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Class 11

2023-24

PRIT EDUCATION
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A COLLECTION OF

COMPULSORY QUESTIONS

SUBJECT:

P H Y S I C S

MR. SS PRITHVI

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Getting in:

- It gives me great pride and pleasure in bringing to you, this wonderful booklet.
- The compulsory questions are collected from almost all the available previous years' question papers, which will give an idea about to study the topics which will help them to tackle these compulsory questions.

-SS PRITHVI, FOUNDER- PRIT~EDUCATION.

Calculate the momentum of two bodies move with same speed 10ms⁻¹ with masses respectively.

Give the significant figures for the following.
i) 600800 ii) 400 iii) 5213.0 iv) 0.007 v) 0.006032 vi) 18.032

Check the correctness of the equation $\frac{1}{2}mv^2 = mgh$ using dimensional analysis method.

In the cricket game, a batsman strikes the ball such that it moves with the speed 30ms⁻¹ at an angle 30° with the horizontal. The boundary line of the cricket ground is located at a distance of 75m from the batsman? Will the ball go for a six? (Neglect the air resistance and take g = 10 ms⁻²)

An iron ball is falling from a height of 10m. Find the time taken by the iron ball to reach the ground.

A train was moving at the rate of 54 km h⁻¹, when brakes were applied. It comes to rest within a distance of 225m. Calculate the retardation produced in the train.

From a point on the ground, the top of a tree is seen to have an angle of elevation 60° .The distance between the tree and a point is 50m.
Calculate the height of the tree?

An iron ball and a feather are both falling from a height of 10m.
a) What are the time taken by the iron ball and feather to reach the ground?
b) What are the velocities of iron ball and feather when they reach the ground?
(Ignore air resistance and taken g = 10 mS^{-2}.)

Two vectors are given as $\vec{r} = 2\hat{i} + 3\hat{j} + 5\hat{k}$ and $\vec{F} = 3\hat{i} - 2\hat{j} + 4\hat{k}$. Find the resultant vector $\vec{\tau} = \vec{r} \times \vec{F}$.

A train was moving at the rate of 54 kmh^{-1} when brake were applied. It came to rest within a distance of 225m. Calculate the retardation produced in the train.

Two resistance $R_1 = (100 \pm 3)\,\Omega$, $R_2 = (150 \pm 2)\,\Omega$ are connected in series. What is their equivalent resistance?

A physical quantity x is given by $x = \dfrac{a^2 b^2}{c \sqrt{d}}$ If the percentage errors of measurement in a, b, c and d are 4% , 2%, 3% and 1% respectively. Then calculate the percentage error in the calculation of x.

What is the angle of projection to have a maximum range in 'kitti pull'? If one strikes kitti pull with of 98ms^{-1} what is the maximum range achieved?

A box is pulled with a force of 25 N to produce a displacement of 15 m. If the angle between the force and displacement is 30°, find the work done by the force?

Water in a bucket tied with rope whirled around in a vertical circle of radius 0.5 m. Calculate the minimum velocity at the lowest point so that the water does no spill form it in the course of motion. (g = 10ms^{-2})

The position vectors of two point masses 10kg and 5 kg are $(-3\hat{i} + 2\hat{j} + 4\hat{k})$ and $(3\hat{i} + 6\hat{j} + 5\hat{k})$ m respectively. Locate the position of center mass.

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Calculate the energy consumed in electrical units when a 75 W fan is used for 8 hours daily for one month (30 days) B. Page no : 191

Calculate the work done by a force of 30N in lifting a load of 2kg to a height of 10m. (g = 10 ms⁻²)

Check dimensionally $S = ut + \frac{1}{2}at^2$

Calculate the energy consumed in electrical units when a 75 W fan is used for 8 hours daily for one month. (30 days)   Part - IV

Calculate Centripetal force of a man of mass 60kg is moving with velocity 50 ms⁻¹ in circular path of 10m radius.

