from a radar. In how much time the radar will be able to detect the plane ? Take velocity of radio waves as  $3 \times 10^8 \text{ m.s}^{-1}$ .



**Watch Video Solution**

**15.** How is the frequency of a stretched string related to:

Its length?



**Watch Video Solution**

**16.** How is the frequency of a stretched string related to:

Its tension?



**Watch Video Solution**

**17.** Define the term "specific resistance and state its S.I. unit.



**Watch Video Solution**



**18.** An electric bulb of resistance  $500\Omega$ , draws a current of 0.4 A. Calculate the power of the bulb and the potential difference at its end.



**Watch Video Solution**

**19.** Name any two types of energy losses in a transformer. State how any one of them can be minimized.



**Watch Video Solution**

**20.** State two characteristics of a good thermion emitter.



**Watch Video Solution**

**21.** State two factors upon which the rate of emission of thermions depends.



**Watch Video Solution**

**22.** When does the nucleus of an atom tend to be radioactive ?



**Watch Video Solution**

## Section II

1. 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.

Draw a diagram of the arrangement.



**Watch Video Solution**

2. 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.

What is the weight of the half metre rule ?



**Watch Video Solution**

3. A boy uses a single fixed pulley to lift a load of 50 kgf to some height. Another boy uses a single movable pulley to lift the same load to the same height. Compare the effort applied by them. Give a reason to support your answer.



**Watch Video Solution**

4. How does uniform circular motion differ from uniform linear motion ?



**Watch Video Solution**

5. Name the process used for producing electricity using nuclear energy.



**Watch Video Solution**

6. A pulley system with V.R. = 4 is used to lift a load of 175 kgf through a vertical height of 15 m. The effort required is 50 kgf in the downward direction.

$$(g = 10 \text{ Nkg}^{-1})$$

Calculate :

Distance moved by the effort.



**Watch Video Solution**

7. A pulley system with V.R. = 4 is used to lift a load of 175 kgf through a vertical height of 15 m. The effort required is 50 kgf in the downward direction.

$$(g = 10 \text{ Nkg}^{-1})$$

Calculate :

Work done by the effort.



**Watch Video Solution**

8. A pulley system with V.R. = 4 is used to lift a load of 175 kgf through a vertical height of 15 m. The effort required is 50 kgf in the downward direction.

$$(g = 10 \text{ N kg}^{-1})$$

Calculate :

M.A. of the pulley system.



**Watch Video Solution**

9. A pulley system with V.R. = 4 is used to lift a load of 175 kgf through a vertical height of 15 m. The effort required is 50 kgf in the downward direction.

$$(g = 10 \text{ N kg}^{-1})$$

Calculate :

Efficiency of the pulley system.



**Watch Video Solution**

**10.** How is the transference of heat energy by radiation prevented in a calorimeter ?



**Watch Video Solution**

**11.** You have a choice of three metals A, B and C, of specific heat capacities

$900 Jkg^{-1} \circ C^{-1}$ ,  $380 Jkg^{-1} \circ C^{-1}$  and  $460 Jkg^{-1} \circ C^{-1}$



respectively, to make a calorimeter. Which material will you select ? Justify your answer.



**Watch Video Solution**

**12.** Calculate the mass of ice needed to cool 150 g of water contained in a calorimeter of mass 50 g at  $32^{\circ}\text{C}$  such that the final temperature is  $5^{\circ}\text{C}$ . Specific heat capacity of calorimeter =  $0.4 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$ , specific heat capacity of water =  $4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$ , latent heat capacity of ice =  $330 \text{ J g}^{-1}$ .



**Watch Video Solution**

**13.** Name the radiations which are absorbed by the green house gases in the earth's atmosphere.



**Watch Video Solution**

**14.** A radiation X is focused by a particular device on the bulb of a thermometer and mercury in the thermometer shows a rapid increase. Name the radiation X.



**Watch Video Solution**

**15.** Name two factors on which the heat energy liberated by a body depends.



**Watch Video Solution**

**16.** A lens forms an upright and diminished image of an object when the object is placed at the focal point of the given lens.

Name the lens.



**Watch Video Solution**

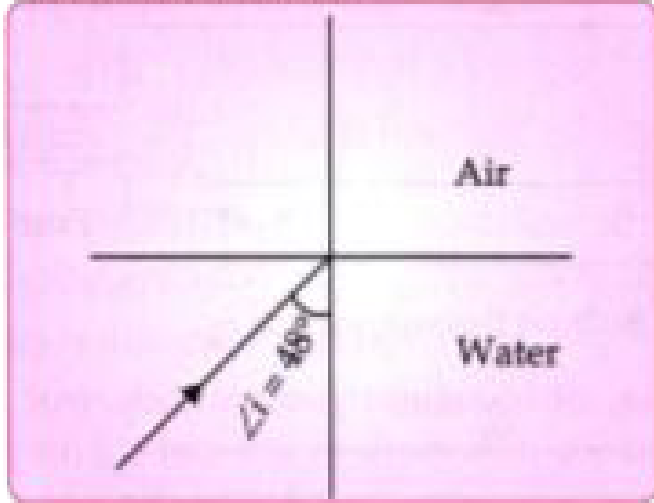
**17.** A lens forms an upright and diminished image of an object when the object is placed at the focal point of the given lens.

