PHYSICS

BOOKS - SELINA PHYSICS (ENGLISH)

SELF ASSESSMENT PAPER 4

Section A

1. Calculate the wavelength of an electromagnetic wave of frequency 15 MHz.

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2. We can burn a piece of paper by focusing the sun rays by using a particular type of lens. Name the type of lens used for the above purpose.

3. We can burn a piece of paper by focusing the sun rays by using a particular type of lens.

Name the type of lens used for the above purpose.

4. How does a trawler man catch fish in deep water?

5. The refractive index of diamond is 2.42. What is the meaning of this statement?

6. What do you understand by the term loudness of sound?

7. In which units is the loudness of sound measured?

A. hurtz

B. decible
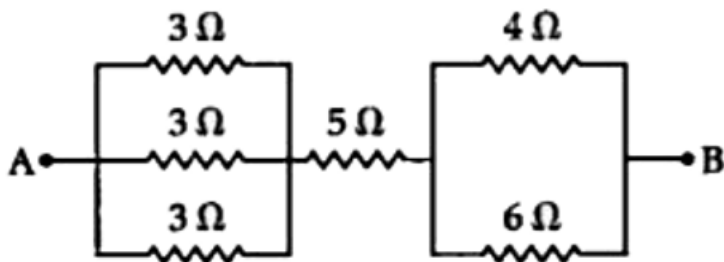
C. kg

D. m/s

Answer: decible

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8. Draw a diagram to illustrate the determination of the focal length of a convex lens using an auxiliary plane mirror.

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9. Find the resistance between points A and B.

10. Define equilibrium.

11. In a beam balance, when the beam is balanced in horizontal position, it is in _____ equilibrium.

A. static

B. kinetic

C. balance

D. unbalance

Answer: static

12. Four resistances of 2.0 Ω each are joined end to end, to form a square ABCD. Calculate the equivalent resistance of the combination between any two adjacent corners

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13. Define the power of a lens.

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14. The lens mentioned in 6 (b) above is of focal length 25 cm. Calculate the power of the lens.

15. A ray of light incident at an angle of incidence 'I' passes through an equilateral glass prism such that the refracted ray inside the prism is parallel to its base and emerges from the prism at an angle of emergence 'e'.

How is the angle of emergence 'e' related to the angle of incidence 'i' ?

16. A ray of light incident at an angle of incidence 'I' passes through an equilateral glass prism such that the refracted ray inside the prism is parallel to its base and emerges from the prism at an angle of emergence 'e'. What can you say about the value of the angle of deviation in such a situation ?

17. What is the colour code for the insulation on the earth wire?

18. Write an expression for calculating electrical power in terms of current and resistance

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

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20. Calculate the change in the kinetic energy of a moving body if its velocity is reduced to 1/3rd of the initial velocity?

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21. Explain why the weather becomes very cold after a hail storm.

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22. Define heat capacity and state its SI unit.

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23. A type of single pulley is very often used as a machine even though it does not give any

gain in mechanical advantage.

Name the type of pulley used.

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24. A type of single pulley is very often used as a machine even though it does not give any gain in mechanical advantage.

Name the type of pulley used.

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25. State the energy changes in the following while in use:

Burning of a candle.

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26. State the energy changes in the following while in use:

A steam engine.

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

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28. Name the factors affecting the critical angle for the pair of media.

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Section B

1. Name the type of single pulley that can act as a force multiplier. Draw a labelled diagram of the above named pulley.

2. A person standing between two vertical cliffs and 480 m from the nearest cliff shouts. He hears the first echo after 3 s and the second echo 2 s later.

Calculate :

The speed of sound.

3. A person standing between two vertical cliffs and 480 m from the nearest cliff shouts. He hears the first echo after 3 s and the second echo 2 s later.

Calculate :

The distance of the other cliff from the person.