Calculate the acceleration of a body of mass 20 kg acted by a force 50N at angle of 30° in x, y direction as shown in figure.
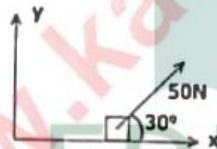
An iron ball and a feather are both falling from a height of 10m, what are the time taken by the iron ball and feather to reaches the ground? (Let g = 10ms⁻²)

Find out the equation for

$\vec{F} = (4\hat{i} - 3\hat{j} + 5\hat{k})$ N and $\vec{r} = (7\hat{i} + 4\hat{j} - 2\hat{k})$M Find out the equation for $\vec{r} = \vec{r} \times \vec{F}$

A book of mass 'm' is at rest on the table, a) What are the forces acting on the book?
b) Draw the free body diagram.

The resultant of two vectors A and B is perpendicular to vector A and its magnitude is equal to half of the magnitude of vector B. The angle between A and B is.

Define torque. Give any two examples of torque in day - to- day life.

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3   SS PRITHVI   PRIT-EDUCATION

Check the correctness of the equation $E = mc^2$ using dimensional analysis method.

A cyclist while negotiating a circular path with speed 20 m s^{-1} is found to bend an angle by 30° with vertical. What is the radius of the circular path?

(given, g = 10 ms^{-2})

A train was moving at the rate of 54 km h- when brakes were applied. It came to rest within a distance of 225m. Calculate the retardation produced in the time.

A cyclist while negotiating a circular path with speed 20 ms is found to bend an angle by 300 with vertical. What is the radius of the circular path?
(Given g= 10 ms)

An object is thrown with initial speed 10 ms^{-1} at an angle $\pi/4$ with the horizontal. What is the range covered?

A uniform disc of mass 100g has a diameter of 10 cm. Calculate the total energy of the disc when rolling along a horizontal table with a velocity of 20 cms'.

An athlete covers 3 rounds on.a circular tráck of radius 50 m. Calculate the total-distance and displacement, travelled by him.

A rolling wheel has velocity of its center of mass as 5 m s^{-2}. If its radius is 1.5 m and angular velocity is 3 rad s^{-1}, then check whether it is in pure rolling or not.

Consider a circular road of radius 20 meter banked at an angle of 30 degree. With what speed a car has to move on the turn so that it will have safe turn? (Consider g=10 m s^{-2})

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4   SS PRITHVI   PRIT-EDUCATION

A physical quantity x is given by $x = \dfrac{a^2 b^3}{c\sqrt{d}}$. If the percentage errors of measurement in a, b, c and d are 4%, 2%, 3% and 1% respectively, then calculate the percentage error in the calculation of x.

If a stone of mass 0.25 kg tried to a string executes uniform circular motion with a speed of 2 ms^{-1} of radius 3 m. What is the magnitude of tensional force acting on the stone?

In a submarine equipped with sonar, the time delay between the generation of a pulse and its echo after reflection from an enemy submarine is observed to be 80 s. If the speed of sound in water is 1460 ms^{-1}. What is the distance of the enemy submarine?

A RADAR signal is beamed towards a planet and its echo is received 7 minutes later. If the distance between the planet and the Earth is 6.3×10^{10} m. Calculate the speed of the signal?

A particle of mass 2kg experiences two forces, $\vec{F_1} = 5\hat{i} + 8\hat{j} + 7\hat{k}$, $\vec{F_2} = 3\hat{i} - 4\hat{j} + 3\hat{k}$. What is the acceleration of the particle?

A rope is wound around a hollow cylinder of mass 3 kg and radius 40 cm what is the angular acceleration of the cylinder if the rope is pulled with a force 20 N?

A stone of mass 2 kg is attached to a string of length 1 meter. The string can withstand maximum tension 200 N. What is the maximum speed that stone can have during the whirling motion?

Find the moment of inertia of a dire of mass 4 kg and radius 60 cm about an axis paring through the center and perpendicular to the plaru of the disc.

.Consider a satellite orbiting the Earth in a circular orbit of radius 1600 km above the surface of the earth. What is the acceleration experienced by the satellite due to Earth's gravitational force.

