



PHYSICS

BOOKS - SELINA PHYSICS (ENGLISH)

SAMPLE QUESTION PAPER 4

Section A

1. A man having a box on his head, climbs up a slope and another man having an identical box walks the same distance on a levelled road. Who does more work against the force of gravity and why?

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2. A ray of light strikes the surface of a rectangular glass block such that the angle of incidence is (i) 0° and (ii) 42°

Sketch a diagram to show the approximate path taken by the ray in each case as it passes through the glass block and emerges.

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3. An object is placed in front of a convex lens such that image formed has the same size as that of the

object. Draw a ray diagram to illustrate this.



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4. A solid metal weighing 150 g melts at its melting point of $800^{\circ}C$ by providing heat at the rate of 100 W. The time taken for it to completely melt at the same temperature is 4 min. What is the specific latent heat of fusion of the metal ?



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5. Name the phenomenon involved, in tuning the radio set.



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6. Define resonance and resonance energy. What are the conditions for resonance?



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7. When does a ray of light falling on a lens pass through it undeviated ?



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8. Fill in the blank.

A piece of red cloth appears red in white light, because it ---
--- blue and green colours --- only red colour.



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9. A machine works as a (i) force multiplier, (ii) speed multiplier. In each case state whether the velocity ratio is more than or less than 1.



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10. State the safe limit of sound level in terms of decibel for human hearing.



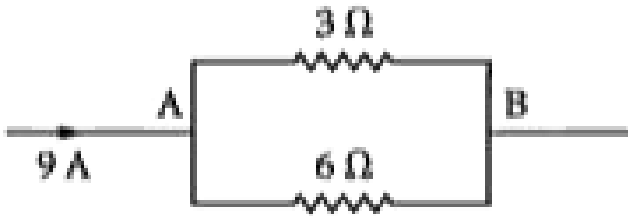
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11. Name the characteristic of sound in relation to its waveform.



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12. Find the current through the 3Ω resistor.



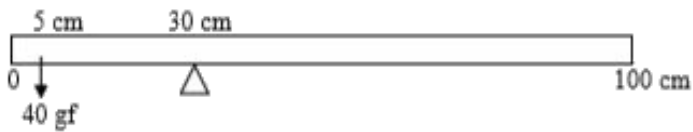
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13. Define resistance of a conductor. State its SI unit.

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14. A uniform metre scale is in equilibrium position.

Calculate the mass of the ruler.



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15. An electrical appliance is rated at 1000 KVA, 220 V.

If the appliance is operated for 2 hours, calculate the energy consumed by the appliance in :

kWh

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16. State the relation between the critical angle and the absolute refractive index of a medium.



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17. Which colour of light has a higher critical angle?

Red light or Green light.



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18. A metal wire has a resistance of 60Ω . It is cut into three equal lengths. Find the equivalent resistance when two parts are connected in parallel and the third part is in series with them.



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19. Name one factor that affects the lateral displacement of light as it passes through a rectangular glass slab.



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20. Name one property of waves that do not change when the wave passes from one medium to another.



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21. In an experiment of finding the refractive index of glass, if blue light is replaced by red light, how will

the refractive index of glass change? Give reason in support of your answer.



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22. 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.



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23. Mention any two differences between nuclear energy and chemical energy.



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24. (i) Why does the sun appear reddish at sun-set or sun-rise ?

(ii) For which colour the refractive index of prism material is maximum and minimum ?



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25. Name the subjective property of light related to its wavelength.



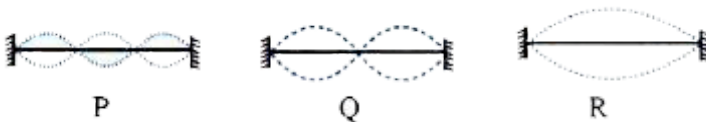
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26. Give any two examples of superconductor.

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Section B

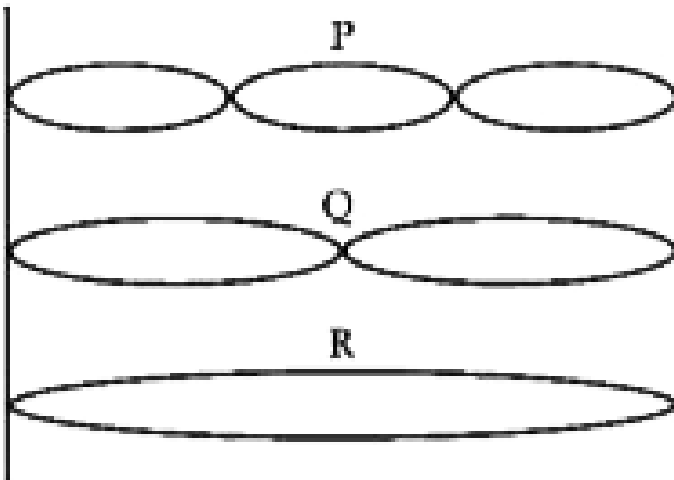
1. The diagram below shows three different modes of vibration P, Q and R of the same string of a given length.



