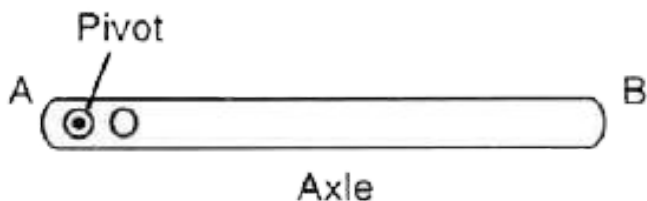# PHYSICS

# BOOKS - SELINA PHYSICS (ENGLISH)

# SPECIMEN PAPER (SOLVED)

## Section I

**1.** The figure alongside shows an axle AB pivoted at a point 0. Draw diagrams showing the point of application and direction of

minimum force to rotate it (b) clockwise, and (ii) anticlockwise.

**2.** Two forces each of magnitude 5 N are applied in opposite directions at the ends of a uniform nod of length 0.5 m. Draw diagram of

the arrangement and find the total moment of the two forces.

**3.** State two differences between centripetal and centrifugal force.

**4.** What is kWh ? State its value in S.I. unit.

**5.** A body of mass art is released from a height

A. What energy will the body possess when (i)

it has fallen by a distance $x(x < h)$ , and (ii) it

reaches the ground.

**6.** A body of mass 500 g is moving with a

speed 10 $ms^{-1}$ . A force acts on it which

makes it to move with a speed 20 $ms^{-1}$ . Find

: (i) the change in kinetic energy of the body, and (ii) the work done by the force on the body.

**7.** A lever has fulcrum and load at the ends and effort in between them. Draw diagram and state whether the velocity ratio of the lever is greater, equal or less than 1 ? Can the velocity ratio of this lever be changed?

**8.** A pulley has a velocity ratio 2. but mechanical advantage 1-6. Name the pulley and state factors which make the mechanical advantage less than the velocity ratio.

**9.** A block and tackle system has 5 pulleys. In ideal situation,

(i) how is load L related to the effort E, and

(ii) how is the distance de moved by effort related to the distance d, moved by load?

10. A light ray in passing from medium A to medium B slows down.

(i) Draw a diagram to show the path of the light ray in the two media.

(ii) Name the medium which is optically denser than the other.

**11.** Define critical angle. How does it depend on the wavelength of incident light?

**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.

**13.** A convex lens of focal length 20 cm forms a virtual image of size twice the size of the object.

(i) How is the distance of image v related to the distance of object ?

(ii) What is the power of lens?

**14.** A concave lens always forms a virtual image. Draw a ray diagram to show it. State the magnification of the image with sign, whether greater than, equal to or less than 1.

▶ Watch Video Solution

**15.** What is a sonar?

▶ Watch Video Solution

**16.** Name the wave used in sonar. Give reason to your answer.

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**17.** An electric heater rated 2.2 kW, 220 V is operated for 2 h. Calculate :

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**18.** An electric heater rated 2.2 kW, 220 V is operated for 2 h. Calculate :

the cost of electricity consumed at a rate of 5.20 per unit.

**19.** Draw diagram to connect two appliances A and B rated as '2.2 kW, 220 V' and '110 W, 220 V' respectively with the mains of 220 V. Show in the diagram the switch and fuse with each

appliances. State the fuse of which appliance is thicker and why?

**20.** What is the approximate specific latent heat of melting of ice? State why for cooling botiled soft drinks, ice at$0°C$ is better than the same mass of iced-water at $0°C$
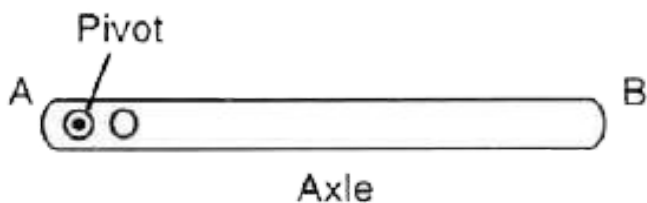
**21.** Differentiate between nuclear fusion and nuclear fission.