The reading of pressure meter attached with a closed pipe is 5 x 10^5 Nm^{-2}. On opening the valve of the pipe, the reading of the pressure meter is 4.5 x 10^5 Nm^{-2}. Calculate the speed of the water flowing in the pipe.

If 5L of water at 50ºC is mixed with 4L of water at 30ºC, what will be the final temperature of water? Take the specific heat capacity of water as 4184 J kg^{-1} k^{-1}.

Consider two point masses m_1 and m_2 which are separated by a distance of 10 metre. Calculate the force of attraction between them. Take m_1=1 kg and m_2=2 kg.

Two pistons of hydraulic lift have diameters of 60cm and 5cm. What is the force exerted by the large piston when 50N is placed on the smaller piston?

A metal plate of area 2.5×10^{-4} m^2 is placed on a 0.25×10^{-3} m thick layer of castor oil. If a force of 2.5 N is needed to move the plate with a velocity 3×10^{-2} m s^{-1}, calculate the coefficient of viscosity of castor oil.

A football at 27°C has 0.5 mole of air molecules. Calculate the internal energy of air in the ball. (R=8.31 J mol^{-1} K^{-1})

A refrigerator has COP of 3. How much work must be supplied to the refrigerator in order to remove 200 J of heat from its interior? (COP - Coefficient Of Performance)

During the cyclic process, a heat engine absorbs 500 J of heat from a hot reservoir, does work and ejects an amount of heat 300 J into the surroundings (cold reservoir). Calculate the efficiency of the heat engine.

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. A solid sphere has a radius of 1.5 cm and a mass of 0.038 kg. Calculate the specific gravity or relative density of the sphere.

A wire 10m long has a cross-sectional area 1.25×10^{-4} m². It is subjected to a load of 5 kg. If Young's modulus of material is 4×10^{10} Nm^{-2}, calculate the elongation produced in the wire. Take g = 10 ms^{-2}

Calculate the energy of the (i) Moon orbiting the earth and (ii) Earth orbiting the sun (Given : $M_E = 6.02 \times 10^{24}$ kg, $M_m = 7.35 \times 10^{22}$ kg, $R_m = 3.84 \times 10^5$ km, $G = 6.67 \times 10^{-11}$ Nm²Kg^{-2}.

Define Poisson's ratio.

A wire of length 2m with the area of cross - section 10^{5}m² is used to suspend a load of 980 N. Calculate i) the stress developed in the wire ii) the strain and iii) the energy stored.

(Given Y = 12×10^{10}Nm^{-2}.)

An unknown planet orbits the sun with distance twice the semi major axis distance of the Earth's orbit. If the Earth's time period is T_1, what is the time period of this unknown planet?


Two pistons of a hydraulic lift have diameters of 60 cm and 5 cm. What is the force exerted by the larger piston when 50 N is placed on the smaller piston ?

A cyclist while negotiating a circular path with speed 20 mS^{-1} is found to bend an angle by 30° with vertical. What is the radius of the circular path? (given g = 10mS^{-2})

Suppose we go 200 km above and below the surface of the Earth, what are the g values at these two points? In which case, is the value of g small?

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A object is thrown with initial speed 5ms⁻¹ with an angle of projection 30°. What is the height reached by the particle?

The force 50 N is acting on the mass 20 kg as shown in the diagram. Find the acceleration of the object along x and y direction.,
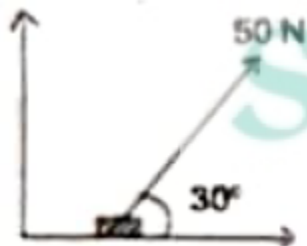
A solid sphere has a radius of 1.5 cm and the mass of 0.038 kg. Calculate the specific gravity of the sphere.

If the length of the simple pendulum is increased by 44% from 'its original length. Calculate the percentage increase in time period of the pendulum.

Calculate the energy consumed in electrical units when a 75w fan is used for 8 hours daily for one month. (30 days)

During a cyclic process, a heat engine absorbs 500J of heat from a hot reservoir, does work and ejects an amount of heat 300J into the surroundings (cold reservoir). Calculate the efficiency of the heat engine.