Which vibration will produce a louder sound and why?

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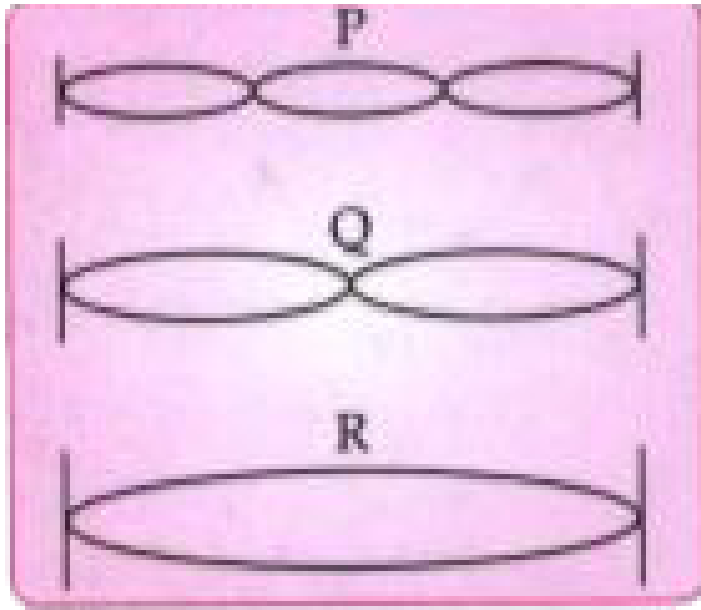
2. Following diagram shows three different mode of vibrations P, Q and R of the same string.



The sound of which string will have maximum shrillness?

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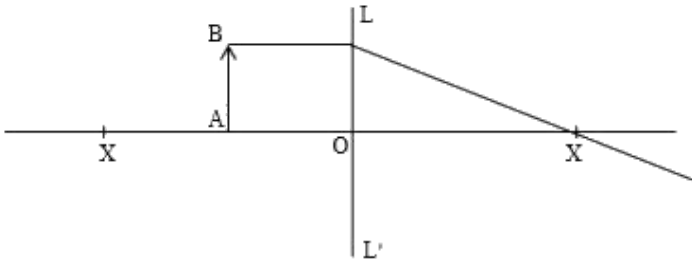
3. The adjacent diagram shows three different modes of vibrations P, Q and R of the same string.



State the ratio of wavelengths of P and R.



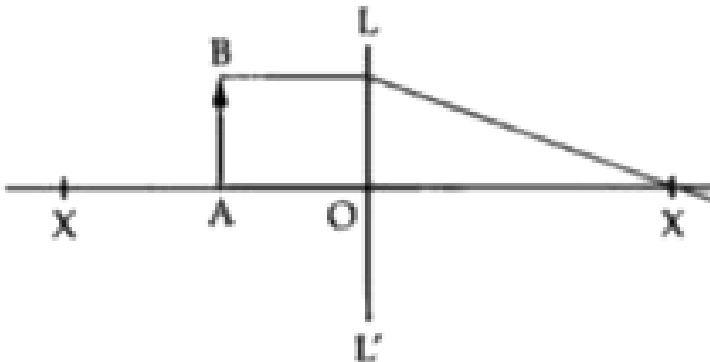
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4.

Copy and complete the ray diagram to show the formation of the image of the object AB

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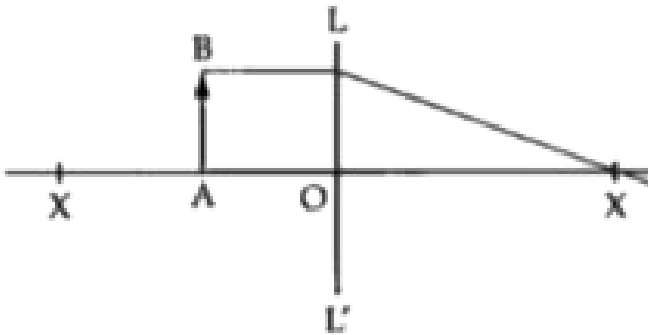


5.

Name the lens LL' .



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6.

Name a device in which this principle is used.



