



PHYSICS

BOOKS - JEEVITH PUBLICATIONS

PHYSICS (KANNADA ENGLISH)

SUPER MODEL QUESTION PAPER 2

Question Paper 2 For Practice Part A

1. What is meant by resolution of a vector ?



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2. What is meant by inelastic collision?



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3. What is the analogue of mass in rotational motion?



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4. Which is more elastic between steel and rubber?



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5. What is an ideal fluid?



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6. Why is a big drop of liquid oblate?



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7. Explain molar specific heat of a gas at constant (i) pressure and (ii) volume. Write the relation between them in terms of gas constant.



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8. What are the values of specific heat of a gas in isothermal and adiabatic processes?



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9. How does mean free path depend on the diameter (size) of the molecule?



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Question Paper 2 For Practice Part B

1. Mention any two contributions of physics to the society.



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2. What is the distance in km of a quasar from which light takes 3.0 billion years to reach us.



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3. Represent x-t graph for (i) $+a$ (ii) $-a$ (iii) $a = 0$ acceleration types of motion.



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4. Write a neat and labelled diagram showing angle of banking and resolution of normal reaction force.



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5. Draw a neat labelled diagram to represent the angle of repose.



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6. Represent moment of force/torque acting on a body with a neat labelled diagram.



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7. State the conditions for stable equilibrium for floating bodies.



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8. Give the expression for total force acting on a mass suspended by a spring (of spring constant k) along with the meaning of the symbols used.



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Question Paper 2 For Practice Part C

1. Find the sum of \hat{i} and \hat{k} and the angle between the resultant and \hat{i} .



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2. Distinguish between mass and weight.



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3. Obtain an expression for final velocities of two colliding bodies initially in motion.



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4. State and explain the law of moments.



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5. Write a few characteristics of gravitational force.



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6. A steel wire of length 0.20 m and uniform cross section $10^{-4}m^2$ is tied rigidly at both

ends. The temperature of the wire is change from 40° to $20^\circ C$. Calculate the thermal tension in the wire given $\alpha = 1.1 \times 10^{-3} / ^\circ C$. and $Y = 2 \times 10^{11} Nm^2$



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7. Show that the average kinetic energy of a gas molecule is directly proportional to the temperature of the gas.



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8. With a suitable example, estimate the radius of a molecule of a substance



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Question Paper 2 For Practice Part D

1. State the law of conservation of mechanical energy. Show that total mechanical energy of a body falling freely under gravity is conserved.



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2. Define a moment of inertia. Obtain an expression for it



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3. Show that efficiency of Caront's ideal heat engine is $\eta = \left(1 - \frac{T_2}{T_1}\right)$.



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4. Show that both odd and even harmonics are present in an open pipe system.



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5. Given displacement of a particle executing SHM $y(t) = A \cos(\omega t + \phi)$. Plot instantaneous displacement, velocity and acceleration of particle with respect to time.



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6. A fighter plane flying horizontally at an altitude of 1.5 km with speed 720 km/h passes directly overhead an anti - aircraft gun . At what angle from the vertical should the gun be fired for the shell with muzzle speed 600ms^{-1} to hit the plane ? At what minimum altitude should the pilot fly the plane to avoid being hit ? (Take $g=10\text{ ms}^{-2}$).



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7. A bullet of mass 0.012 kg and horizontal speed 70 m s^{-1} strikes a block of wood of mass 0.4 kg and instantly comes to rest with respect to the block. The block is suspended from the ceiling by means of thin wires. Calculate the height to which the block rises. Estimate the loss in kinetic energy.



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8. Two stars each of one solar mass ($2 \times 10^{30} \text{ kg}$) are approaching each other for a head on collision. When they are at a distance 10^9 their speeds are negligible. What is the speed with which they collide? The radius of each star is 10^4 assume the stars to remain undistorted until they collide.



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9. A brass boiler has a base area of 0.15m^2 and thickness 1 cm. It boils water at the rate of 6 kg per minute when placed on a gas stove. Estimate the temperature of the part of the flame in contact with the boiler. Thermal conductivity of brass is $= 109\text{Js}^{-1}\text{m}^{-1}\text{K}^{-1}$, Heat of vapourisation of water is $2256 \times 10^3\text{Jkg}^{-1}$



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10. A sonar system fixed in a submarine operates at a frequency 40.0 kHz . An enemy submarine moves towards the sonar with a speed of 360 km h^{-1} . What is the frequency of sound reflected by the submarine ? Take the speed of sound in water to be 1450 m s^{-1}



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