If the position vector of the particle is given by $\vec{r} = 3t^2\vec{i} + 5t\vec{j} + 4\vec{k}$, find the velocity of the particle at t = 3s.

Jogging every day is good for health. Assume that when you jog a work of 500 KJ is done and 230 KJ of heat is given off. What is the change in internal energy of your body?

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Calculate the energy consumed in electrical units when a 75W fan is used for 8 hours daily for one month (30 days).

A cannot engine whose efficiency is 45% takes heat from a source maintained at a temperature of 327^0C. To have an engine of efficiency 60% what must be the intake temperature for the same exhaust (Sink) Temperature?

In a horizontal pipe of non-uniform cross section, water flows with a velocity of 1 ms^{-1} when the diameter of the pipe is 20 cm. The velocity of water is 1.5 ms^{-1}, find the diameter of the pipe.

An object at an angle such that the horizontal range is 4 times of the maximum height. What is the angle of porjection of the object.

Check whether the following vectors are orthogonal. $A = 2\hat{i} + 3\hat{j}$, $\vec{B} = 4\hat{i} - 5\hat{j}$

During a cyclic process a heat engine absorbs 500 J of heat from a hot reservoir. Does work and ejects an amount of heat 300 J into surroundings (cold reservoir). Calculate the efficiency of the heat engine.

Calculate the energy consumed in electrical units when a 75W fan is used for 8 hours daily for one month (30 days).

Consider a circular leveled road of radius 10m having coefficient of static friction 0.81. Three cars (A, B and C) are travelling with speed 7 ms^{-1}, 8 ms^{-1}, 10 ms^1 respectively. Which car will skid when it moves in the circular level road? (g = 10 ms^{-2})

Check whether the following vectors are orthogonal

$A = 2\hat{i} + 3\hat{j}$ and $B = 4\hat{i} - 5\hat{j}$

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If excess pressure is balanced by a column of oil (with specific gravity 0.8) 4 mm high, where $R = 2.0\ cm$, find the surface tension of the soap bubble.

A body executing SHM, has velocity $4.4\ ms^{-1}$ and amplitude 7 mm, calculate its time period of oscillation.

Pressure gauge attached to a tube closed with lid shows $5 \times 10^5\ Nm^{-2}$. When the lid is opened, the pressure gauge shows $4.5 \times 10^5\ Nm^{-2}$. Calculate the velocity of flow of water.

If the length of the simple pendulum is increased by 44% from its original length, calculate the percentage increase in time period of the pendulum.

. A farce of $\left(4\hat{i} - 3\hat{j} + 5\hat{k}\right)$ N is applied at paint whose position vector is $\left(7\hat{i} + 4\hat{j} - 2\hat{k}\right)$ M. Find the torque of force about the origin.

An object at an angle such that the horizontal range is 4 times of the maximum height? What is the angle of projection of the object?

If excess pressure is balanced by a column of oil (with specific gravity 0.8) 4mm high, where $R = 2.0\ cm$. Find the surface tension of the soap bubble.

A metal plate of area $2.5 \times 10^{-4}\ m2$ is placed on a 0.25×10^{-3} m thick layer of castor oil. If a force of 2.5 N is needed to move the plate with a velocity 3×10^{-2} m s-1, calculate the coefficient of viscosity of castor oil.

State Newton's three laws and discus their significance.
Calculate the work done by a force of 30 N in lifting a load of 2 kg to a height of 10 m. (g=10 ms-2)

Two streamlines cannot cross each other. Why?

Draw the PV diagram for a) Isothermal process   b) Adiabatic process

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10   SS PRITHVI   PRIT-EDUCATION

What are longitudinal waves.
Two objects of masses 2 kg and 4 kg are moving with the same momentum of 20 kg ms^{-1}.
(i) Will they have same kinetic energy?

Part - III

During a cyclic process, a heat engine abords 500J of heat form a hot reservoir, does work and ejects an amount of heat 300J into the surroundings (Cold reservoir). Calculate the efficiency of the heat engine?

