



PHYSICS

BOOKS - R G PUBLICATION

MODEL QUESTION PAPER 2

Exercise

1. Define systematic error



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2. The resistance $R = \frac{V}{I}$ where

$V = (100 \pm 5)V$ and $I = (10 \pm 0.2)A$,

calculate ERROR IN the resistance.



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3. When you shake hand with you friend, what kind of force do you exert?



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4. Find the dimensional formula of G.



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5. A particle is displaced from the point A $(-2, 0, 1)$ to the point B $(1, 3, -3)$. Find the magnitude of displacement.



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6. Establish the relation $S = ut + \frac{1}{2}at^2$, using calculus.



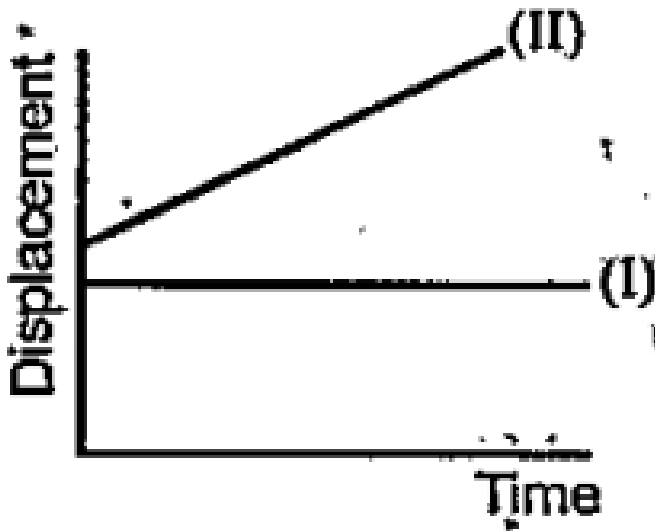
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7. A body travels through 15m in the 5th 1 sec and 25m in the 10th sec of its motion. Find its displacement in 7 sec.



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8. Identify the motions described by the graphs.



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9. A body is projected in, such a way that it just crosses, a wall of height ,10m at a distance of 20m and falls at a distance of 40m from the wall. Find the velocity of projection



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10. Obtain an expression for the centripetal force required to make a body of mass m moving with a constant speed v around a circular path of radius r .





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11. Calculate the angular speed of the hour's hand of your watch.



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12. Write the dimensional formula of impulse.



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13. WHY Cricketers move their hands backward while holding a catch.



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14. It is easier to pull a lawn mower than to push it.



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15. State work energy principle.



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16. Give an example of negative work



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17. A ball is dropped from a height of 20m. it rebounds to a height on 10m. Calculate the loss of energy of the ball



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18. Show that in two dimensional elastic collision between two bodies of equal mass and one body initially at rest, they move at an angle of $\frac{\pi}{2}$ after collision.



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19. Define centre of mass. Find the centre of mass of a triangular lamina.



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20. Starting from the relation $\vec{L} = \vec{r} \times \vec{p}$, establish the law of conservation of angular momentum.



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21. Derive the expression of escape speed.



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22. Find the expression of acceleration due to gravity at a depth d below the surface of the earth.



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23. Find the potential energy of a system of four particles each of mass m placed at the vertices of a square of side I .



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24. State Bernoulli's theorem. Establish it on the basis of work-energy theorem.



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25. Calculate the excess pressure inside a liquid drop of radius r and surface tension T . What is the expression of the excess pressure inside a soap bubble?



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26. The average depth of the Indian Ocean is about 3 km. Calculate the bulk strain produced in water at the bottom of the ocean. Given that

bulk modulus of water is

$$2.2 \times 10^9 \text{ Nm}^{-2} \text{ (take } g = 10 \text{ ms}^{-2} \text{)}$$



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27. At what temperature both the Celsius and Fahrenheit scales give the same reading?



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28. Establish the relation $\gamma = 3\alpha$



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29. Establish the relation $C_p - C_v = R$



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30. Find the expression of adiabatic work done.



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31. A carnot's engine has an efficiency of 50% when its sinks temperature is 27 degree C what must be the change in its source temperature for increasing its efficiency of 60% ?



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32. For a poly-atomoic gas esatblish the relation $\gamma = 1 + \frac{2}{f}$



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33. What is the interpretation of temperature on the basis of kinetic theory of gas?



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34. Calculate the root mean square speed of gas particles each of mass 5×10^{-17} kg at *NTP* ($K_B = 1.38 \times 10^{-23} JK^{-1}$]



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35. A point particle of mass 0.1kg is executing SHM of amplitude 0.1m. When the particle passes through the mean position, its kinetic energy is 8×10^{-3} J. Obtain the equation of motion of the particle if the initial phase of oscillation is 45° .



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36. Write down Newton's formula for velocity of sound and state the Laplace's correction.



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37. Draw the representative diagram to show the formation of 3rd and 5th harmonics in a closed organ pipe.



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38. A siren is fitted on a car going towards a vertical wall at a speed of 36kmh^{-1} . A person standing on the ground behind the car, listens to the siren sound coming directly from the source as well as that coming after

reflection from the wall. Calculate the apparent frequencies of both the sounds. Velocity of sound 340ms^{-1} , frequency of the siren 500Hz .



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39. The displacement y of a particle in a medium can be expressed as $y = 10^{-6} \sin(100t + 20x)$, where t and x are in second and metre respectively. Calculate the speed of the wave.



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40. The length of a sonometer wire is 0.75m and density $9 \times 10^3 \text{kgm}^{-3}$. It can bear a stress of $8.1 \times 10^8 \text{Nm}^{-2}$ without exceeding the elastic limit. Calculate the fundamental frequency that can be produced in the wire.



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