



PHYSICS

BOOKS - R G PUBLICATION

MODEL QUESTION PAPER 1

Exercise

1. Write the four force in nature.

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2. If the maximum error in the measurement of the radius of a sphere is 2% then what is maximum error in the calculation of volume?

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3. The value of G in CGS system is $6.67 \times 10^{-8} dy \neq cm^2g^{-2}$. Calculate the value in SI units.



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4. Which of the following length measurements is most precise?

A. l=5cm

B. l=5.00cm

C. l=5.000cm

D.

Answer:



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5. The position of particle is given by $\vec{r} = 3.0t\hat{i} - 2.0t^2\hat{j} + 4.0\hat{k}$. Find the magnitude and direction of velocity of the particle at $t=1.0s$.



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6. A body is projected so that it has maximum range R . What is the maximum height reached during the flight.



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7. What is the angle between $(\vec{i} + \vec{j})$ and $(\vec{i} - \vec{j})$?



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8. Derive an equation for the distance covered by a uniformly accelerated body in n th second of its motion.



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9. Derive acceleration from velocity-time graph.

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10. State Newton's second law of motion. Give and state definition of the SI unit of force.

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11. 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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12. A block of mass 0.1 kg is held against a wall by applying a horizontal force of 5 N on the block. If the coefficient of friction between the block and the wall is 0.5 , what is the magnitude of the frictional force acting on the block?

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13. A block of mass 2 kg is placed on the floor. The coefficient of friction is 0.4. If a force of 2.5 is applied on the block horizontally, what will be the state of block. Give reason.

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14. A ball moving with momentum of 5kgms^{-1} strikes against a wall at an angle 45° and is reflected at the same angle. Calculate the change in momentum.

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15. In a head on elastic collision of two bodies of equal masses

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16. State the work-energy theorem



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17. A force $F = (10 + 0.50x)$ acts on a particle in the x direction, where F is in newton and x in meter. Find the work done by this force during a displacement from $x=0$ to $x=2.0\text{m}$



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



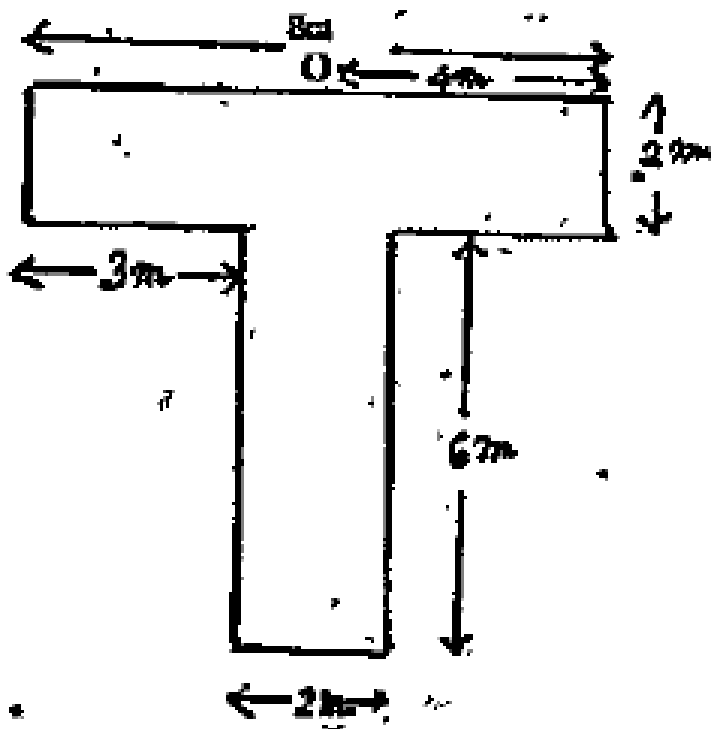
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19. Three point masses m_1, m_2 and m_3 are located at the vertices of an equilateral triangle of side α . What is the moment of inertia of the

system about an axis along the altitude of the triangle passing through m_1 ?

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20. Find the position of centre of the mass of the T-shaped plane from O,



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21. What is basic of Kepler's law of areas of planetary motion?

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22. Deduce Newton's law of gravitation from Kepler's third law.

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23. Write the three necessary conditions for a satellite to be geostationary.

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24. Write the significance of negative total energy of a satellite?

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25. What is anomalous expansion of water?

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26. How does surface tension change with temperature?

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27. Calculate the amount of heat required to vaporise 1g of ice initially at 0°C .

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28. Write the basic difference between liquid and gas.

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29. What is surface tension of a liquid ? Show that the surface tension of a liquid is numerically equal to the surface energy per unit area.

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30. Derive Stokes' law by dimensional analysis.