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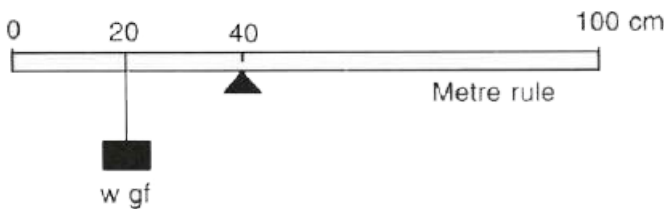**42.** Differentiate between nuclear fusion and nuclear fission.

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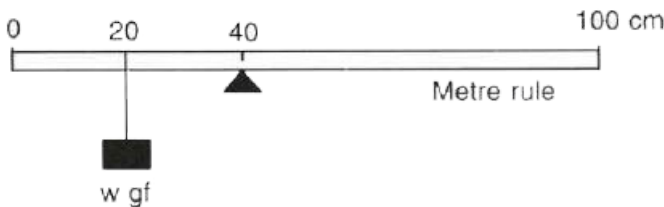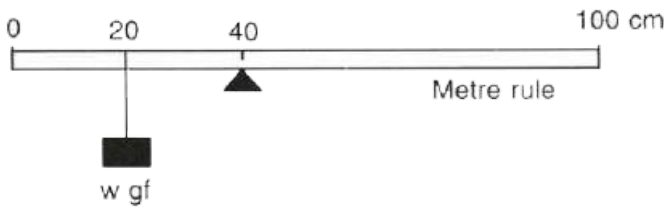


the value of w.

▶ Watch Video Solution

**2.** The diagram alongside shows a uniform metre rule of weight 100 gf being balanced on a knife edge placed at the 40 cm mark, by suspending a weight w gf at the mark 20 cm, find:



the resultant moment and its direction if the weight w is moved to the mark 30 cm.

**3.** The diagram alongside shows a uniform metre rule of weight 100 gf being balanced on a knife edge placed at the 40 cm mark, by suspending a weight w gf at the mark 20 cm, find:



the position of another weight of 50 gf to balance the rule in part (ii).

▶ **Watch Video Solution**

**4.** A pulley system with a velocity ratio 4 is used to lift a load of 300 kgf to a vertical height of 10 m by applying an effort of 100 kgf downwards.

Draw the arrangement of pulley showing the load (L), effort (E) and tension (T) in each strand.

▶ **Watch Video Solution**

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ind the efficiency of the pulley system and the

work done by the effort.

▶ **Watch Video Solution**

**6.** Differentiate between energy and power

▶ **Watch Video Solution**

**7.** Amit weighing 60 kgf climbs up a ladder of height 10 m in 15 minutes. Calculate the increase in his potential energy and the power spent by him. Take 1 kgf = 10 N.

**8.** A coin is placed at the bottom of a glass trough containing water (refractive index = $\dfrac{4}{3}$) up to a height 20 cm. At what depth it will appear when it is viewed from air, vertically
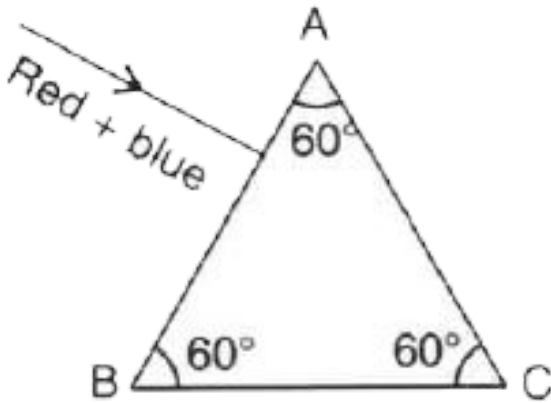
above the coin. Draw a suitable ray diagram in support of your answer.

**9.** The diagram alongside shows a beam of light (red + blue) incident normally on an equilateral triangular prism. If the critical angle for the material of prüsm is $60°$ for the light of red colour, complete the diagram showing the path of light of each colour emerging out of the prism. Mark in the

diagram the angles wherever necessary.

10. An object of height 2 cm is placed in front of a convex lens of focal length 20 cm at a

distance of 15 cm from it. Find the position and magnification of the image.