A train was moving at the rate of 54Kmh^{-1} when brakes were applied. It came to rest within a distance of 225m. Calculate the retardation produced in the train.

A refrigerator has cop of 3. How much work must be supplied to the refrigerator in order to remove 200 J of heat from its interior?

The resultant of two vectors A and B is perpendicular to vector A and its magnitude is equal to half of the magnitude of vector B. Find the angle between A and B.

A car takes your turn with velocity 50 m/s on the circular road of radius of curvature 10 m. Calculate the centrifugal force experienced by a person a mass 60 kg inside the car?

The radius of the circle 3.12 m. Calculate the area of the circle with regard to signature Figure.

$A = 2i+3j$ then find 3A

The following two forces act on an object of mass 2 kg. Find acceleration of object F1 = 5i+8j+7k and F2 = 3i−4j+3k.

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11 | **SS PRITHVI**   **PRIT-EDUCATION**

A particle moves along the X - axis in such a way that its co-ordinates X varies with time 't' according to equation $x = 2 - 5t + 6t^2$. What is the initial velocity of the particle?

A ball with a velocity of 5 m/s inclined at angle of 60° with the vertical on a smooth horizontal plane. If the coefficient of restitution is 0.5. Find the velocity and direction after the impact.

A train was moving at the rate of 54 km h^{-1} when brakes were applied. It came to rest within a distance of 225 m. Calculate the retardation produced in the train.

Calculate the amplitude, angular frequency, frequency, time period and initial phase for the simple harmonic oscillation $Y = 0.3 \sin (40\pi t + 1.1)$

State perpendicular axis theorem.
Two vectors are given as $\vec{r} = 2i + 3j + 5k$ and $\vec{F} = 3i - 2j + 4k$. Find the resultant vector $\vec{\tau} = \vec{r} \times \vec{F}$.

PART – III

If a clarinet sounds with the frequency 450 HZ. What are the frequencies of the second, third and fourth harmonics of this pitch.

Convert the vector $\vec{r} = 3\hat{i} + 2\hat{j}$ into a unit vector.

A particular of mass 2kg experiences two forces $\vec{F_1} = 5\hat{i} + 8\hat{j} + 7\hat{k}$ and $\vec{F_2} = 3\hat{i} - 4\hat{j} + 3\hat{k}$. What is the acceleration of the particle?

A wire 10m long has a cross-sectional area 1.25×10^{-4} m^2. It is subjected to a load of 5kg. If young's modulus of the material is 4×10^{10} Nm^{-2}, calculate the elongation produced in the wire.

6 x 3 = 18

State and explain work energy principle.

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12   SS PRITHVI   PRIT-EDUCATION

) A wire of length 2m with the area of cross section $10^{-6}m^2$ is used to suspend a load 980N. Calculate (i) Strain (ii) energy stored. Given $y = 12 \times 10^{10}$ Nm^{-2}.

Part - III

) State and explain law of Equipartition of Energy.

i. When walking on ice one should take short steps. Why?

. Differentiate sliding and slipping.

Proove moon has not atmosphere on the units of kinetic theory of gases
(Here k = 1.38×10^{-23} JK^{-1}, T = 273 K)

A water foundation on the ground sprinkles water all around it. If the speed of the water coming out of the foundation is v. Calculate the total area around the founation that gets wet

Check whether the following vectors are orthogonal.
i) $\vec{A} = 2\vec{i} + 3\vec{j}$ and $\vec{B} = 4\vec{i} - 5\vec{j}$ ii) $\vec{c} = 5\vec{i} + 2\vec{j}$ and $\vec{D} = 2\vec{i} - 5\vec{j}$
Define gravitation

Mercury has an angle of contact equal to 140° with soda lime glass. A narrow tube of radius 2mm, made of this glass is dipped in a trough containing Mercury. By what amount does the mercury dip down in the tube relative to be liquid surface outside? Surface tension of Mercury T = 0.456 Nm^{-1}
Density of Mercury P = 13.6×10^3 Kgm^{-3}·

.During a cyclic process, a heat engine absorbs 500 J of heat from a hot reservoir, does work and ejects an amount of heat 300 J into the surrounding (cold reservoir) Calculate the efficiency of the heat engine?