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7. Name the waves (a) of lowest wavelength, (b) used for taking photographs in dark, (c) produced by

changes in the nucleus of an atom, (d) of wavelength nearly 0-1 nm.



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8. A stone of mass 'm' is rotated in a circular path with a uniform speed by tying a string with the help of your hand. Answer the following questions :

is the stone moving with a uniform or variable speed?



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9. A stone of mass 'm' is rotated in a circular path with a uniform speed by tying a string with the help

of your hand. Answer the following questions :

Is the stone moving with a uniform acceleration? In which direction does the acceleration act?



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10. A stone of mass ' m ' is rotated in a circular path with a uniform speed by tying a string with the help of your hand. Answer the following questions :

What kind of force acts on the hand and state its direction?



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11. 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.



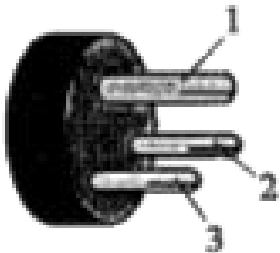
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12. The diagram (a) and (b) given below are of a plug and a socket with arrow marked as 1, 2, 3 and 4, 5, 6 respectively on them. Identify and write live (L), neutral (N) and the earth (E) against the correct number.

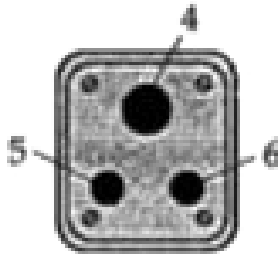


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13. Calculate the electrical energy consumed when a bulb of 40 W is used for 12.5 h every day for 30 days



(a) Plug



(b) Socket



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14. Which wire in a power circuit is connected to the metallic body of the appliance ?



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15. Give two characteristics of a high tension wire.



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16. An engine can pump 30,000 L of water to a vertical height of 45 m in 10 min. Calculate the work done by the machine and the power. (Density of water = 10^3 kg/m^3 , $1000 \text{ L} = 1 \text{ m}^3$, $g = 9.8 \text{ m/s}^{-2}$)



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17. (a) What is a calorimeter ?

(b) Name the material of which it is made of. Give two reasons for using the material stated by you.



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18. (a) What is a calorimeter ?

(b) Name the material of which it is made of. Give two reasons for using the material stated by you.



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19. A cell is sending current in an external circuit. How does the terminal voltage compare with the e.m.f. of the cell ?



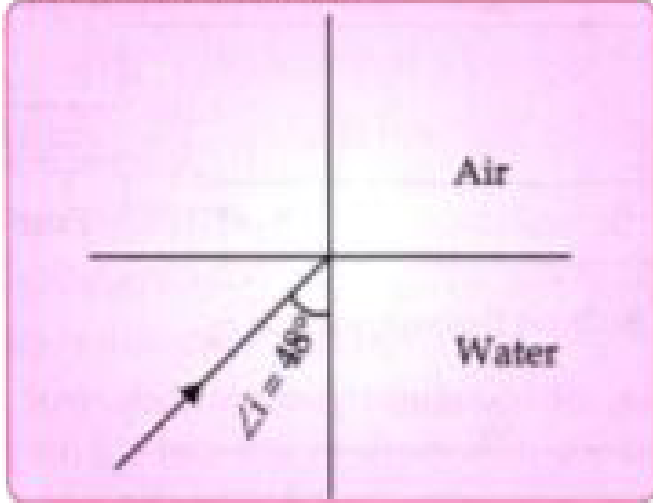
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20. Name the material used for filament of an electric bulb,



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

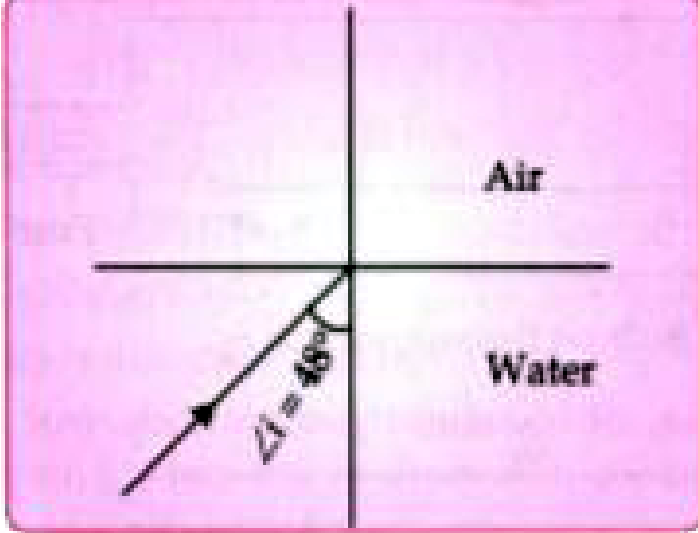


Copy the diagram and complete the path of the ray.