4. A monochromatic point source of light O is seen through a rectangular glass block ABCD. Paths of two rays, in and outside the block, are shown in the figure below.
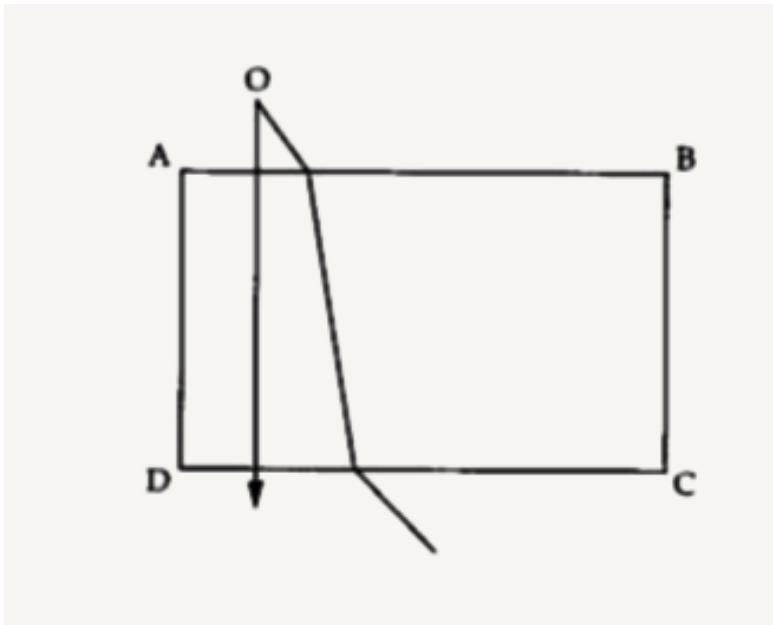
Does the source at point O appear to be

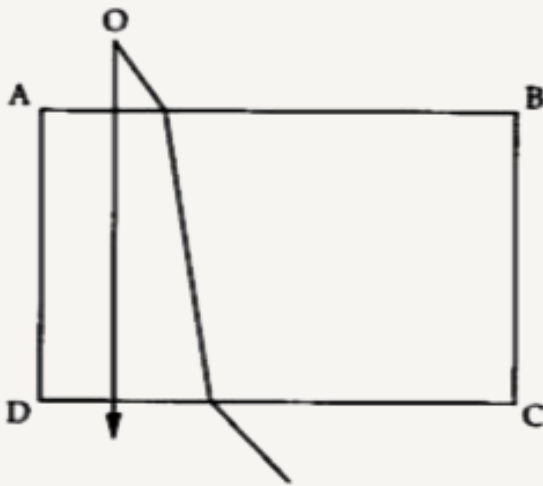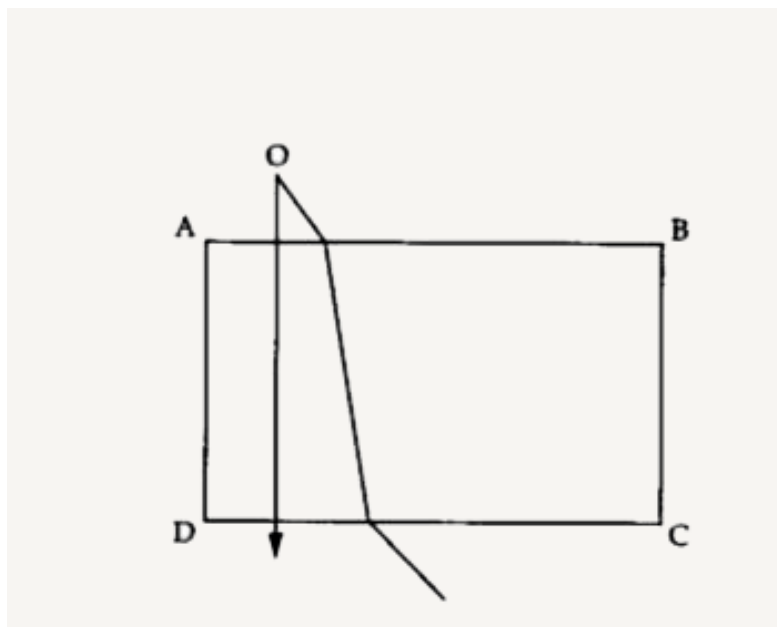nearer or farther with respect to the surface AB?

5. A monochromatic point source of light O is seen through a rectangular glass block ABCD. Paths of two rays, in and outside the block, are shown in the figure below.

How does the shift depend on the thickness (AD or BC) of the block?