.An object is thrown with initial speed 5 ms^{-1} with an angle of projection 30°. What is the height and range reached by the particle?

State Newton's Universal law of gravitation.

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13   **SS PRITHVI**   **PRIT-EDUCATION**

A hot water cools from $92°C$ to $84°C$ in 3 minutes when the room temperature is $27°C$. How long will it take for it to cool from $65°C$ to $60°C$?

During a cyclic process a heat engine absorbs 500J of heat from a hot reservoir, does work and ejects an amount of heat 300J into the surrounding (cold reservoir) calculate the efficiency of the heat engine?

An object is thrown with initial speed 5ms⁻¹ with an angle of projection 30°. What is the height and range reached by the particle?

Let the two springs A and B be such that $k_A > k_B$. On which spring will more work has to be done if they are stretched by the same force?

Two point masses 3 kg and 5 kg are at 4 m and 8 m from the origin on X-axis. Locate the position of centre of mass of the two point masses from the origin.

A Nurse measured the average heart beats of a patient and reported to the doctor in terms of time period as 0.8 second. Express the heart beat of the patient in terms of number of beats measured per minute.

Suppose we go 200 Km above and below the surface of the earth, What are the 'g' values at these two points ? In which case, is the value of 'g' small ?

Suppose we go 200 Km above and below the surface of the earth, What are the 'g' values at these two points ? In which case, is the value of 'g' small ?

Calculate the amplitude, angular frequency, frequency and time period for the simple harmonic oscillation $y = 0.3 \sin(40\pi t + 1.1)$

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Mercury has an angle of contact equal to 140° with soda lime glass. A narrow tube of radius 2 mm, made of this glass is dipped in a trough containing mercury. By what amount does the mercury dip down in the tube relative to the liquid surface outside? Surface tension of mercury T=0.456 Nm^{-1}. Density of mercury $\rho = 13.6 \times 10^3 kgm^{-3}$

Write the rules for determining significant figures.

Consider two organ pipes of same length in which one organ pipe is closed and another organ pipe is open. If the fundamental frequency of closed pipe is 250 Hz. Calculate the fundamental frequency of the open pipe.

A refrigerator has cop of 3. How much work must be supplied to the refrigerator in order to remove 200 J of heat from its interion?

The resultant of two vectors A and B is perpendicular to vector A and its magnitude is equal to half of the magnitude of vector B. Find the angle between A and B.

A RADAR signal is beamed towards a planet and its echo is received 7 minutes later. If the distance between the planet and the Earth is 6.3×10^{10} m. Calculate the speed of the signal?

During a cyclic process, a heat engine absorbs 500 J of heat from a hot reservior, does work and ejects an amount of heat 300 J into the surrounding (cold reservoir). Calculate the efficiency of heat Engine.

If a stone of mass 0.25kg tied to a string executes uniform circular motion with a speed of 2 m s^{-1} of radius 3m, what is the magnitude of tensional force acting on the stone?

A wire 10 m long has a cross-sectional area 1.25×10^{-4} m^2. It is subjected to a load of 5 kg. If Young's modulus of the material is 4×10^{10} N m^{-2}, calculate the elongation produced in the wire. Take g = 10 ms^{-2}.

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15   SS PRITHVI   PRIT-EDUCATION

PUBLIC   EXAM   COMPULSORY   QUESTIONS

Consider a lamp (with holder) of mass 50 g (shown in the figure) Draw free body diagram and compute the tension in the string. (assume lamp with holder as a point mass)

Consider a system of two identical particles having mass m. If one of the particles of mass m is pushed towards the center of mass of the particles through a distance x, by what amount the other particle should move so as to keep the center of mass of particles at the original position?

. The speed of a wave in a certain medium is 900 m/s. If 3000 waves passes over a certain point of the medium in 2 minutes, the compute its wavelength.