**11.** Arrange the following electromagnetic radiations in increasing order of their wavelengths : micro-waves, X-rays, infrared radiations, Y-rays, radio waves and ultraviolet rays.

**12.** Name the constituent colour of white light for which

the deviation produced by the glass prism is

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for which

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**14.** There is a sunken ship at a depth of 50 m in a sea. From the surface of sea, waves are sent to locate it. Find the time when the wave after reflection will reach the surface. State whether echo is heard or not? Give reason. Take speed of sound in water = 1400 m $s^{-1}$

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**15.** State two differences between the forced and resonant vibrations.

**16.** State two ways by which the frequency of a note given out by a stretched vibrating string can be increased.

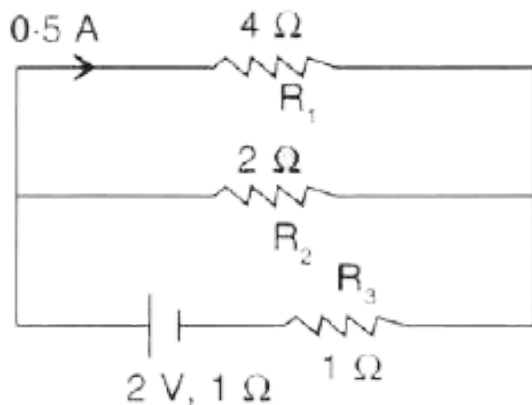**17.** Name the quantity which determines loudness, pitch and quality of a sound.

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current in resistor 2Ω
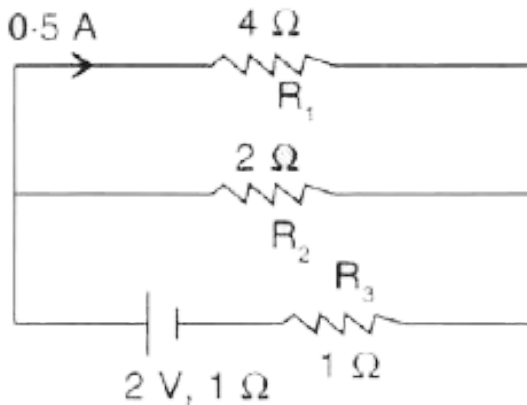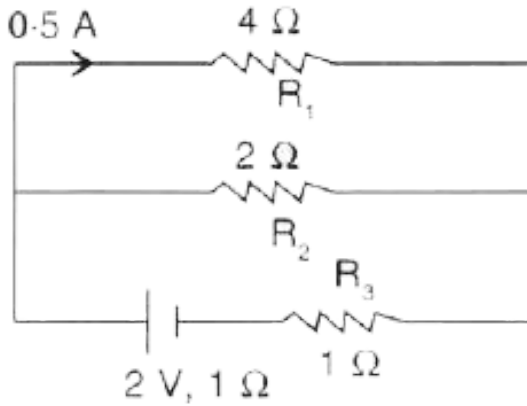
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**29.** Name the device you will use to obtain 220 V a.c. from 11 V a.c. Draw a labelled diagram of the device. Name one type of loss of energy in it and state how is it remedied.

**30.** 200 g of water at $50.5°C$ is cooled down to $10°C$ by adding m g of ice cubes at $0°C$ in

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**31.** Define the following terms: (i) calorie, (ii) heat capacity, (iii) specific heat capacity, and (iv) specific latent heat of ice.

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Write the above nuclear changes in form of an equation stating the atomic number and mass number of each nucleus.

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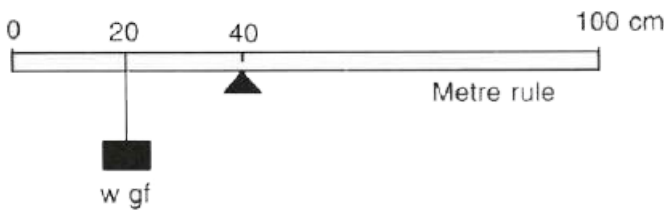▶ **Watch Video Solution**