6. A monochromatic point source of light O is seen through a rectangular glass block ABCD.

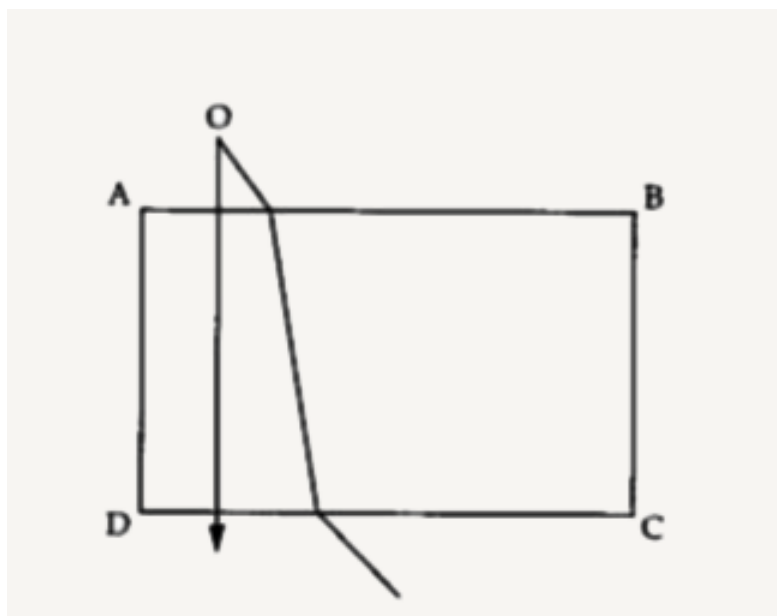Paths of two rays, in and outside the block, are shown in the figure below.

Justify your answer with the help of an appropriate ray diagram as shown in figure.

7. A monochromatic point source of light O is seen through a rectangular glass block ABCD. Paths of two rays, in and outside the block, are shown in the figure below.
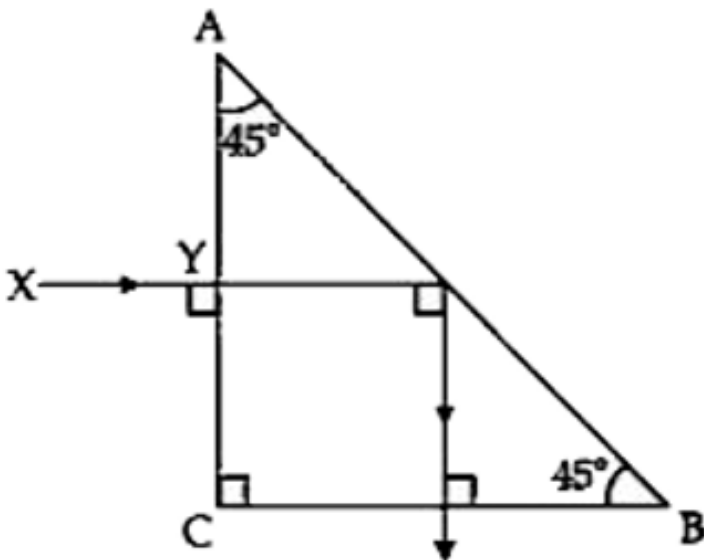

For the same rectangular glass block, which

colour from the visible spectra will produce
the maximum shift?

8. A ray of light XY passes through a right
angled isosceles prism as shown below.

What is the angle through which the incident ray deviates and emerges out of the prism?
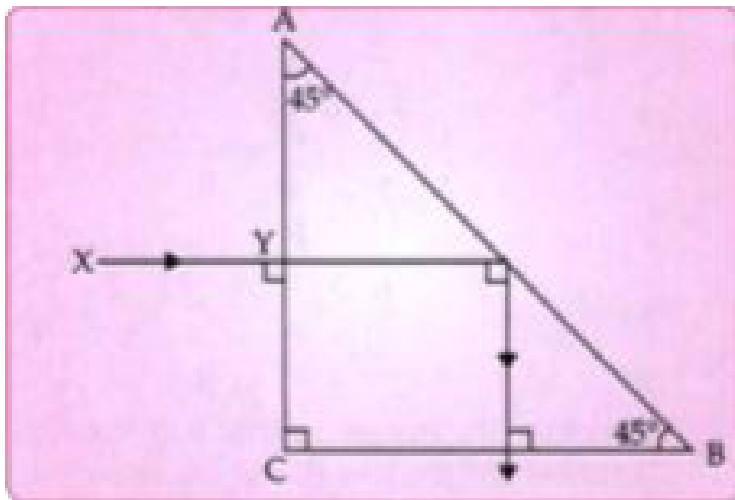
9. A ray of light XY passes through a right angled isosceles prism as shown below.

Name the instrument where this action of prism is put into use.

10. A ray of light XY passes through a right angled isosceles prism as shown below:

Which prism surface will behave as a mirror ?

11. Draw a graph of potential difference (V) versus current (I) for an ohmic resistor.

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12. How can you find the resistance of the resistor from this graph?