An unknown planet orbits the sun with distance twice the semi major axis distance of the Earth's orbit.   If the Earth's time period is T_1, what is the time period of this unknown planet?

What is the angle of projection to have a maximum range in 'kitti pull'? If one strikes kitti pull with of 98ms⁻¹ what is the maximum range achieved?

A box is pulled with a force of 25 N to produce a displacement of 15 m. If the angle between the force and displacement is 30⁰, find the work done by the force?

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Water in a bucket tied with rope whirled around in a vertical circle of radius 0.5 m. Calculate the minimum velocity at the lowest point so that the water does no spill form it in the course of motiion. (g = 10ms⁻·)

The position vectors of two point masses 10kg and 5 kg are $(-3\vec{i}+2\vec{j}+4\vec{k})$ and $(3\vec{i}+6\vec{j}+5\vec{k})$ m respectively. Locate the position of center mass.

Calculate the work done by a force of 30N in lifting a load of 2kg to a height of 10m (g = 10ms⁻²).

The position vectors of two point masses 10 kg and 5 kg are $(3\hat{i}+2\hat{j}+4\hat{k})$m, and $(3\hat{i}+6\hat{j}+5\hat{k})$m respectively. Locate the position of center of mass.

Two pistons of a hydraulic lift have diameters of 60 cm and 5 cm. What is the force exerted by the larger piston when 50 N is placed on the smaller piston ?

The surface tension of a soap solution is 0.03 Nm⁻¹. How much work is done in producing soap bubble of radius 0.05 m?

Two waves of wavelength 99 cm and 100 cm both travelling with the velocity of 396 ms⁻¹ are made to interfere. Calculate the number of beats produced by them per sec.

A particle executing SHM, covers a displacement of half of amplitude in one second. Calculate its time period.

A child is playing on a sliding board. If he is sliding down :
(a)   Mention the forces acting on the child.
(b)   Draw FBD (Free Body Diagram).
(c)   Write the force equation.

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17   **SS PRITHVI**   **PRIT-EDUCATION**

If the length of the simple pendulum is increased by 44% from its original length, calculate the percentage increase in time period of the pendulum.

A force of $(4\hat{i} - 3\hat{j} + 5\hat{k})$ N is applied at a point whose position vector is $(7\hat{i} + 4\hat{j} - 2\hat{k})$m. Find the torque of force about the origin.

Calculate the energy consumed in electrical units when a 75 W fan is used for 8 hours daily for one month (30 days).

If excess pressure is balanced by a column of oil with specific gravity 0.8, 4 mm high, where R=2.0 cm, find the surface tension of the soap bubble.

A particle moves along the x-axis in such a way that its coordinates x varies with time 't' according to equation $x=2-5t+6t^2$. What is the initial velocity of the particle?

A person docs 30 kJ work on 2 kg of water by stirring using a paddle wheel. While stirring, around 5 kcal of heat is released from water through its container to the surface and surroundings by thermal conduction and radiation. What is the change in internal energy of the system?

Consider two trains A and B moving along parallel tracks with same velocity in the ame direction. Let the velocity of each train be 50 km / hr due east. Calculate the relative velocities of the trains.

During a cyclic process, a heat engine absorbs 500 J of heat from a hot reservoir, does work and ejects an amount of heat 300 J into the surroundings (cold reservoir). Calculate the efficiency of the heat engine

Two objects of masses 3 kg and 6 kg are moving with the same momentum of 30 kgms^{-1}. Will they have same kinetic energy ?

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During a cyclic process, a heat engine absorbs 600 J of heat from a hot reservoir, does work and ejects an amount of heat 200 J into the surroundings (cold reservoir). Calculate the efficiency of the heat engine.

A fly wheel rotates with a uniform angular acceleration. If its angular velocity increases from 20π rad/s to 40π rad/s in 10 seconds, find the number of rotations in that period.

Ten particles are moving at the speed of 2, 3, 4, 5, 5, 5, 6, 6, 7 and 9 ms^{-1}. Calculate root mean square speed (V_{rms}) and most probable speed (V_{mp}).

ALL THE BEST !!

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