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31. What do you mean by breaking stress? The breaking stress for a metal is $7.8 \times 10^9 \text{ Nm}^{-2}$. Calculate the maximum length of the wire made of this metal which may be suspended without breaking. The density of the metal $\rho = 7.8 \times 10^3 \text{ kg m}^{-3}$, $g = 10 \text{ ms}^{-2}$.

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32. Why does a gas not possess a single specific heat? Explain why C_p is greater than C_v ?



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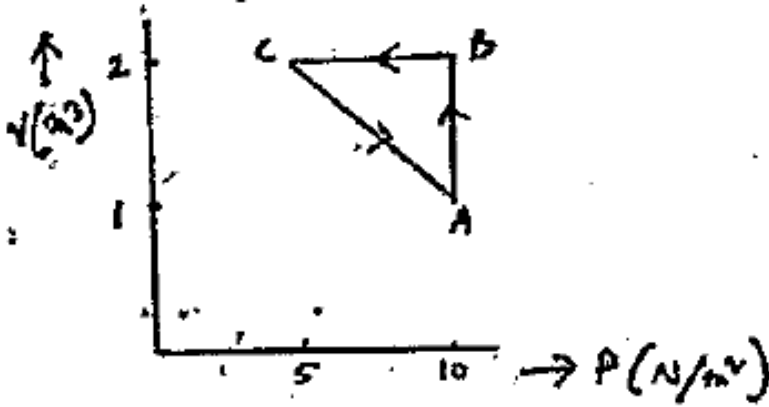
33. Three moles of an ideal gas at a constant temperature of $300K$ is compressed from a volume of 4 litres to 1 litre. Calculate the work done in the process. Given $R = 8.31Jmol^{-1}K^{-1}$.



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34. An ideal gas is taken through the cycle $A \rightarrow B \rightarrow C \rightarrow A'$ as shown. If the heat added to the gas in the cycle is Q , then the work done by the gas in the cycle is W .

CrarrA'. Give the interpretation of the result.



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35. State the law of equipartition of energy.

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36. At what temperature is the rms velocity of a hydrogen molecule equal to that of an oxygen molecule at $47^\circ C$? a) 10 K b) 20 K c) 30 K d) 40 K

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37. Explain the kinetic interpretation of temperature



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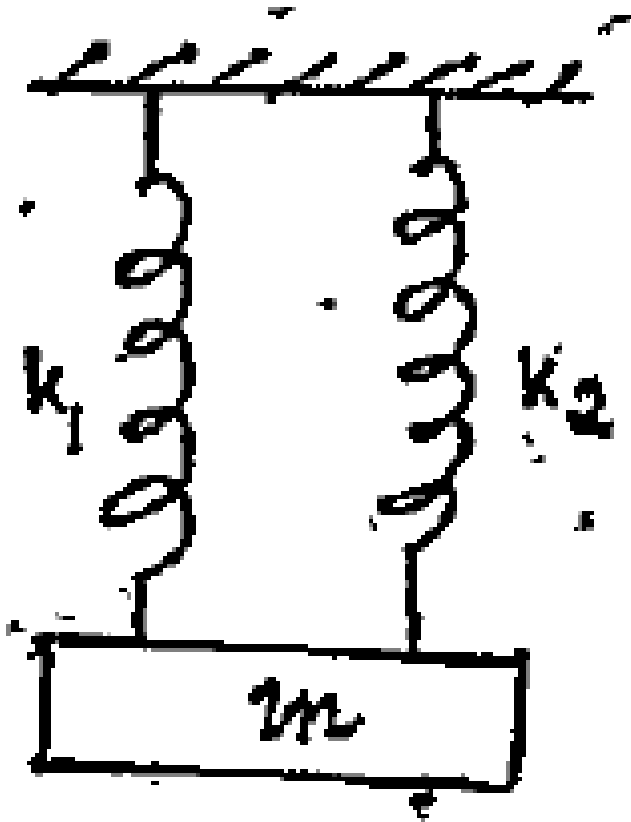
38. A simple harmonic motion is represented by $x=10\sin (20t+0.5)$ where x is in metre and t is in second. Find its amplitude, angular frequency, frequency and time period.



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39. Two springs are connected in parallel as shown. If the mass is displaced from its equilibrium position and released. What is the

resultant frequency of vibration?



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40. Describe the first and second mode of vibrations of an open organ pipe.

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41. A metal wire of linear mass density of 9.8 gm^{-1} is stretched with a tension of 10kg wt between two rigid supports of 1 metre apart. If the wire is allowed to vibrate in its fundamental frequency, then find the frequency of vibration.



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42. Define free oscillation damped oscillation and forced oscillation.



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