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13. What is a non-ohmic resistor ?

14. Sometimes when a vehicle is driven at a particular speed, a rattling sound is heard. Explain briefly, why this happens and give the name of the phenomenon taking place?

15. Suggest one way by which the rattling sound could be stopped.

16. An electric bulb is marked 100 W, 250 V. What information does this convey?

$\blacktriangleright$ **Watch Video Solution**

17. How much current will the bulb draw, if connected to a 250 V supply?

$\blacktriangleright$ **Watch Video Solution**

18. Draw a labelled ray diagram to illustrate (a) critical angle (b) total internal reflection for a ray of light moving from one medium to another.

19. Write a formula to express the relationship between refractive index of the denser medium with respect to rarer medium and its critical angle for that pair of media.

20. A battery of e.m.f. 12 V and internal resistance 2 Ω is connected with two resistors A and B of resistance 4 Ω and 6 Ω respectively joined in series.

Find Current in the circuit.

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21. A battery of e.m.f. 12 V and internal resistance 2 Ω is connected with two resistors

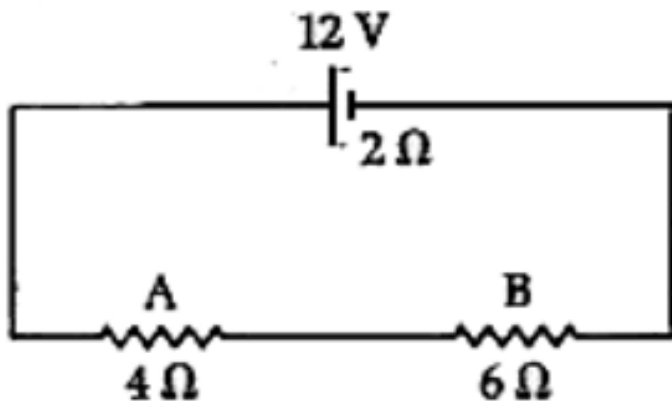A and B of resistance 4 Ω and 6 Ω respectively joined in series.

Find The terminat voltage of the cell .

22. A battery of e.m.f. 12 V and internal resistance 2 Ω is connected with two resistors A and B of resistance 4 Ω and 6 Ω respectively joined in series.
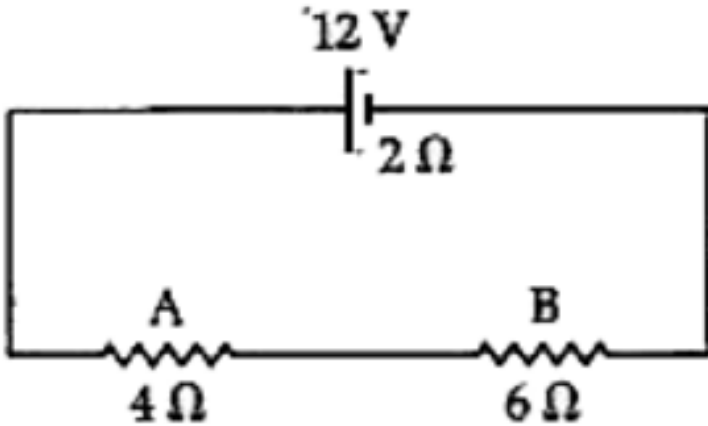
Find The potential difference across 6 Ω Resistor.

23. A battery of e.m.f. 12 V and internal resistance 2 Ω is connected with two resistors A and B of resistance 4 Ω and 6 Ω respectively

joined in series.

Find Electrical energy spent per minute in 4 Ω

Resistor.

24. Name the liquid which has the highest specific heat capacity.

A. milk

B. gas

C. solid

D. water

Answer: water

25. Name two factors on which the heat absorbed or given out by a body depends.

26. An equal quantity of heat is supplied to two substances A and B. The substance A shows a greater rise in temperature. What can you say about the heat capacity of A as compared to that of B?

27. State in brief, the meaning of each of the following:

The heat capacity of body is $50\ J\,{}^{\circ}C^{-1}$

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28. State in brief, the meaning of each of the following:

The specific latent heat of fusion of ice is $336000\ J\ kg^{-1}$

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29. State in brief, the meaning of each of the following:

The specific heat capacity of copper is 0.4 $Jg^{1}°C^{-1}$

30. Radioactive materials as an alternative source of energy must be wisely used. Give reasons to justify this statement.

