PHYSICS

BOOKS - FULL MARKS PHYSICS (TAMIL ENGLISH)

SAMPLE PAPER - 9

Part I

1. In some region, the gravitational field is zero. The gravitational potential in this region

is

A. a variable

B. a constant

C. zero

D. can't be zero

Answer: B

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2. Find the angle between the vectors

$2\hat{i} + 3\hat{j} - 6\hat{k}$ and $6\hat{i} - 3\hat{j} + 2\hat{k}$

A. 0°

B. 30°

C. 60°

D. 90°

Answer: D

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3. A stretched rubber has:

A. increased kinetic energy

B. increased potential energy

C. decreased kinetik energy

D. decreased potential energy

Answer: B

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4. The direction of angular velocity vector is along:

A. the tangent to the circular path

B. the inward radius

C. the outward radius

D. the axis of rotation

Answer: D

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5. For a satellite moving in an orbit around the earth, the ratio of kinetic energy of potential

A. $\frac{1}{2}$

B. $\frac{1}{\sqrt{2}}$

C. 2

D. $\sqrt{2}$

Answer: A

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6. If the linear momentum of the object is inceaseby by 0.01% the the kinetic energy is increased by

A. 0.0001

B. 0.0002

C. 0.0004

D. 0.0001

Answer: C

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7. A block of mass 4 kg is suspended through two light spring balances A and B. Then A and B will read respectively .

A. 4 kg and 0 kg

B. 0 kg and 4 kg

C. 4 kg and 4 kg

D. 2kg and 2 kg

Answer: C

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8. At the same temperature, the mean kinetic energies of molecules of hydrogen and oxygen are in the ratio of .....

A. $1:1$

B. $1:16$

C. $8:1$

D. $16:1$

Answer: A

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9. A uniform rope having mass m hangs vertically from a rigid support. A tranverse wave pulse is produced at the lower end. Which of the following plots shows the correct variation of speed v with height h from the lower end ?

A. 

B. 

C. 

D. 

Answer: D

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10. In a simple harmonic oscillation, the acceleration against displacement for one complete oscillation will be.

A. an ellipse

B. a circle

C. a parabola

D. a straight line

Answer: D

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11. In an explosion, a body breaks up into two pieces of unequal masses. In this case which one of the following statements is correct?

A. $3v\cos\theta$

B. $2v\cos\theta$

C. $\frac{3}{2}v\cos\theta$

D. $\frac{\sqrt{3}}{2}v\cos\theta$

Answer: A

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12. In which process, the p - v indicator diagram is a straight line parallel to volume axis?

A. Isothermal

B. adiabatic

C. Isobaric

D. Irreversible

Answer: C

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13. For a liquid to rise in capillary tube, the angle of contact should be .....

A. acute

B. obtuse

C. right

D. none of these

Answer: A

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14. The increase in internal energy of a system is equal to the workdone on the system. The process does the system undergoes is .....

A. isochoric

B. adiabatic

C. isobaric

D. isothermal

Answer: B

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15. The change in frequency due to Doppler effect does not depend on .....

A. the speed of the source

B. the speed of the observer

C. the frequency of the source

D. separation between the source and the observer

Answer: D

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Part Ii

1. What are the advantages of SI system?

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2. Determine whether the given points are collinear.

$P(1, 2), Q\left(2, \frac{8}{5}\right), R\left(3, \frac{6}{5}\right)$

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3. Find out the workdone required to extract water from the well of depth 20 m. Weight of water and backet is 2.8 kg wt

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4. Is a single isolated force possible in nature.

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5. State the factors on which the moment of inertia of a body depends.

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6. If a drop of water falls on a very hot iron, it takes long time to evaporate. Explain why?

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7. Define the gravitational field. Give its unit.

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8. Why dimensional methods are applicable only up to three quantities?

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9. Why does a porter bend forward while carrying a sack of rice on his back ?

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Part Iii

1. Explain the variation of 'g' with latitude.

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2. Can you associate a vector with (a) the length of a wire bent into a loop (b) a plane area (c) a sphere.

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3. What is smelting ? Explain the process with example.

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4. A light body and a heavy body have the same kinetic energy. Which one will have greater momentum?

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5. Three particles of masses $m_1 = 1kg, m_2 = 2kg$ and $m_2 = 3kg$ are placed at the corners of an equilateral triangle of side 1m as shown in Figure. Find the position of center of mass.

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6. Define precision and accuracy. Exp,ain with one example.

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7. Derive an expression for total acceleration in the non uniform circular motion.

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8. Calculate the value of adiabatic exponent for monoatomic molecule.

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9. At what temperature will the rms speed of oxygen molecules become just sufficient for escaping from the Earth's atmosphere? (Mass of oxygen molecules $(m) = 2.76 \times 10^{-26}$ kg Boltzmann's constant $(k_B) = 1.38 \times 10^{-23} JK^{-1}$)

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Part Iv

1. State Kepler's law of period in planetory motion.

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2. The distance of planet Jupiter from the sun is 5.2 times that of the earth. Find the period of resolution of Jupiter around the sun.

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3. Explain the propagation of errors in multiplication.

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4. The period of Oscillation of a simple pendulum is recorded as 2.63s, 2.56s, 2.42s ,2.71s and 2.80s respectively. The average absolute error is .....

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5. Explain in detail the triangle law of addition.

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6. State and prove Bernoulli's theorem for a flow of incompressible, non-viscous, and streamlined flow or fluid.

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7. What are the limitations of dimensional analysis?

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8. The escape velocity v of a body depends upon (i) the acceleration due to gravity of the planet and (ii) the radius of the planet R. Establish dimensionally the relationship between v, g and R.

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9. Discuss the laws of transverse vibration in stretched strings.

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10. What is a sonometer? Give its construction and working. Explain how to determine the frequency of tuning fork using sonometer.

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11. To move an object, which one is easier, push or pull? Explain

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12. What is elastic collision ? Derive an expression for final velocities of two bodies which undergo elastic in one dimension.

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13. Prove that at points near the surface of the Earth, the gravitational potential energy of the object is U = mgh.

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14. Derive an expression for Radius of gyration.

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