

**X – SCIENCE IMPORTANT PROBLEM QUESTION-**

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PREPARED BY :

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1. Two bodies have a mass ratio of 3:4 The force applied on the bigger mass produces an acceleration of  $12 \text{ ms}^{-2}$ . What could be the acceleration of the other body, if the same force acts on it.
2. A ball of mass  $1 \text{ kg}$  moving with a speed of  $10 \text{ ms}^{-1}$  rebounds after a perfect elastic collision with the floor. Calculate the change in linear momentum of the ball.
3. A mechanic unscrew a nut by applying a force of  $140 \text{ N}$  with a spanner of length  $40 \text{ cm}$ . What should be the length of the spanner if a force of  $40 \text{ N}$  is applied to unscrew the same nut?
4. The ratio of masses of two planets is 2:3 and the ratio of their radii is 4:7 Find the ratio of their accelerations due to gravity.
5. An object is placed at a distance  $20 \text{ cm}$  from a convex lens of focal length  $10 \text{ cm}$ . Find the image distance and nature of the image.
6. An object of height  $3 \text{ cm}$  is placed at  $10 \text{ cm}$  from a concave lens of focal



length 15cm. Find the size of the image

7. Find the final temperature of a copper rod. Whose area of cross section changes from  $10 \text{ m}^2$  to  $11 \text{ m}^2$  due to heating. The copper rod is initially kept at  $90\text{K}$ . (Coefficient of superficial expansion is  $0.0021 /\text{K}$ )

8. Calculate the coefficient of cubical expansion of a zinc bar. Whose volume is increased  $0.25 \text{ m}^3$  from  $0.3 \text{ m}^3$  due to the change in its temperature of  $50\text{K}$ .

9. An electric iron consumes energy at the rate of  $420 \text{ W}$  when heating is at the maximum rate and  $180 \text{ W}$  when heating is at the minimum rate. The applied voltage is  $220 \text{ V}$ . What is the current in each case?

10. A  $100 \text{ watt}$  electric bulb is used for  $5 \text{ hours}$  daily and four  $60 \text{ watt}$  bulbs are used for  $5 \text{ hours}$  daily. Calculate the energy consumed (in  $\text{kWh}$ ) in the month of January.

11. A torch bulb is rated at  $3 \text{ V}$  and  $600 \text{ mA}$ . Calculate it's

a) power b) resistance c) energy consumed if it is used for  $4 \text{ hour}$ .

12. A piece of wire having a resistance  $R$  is cut into five equal parts.

a) How will the resistance of each part of the wire change compared with the original resistance?

b) If the five parts of the wire are placed in parallel, how will the resistance of the combination change?

c) What will be ratio of the effective resistance in series connection to that of the parallel connection?

13. A sound wave has a frequency of  $200 \text{ Hz}$  and a speed of  $400 \text{ ms}^{-1}$  in a medium. Find the wavelength of the sound wave.

14. The thunder of cloud is heard  $9.8 \text{ seconds}$  later than the flash of lightning. If the speed of sound in air is  $330 \text{ ms}^{-1}$ , what will be the height

of the cloud?

15. A person who is sitting at a distance of 400 m from a source of sound is listening to a sound of 600 Hz. Find the time period between successive compressions from the source?

16. An ultrasonic wave is sent from a ship towards the bottom of the sea. It is found that the time interval between the transmission and reception of the wave is 1.6 seconds. What is the depth of the sea, if the velocity of sound in the seawater is  $1400 \text{ ms}^{-1}$ ?

17. A man is standing between two vertical walls 680 m apart. He claps his hands and hears two distinct echoes after 0.9 seconds and 1.1 second respectively. What is the speed of sound in the air?

18. Two observers are stationed in two boats 4.5 km apart. A sound signal sent by one, under water, reaches the other after 3 seconds. What is the speed of sound in the water?

19. A strong sound signal is sent from a ship towards the bottom of the sea. It is received back after 1s. What is the depth of sea given that the speed of sound in water  $1450 \text{ ms}^{-1}$  ?

20.  $^{88}\text{Ra}^{226}$  experiences three  $\alpha$  - decay. Find the number of neutrons in the daughter element.

21. A cobalt specimen emits induced radiation of 75.6 millicurie per second. Convert this disintegration in to becquerel (one curie =  $3.7 \times 10^{10} \text{ Bq}$ )

22. Calculate the gram molecular mass of the following.

a)  $\text{H}_2\text{O}$

b)  $\text{CO}_2$

c)  $\text{Ca}_3(\text{PO}_4)_2$

23. Calculate the number of moles in 46 g of sodium?



24. Vinu dissolves 50 g of sugar in 250 ml of hot water, Sarath dissolves 50 g of same sugar in 250 ml of cold water. Who will get faster dissolution of sugar? and Why?
25. Lemon juice has a pH 2, what is the concentration of H<sup>+</sup> ions?
26. Calculate the pH of  $1.0 \times 10^{-4}$  molar solution of HNO<sub>3</sub> .
27. What is the pH of  $1.0 \times 10^{-5}$  molar solution of KOH?
28. The hydroxide ion concentration of a solution is  $1 \times 10^{-11}$ M. What is the pH of the solution?

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----- ALL THE BEST -----



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