



# PHYSICS

## BOOKS - SELINA PHYSICS (ENGLISH)

### SAMPLE QUESTION PAPER 5

#### Section A

1. A uniform meter scale is put on a knife edge at 40 cm mark. It is found that this scale gets balanced when a weight of 20 gf is suspended

from the 20 cm mark. Find the weight of meter scale.



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2. What do you understand by free vibrations of a body?



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3. Why does the amplitude of a vibrating body continuously decrease during damped

vibrations ?



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4. What are mechanical waves ?



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



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6. Ranbir claims to have obtained an image twice the size of the object with a concave lens. Is he correct? Give a reason for your answer.



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7. When does a force do work ?



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8. What is the work done by the moon when it revolves around the earth?



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9. What do you mean by dispersion of light?



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10. In the atmosphere which colour of light gets scattered the least ?





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**11.** The music system draws a current of 400 mA when connected to a 12 V battery.

What is the resistance of the music system ?



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**12.** The music system draws a current of 400 mA when connected to a 12 V battery.

The music system if left playing for several hours and finally the battery voltage drops

and the music system stops playing when the current drops to 320 mA. At what battery voltage does the music system stop playing ?



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**13.** State and define the S.I. unit of power.



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**14.** How is the unit horse power related to the S.I. unit of power ?



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15. How does the speed of light in glass change on increasing the wavelength of light?



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



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



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**18.** What is the principle of an ideal machine ?



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**19.** When does a machine act as (a) a force multiplier, (b) a speed multiplier. Can a machine act as a force multiplier and a speed multiplier simultaneously ?



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**20.** What is resistance of a wire ? What are the factors on which resistance of a conductor depends ?



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



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**22.** State the dependence of angle of deviation of light while passing through the prism:

On the refractive index of the material of the prism.



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**23.** State the dependence of angle of deviation of light while passing through the prism:

On the wavelength of light.



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**24.** What is the position of the centre of gravity of a:

(a) rectangular lamina

(b) cylinder?



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**25.** What is the position of the centre of gravity of a:

(a) rectangular lamina

(b) cylinder?



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**26.** What do you understand by the following statements :

The heat capacity of the body is  $60JK^{-1}$



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27. What do you understand by the following statements :

The specific heat capacity of lead is  $130 J kg^{-1} K^{-1}$



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28. The speed of light in glass is  $2 \times 10^5$  km/s.

What is the refractive index of glass?



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**29.** A satellite revolves around a planet in a circular orbit. What is the work done by the satellite at any instant ? Give a reason.



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



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31. Why is the ratio of the velocities of light of wavelengths  $4000 \text{ \AA}$  and  $8000 \text{ \AA}$  in vacuum 1 : 1?



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## Section B

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

Which of the above wavelengths has a higher frequency?





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2. Name the factor that determines :

Loudness of the sound heard.



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3. Name the factor that determines :

Quality of the note.



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4. Name the factor that determines :

Pitch of the note.



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5. A pulley system comprises of two pulleys, one fixed and the other movable.

Draw labelled diagram of the arrangement and show clearly the directions of all the forces acting on it.



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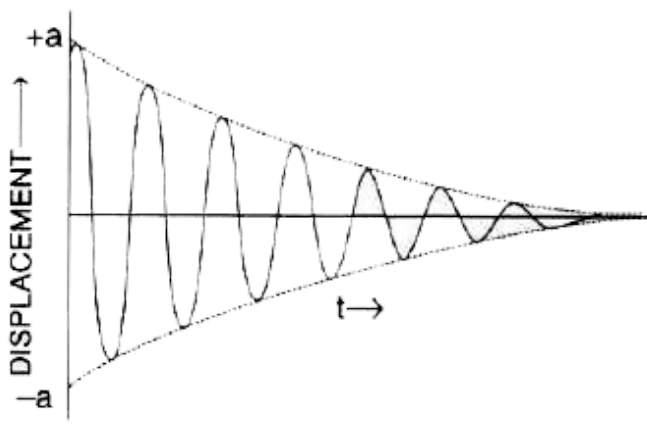
6. A pulley system comprises of two pulleys, one fixed and the other movable.

What change can be made in the movable pulley of this system to increase the mechanical advantage of the system?



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7. The diagram in Fig. shows the displacement time graph of a vibrating body.