Given the critical angle for water is 48° .

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22. 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.

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23. It is observed that:

alpha particles and beta particles are deflected by an

electric or magnetic field.

Explain observations.



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24. It is observed that:

gamma rays are not deflected by either an electric or a magnetic field. Explain observations.



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



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26. You have a choice of three metals A, B and C, of specific heat capacities $900 \text{ J kg}^{-1} \text{ }^\circ \text{C}^{-1}$, $380 \text{ J kg}^{-1} \text{ }^\circ \text{C}^{-1}$ and $460 \text{ J kg}^{-1} \text{ }^\circ \text{C}^{-1}$ respectively, to make a calorimeter. Which material will you select ? Justify your answer.

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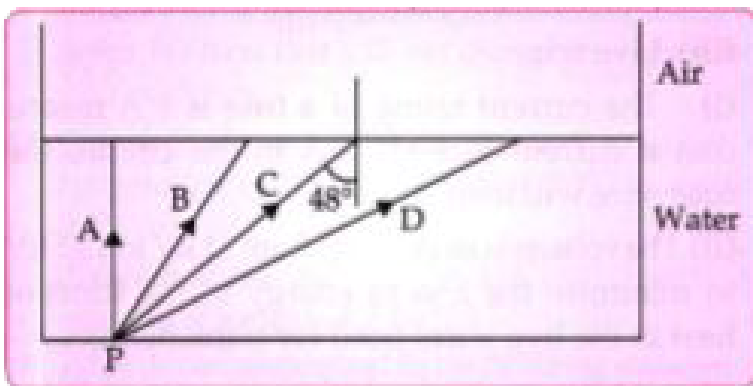
27. A fuse is rated 8 A. Can it be used with an electrical appliance rated 5 kW, 200 V ? Give a reason.

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28. Name two safety devices which are connected to the live wire of a household electric circuit.

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29. 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.

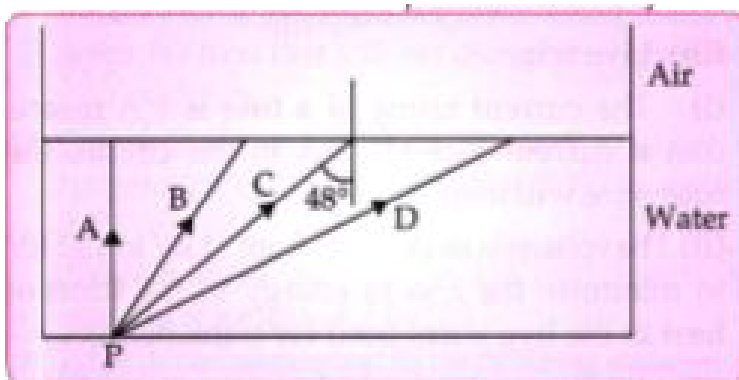


Show in the diagram the path of these rays after

striking the water surface. The critical angle for water air surface is 48° .

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30. 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.



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31. Among α , β and γ -rays, which is the most penetrating?



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32. Arrange α , β and γ rays in ascending order with respect to their
Ionising power



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33. Arrange the α , β and γ radiation in ascending order of their biological damage. Give reason.

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34. State two factors on which the speed of a wave travelling in a medium depends.

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35. Give one application of echo.

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36. A nucleus of stable phosphorus has 15 protons and 16 neutrons.

(a) What is its atomic number and mass number ?

(b) The nucleus of radio phosphorus has one neutron more than the stable nucleus. What will be its atomic and mass number ?

(c) What will be the atomic number and mass number of new nucleus formed by the decay of a β -particle by the radio phosphorus in part (b) ?



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37. A nucleus of stable phosphorus has 15 protons and 16 neutrons.

(a) What is its atomic number and mass number ?

(b) The nucleus of radio phosphorus has one neutron more than the stable nucleus. What will be its atomic and mass number ?

(c) What will be the atomic number and mass number of new nucleus formed by the decay of a β -particle by the radio phosphorus in part (b) ?



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38. A nucleus of stable phosphorus has 15 protons and 16 neutrons.

(a) What is its atomic number and mass number ?

(b) The nucleus of radio phosphorus has one neutron more than the stable nucleus. What will be its atomic and mass number ?

(c) What will be the atomic number and mass number of new nucleus formed by the decay of a β -particle by the radio phosphorus in part (b) ?



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