Draw a ray diagram to show the image formation.



**Watch Video Solution**

**18.** A ray of light travels from water to air as shown in the diagram given below:



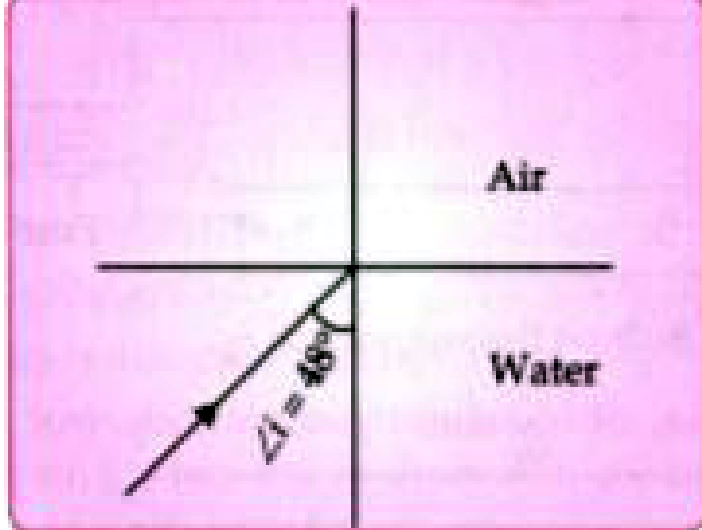
Copy the diagram and complete the path of the ray.

Given the critical angle for water is  $48^\circ$ .



**Watch Video Solution**

**19.** A ray of light travels from water to air as shown in the diagram given below:

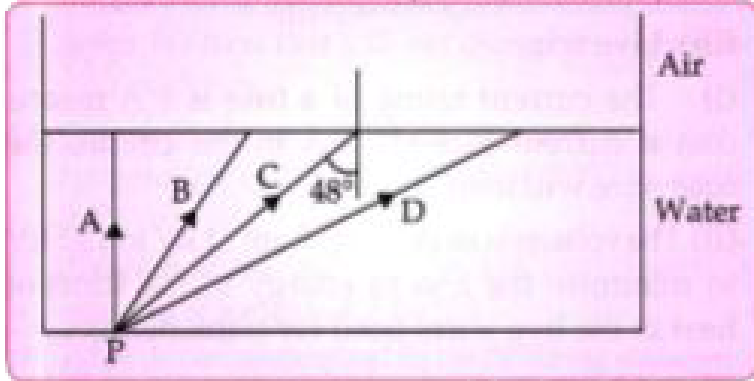


State the condition so that total internal reflection occurs in the above diagram.



**Watch Video Solution**

**20.** The diagram below shows a point source P inside a water container. Four rays A, B, C, D starting from the source P are shown up to the water surface.

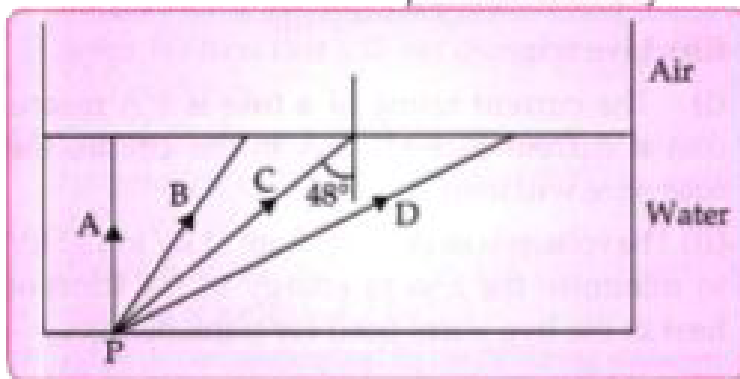


Show in the diagram the path of these rays after striking the water surface. The critical angle for water air surface is  $48^\circ$ .



**Watch Video Solution**

**21.** The diagram below shows a point source P inside a water container. Four rays A, B, C, D starting from the source P are shown up to the water surface.



Name the phenomenon which the rays B and D exhibit.



**Watch Video Solution**

**22.** State two physical factors which determine loudness of sound.



**Watch Video Solution**



**23.** Name the factor that determines :

Quality of the note.



**Watch Video Solution**

**24.** Name the factor that determines :

Pitch of the note.



**Watch Video Solution**

**25.** What are damped vibrations ?



**Watch Video Solution**

**26.** Give examples of damped oscillation.



**Watch Video Solution**

**27.** Name the phenomenon that cause a loud sound when the stem of a vibration tuning fork is kept pressed on the surface of a table.



**Watch Video Solution**

**28.** A certain sound has a frequency of 256 hertz and a wavelength of 1.3 m.

(a) Calculate the speed with which this sound travels.

(b) What difference would be felt by a listener between the above sound and another sound travelling at the same speed, but of wavelength 2.6 m?



**Watch Video Solution**