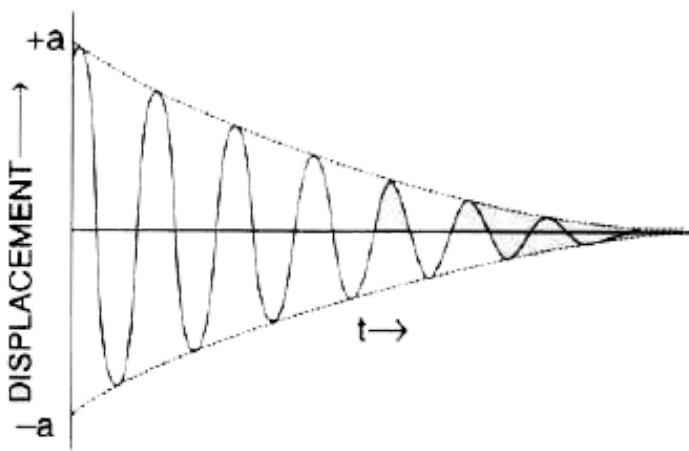


Name the kind of vibrations.



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**8.** The diagram in Fig. shows the displacement time graph of a vibrating body.

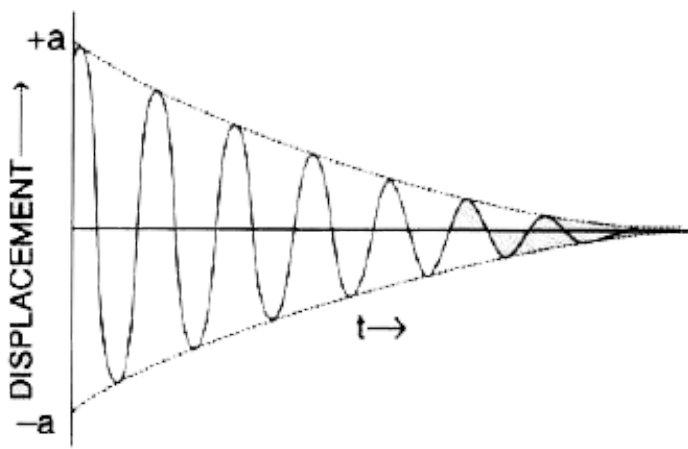


Give one example of such vibrations.



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9. The diagram in Fig. shows the displacement time graph of a vibrating body.

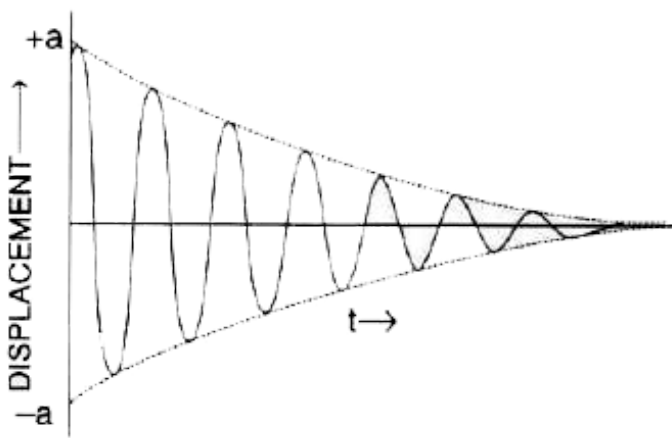


Why is the amplitude of vibrations gradually decreasing ?



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**10.** The diagram in Fig. shows the displacement time graph of a vibrating body.



What happens to the vibrations of the body after some time?



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**11.** Two sets A and B, of three bulbs each, are glowing in two separate rooms. When one of the bulbs in set A is fused, the other two bulbs

also cease to glow. But in set B, when one bulb fuses, the other two bulbs continue to glow. Explain why this phenomenon occurs.



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**12.** Why do we prefer arrangements of set B for house circuit?



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**13.** 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.



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**14.** 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.



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15. What is the function of a fuse?



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16. Name the principle on which fuse works.



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17. To Which wire does the fuse is connected?



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18. A type of electromagnetic wave has wavelength  $50 \text{ \AA}$ .

Name the wave.



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**19.** A type of electromagnetic wave has wavelength  $50 \text{ \AA}$ .

What is the speed of the wave in vacuum ?