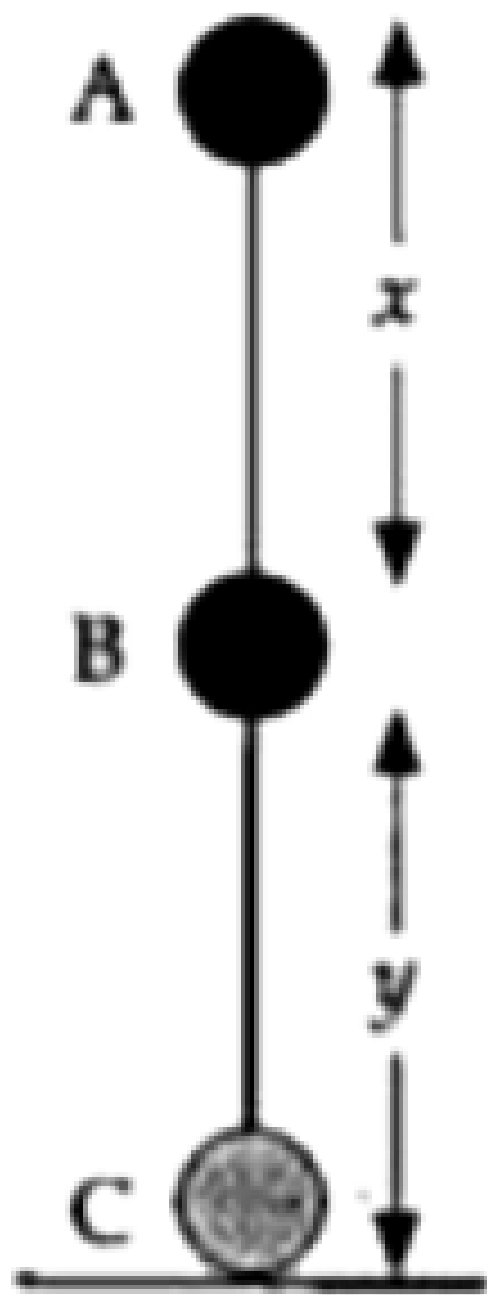**31.** An engine can pump 30,000 L of water to a vertical height of 45 m in 10 min. Calculate the work done by the machine and the power. (Density of water = $10^3 kg/m^3$, $1000L - 1m^3$, $g = 9.8ms^{-2}$)

32. An object of mass 'm' is allowed to fall freely from a point A as shown in the figure.

A

B

x

C

y

Calculate the total mechanical energy of object at:

Point A

33. An object of mass 'm' is allowed to fall freely from a point A as shown in the figure.

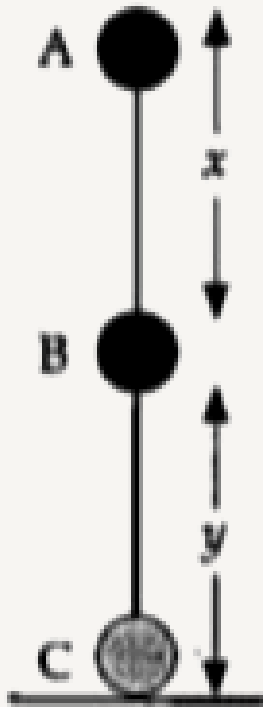Calculate the total mechanical energy of object at:

Point B

34. An object of mass 'm' is allowed to fall freely from a point A as shown in the figure.

Calculate the total mechanical energy of object at:

object at:

State the law which is verified by your calculations

35. State three characteristics of musical sound.

36. How does the musical sound differ from the noise?

37. A nut is opened by a wrench of length 20 cm. If the least force required is 2 N, find the moment of force needed to loosen the nut.

38. Can the centre of mass of a body be at a point outside the body?

39. A nucleus $_{11}Na^{24}$ emits a beta particle to change into Magnesium (Mg).

Write the symbolic equation for the process.

40. A nucleus $_{11}Na^{24}$ emits a β-particle to change into magnesium (Mg).

What are numbers 24 and 11 called?

41. A nucleus $_{11}Na^{24}$ emits a beta particle to change into Magnesium (Mg).

What is the general name $_{12}^{24}Mg$ with respect to $_{11}^{24}Na$?

42. Define the emf (E) of a cell and the potential difference (V) across a resistor (R) in terms of the work done in moving a unit charge. State the relation between these two works and the work it charge through a cell

connected across the resistor. Take the internal resistance of the cell as r. Hence, obtain expression for the current i in the circuit.

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