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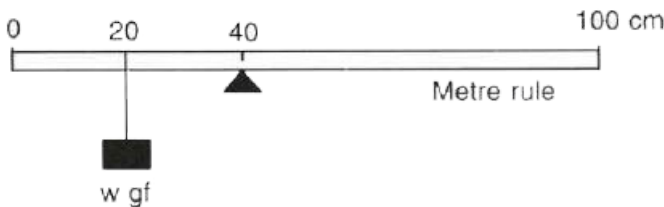


0      20        40                              100 cm

Metre rule

w gf

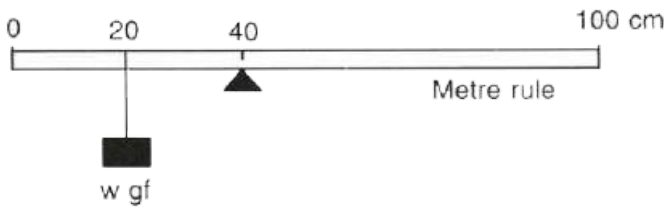the resultant moment and its direction if the weight w is moved to the mark 30 cm.

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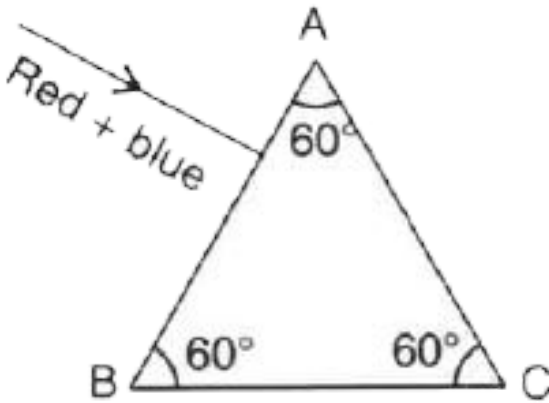
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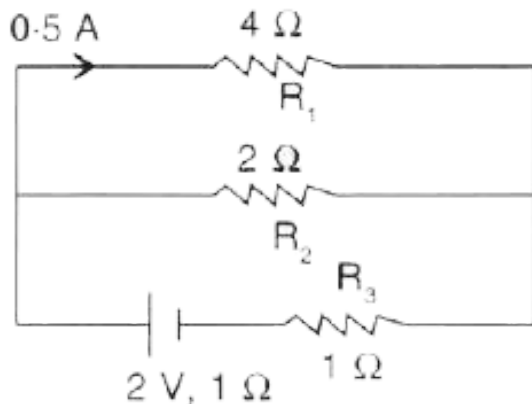**56.** Name the quantity which determines loudness, pitch and quality of a sound.

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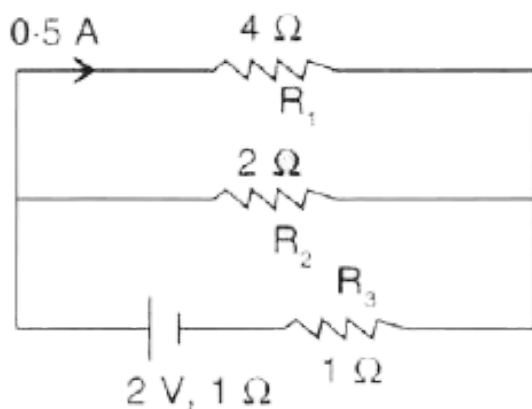**58.** In an electric circuit shown alongside, find



0·5 A          4 Ω
$R_1$

2 Ω
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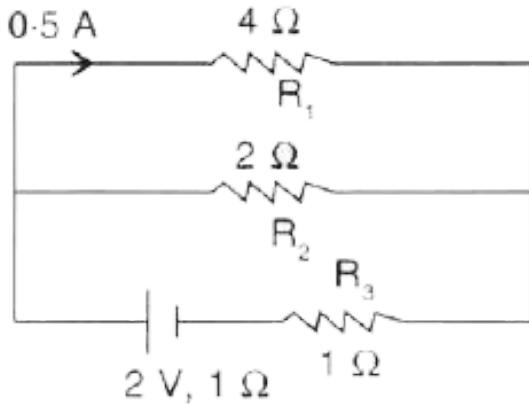$R_3$

2 V, 1 Ω          1 Ω

current in resistor $2\Omega$

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