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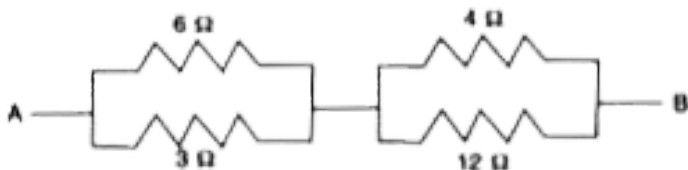
**20.** A type of electromagnetic wave has wavelength  $50 \text{ \AA}$ .

State one use of this type of wave.



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21. Find the equivalent resistance between A and B.



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22. State whether the resistivity of a wire changes with the change in the thickness of the wire.



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23. In a laboratory experiment to measure specific heat capacity of copper, 0.02 kg of water at  $70^{\circ}C$  was poured into a copper calorimeter with a stirrer of mass 0.16 kg initially at  $15^{\circ}C$ . After stirring, the final temperature reached to  $45^{\circ}C$ . Specific heat of water is taken as  $4200J/kg^{\circ}C$

What is the quantity of heat released per kg of water at per  $1^{\circ}C$  fall in temperature?



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24. In a laboratory experiment to measure specific heat capacity of copper, 0.02 kg of water at  $70^{\circ}C$  was poured into a copper calorimeter with a stirrer of mass 0.16 kg initially at  $15^{\circ}C$ . After stirring, the final temperature reached to  $45^{\circ}C$ . Specific heat of water is taken as  $4200J/kg^{\circ}C$

Calculate the heat energy released by water in the experiment in cooling from  $70^{\circ}C$  to  $45^{\circ}C$ .



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25. In a laboratory experiment to measure specific heat capacity of copper, 0.02 kg of water at  $70^{\circ}C$  was poured into a copper calorimeter with a stirrer of mass 0.16 kg initially at  $15^{\circ}C$ . After stirring, the final temperature reached to  $45^{\circ}C$ . Specific heat of water is taken as  $4200J/kg^{\circ}C$

Assuming that the heat released by water is entirely used to raise the temperature of calorimeter from  $15^{\circ}C$  to  $45^{\circ}C$  calculate the specific heat capacity of copper.



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**26.** State Ohm's law? How can it be verified experimentally ? Does it hold good under all conditions ? Comment.



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**27.** A metal wire of resistance  $6\Omega$  is stretched so that its length is increased to twice its original length. Calculate its new resistance.



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**28.** A man spend 64 KJ energy in displacing a body by 64 m in the direction in which he applies force, in 2.5 s. Calculate : (i) the force applied, and (ii) the power spent (in H.P) by the man



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**29.** A man spend 64 KJ energy in displacing a body by 64 m in the direction in which he applies force, in 2.5 s. Calculate : (i) the force

applied, and (ii) the power spent (in H.P) by the man



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**30.** Which of the two wires of similar dimensions, copper or nichrome, would you use for the electric heater element? Give reasons to justify your answer.



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**31.** Two fuse wires are rated 5 A and 20 A.

Which of the two is (i) thicker, (ii) longer ?



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**32. (a)** State the laws of refraction of light. Give an expression to relate the absolute refractive index of a medium with speed of light in vacuum.

(b) The refractive indices of water and glass with respect to air are  $\frac{4}{3}$  and  $\frac{3}{2}$

respectively. If the speed of light in glass is  $2 \times 10^8 \text{ m s}^{-1}$ , find the speed of light in (i) air, (ii) water.



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**33.** Write a relation between the angle of incidence

(i), angle of emergence (e), angle of prism (A) and angle of deviation (d) for a ray of light passing through an equilateral prism.



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**34.** How is the heat capacity of the body related to its specific heat capacity ?



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**35.** Represent the change in the nucleus of radioactive element when  $\alpha$  particle is emitted.



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**36.** What is the name given to elements with same mass number and different atomic number ?



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**37.** Under which condition does the nucleus of an atom tend to be radioactive?



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**38.** Heat supplied to a solid changes it into liquid. What is this change in phase called ?



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**39.** During the phase change does the average kinetic energy of the molecules of the substance increase ?



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**40.** What is the energy absorbed during the phase change called ?



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

Write the symbolic equation for the process.



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**42.** A nucleus  ${}_{11}\text{Na}^{24}$  emits a  $\beta$ -particle to change into magnesium (Mg).

What are numbers 24 and 11 called?



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

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



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**44.** With the help of a well-labelled diagram, show that the apparent depth of an object such as a coin in water is less than its real depth.



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



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