PHYSICS

BOOKS - FULL MARKS PHYSICS (TAMIL ENGLISH)

EXAMINATION QUESTION PAPER - JUNE 2019

Part I

1. If $\pi = 3.14$, then the value of π^2 is

A. 9.8596

B. 9.86

C. 9.86

D. 9.9

Answer: C

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2. If an object is thrown vertically up with initial speed u from the ground, then the time

taken by the object to return back to ground is

A. $\frac{u^2}{2g}$

B. $\frac{u^2}{g}$

C. $\frac{u}{2g}$

D. $\frac{2u}{g}$

Answer: D

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3. If the position vector of a particle is given by $\overrightarrow{r} = 5t^2\hat{i} + 7t\hat{j} + 4\hat{k}$, then its velocity lies in:

A. X-Z plane

B. X-Y plane

C. along Y-direction

D. along X- direction

Answer: B

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4. Force acting on the particle moving with constant speed is

A. always zero

B. need not be zero

C. always non-zero

D. cannot be concluded

Answer: A

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5. Force

A. viscous force

B. surface tension

C. centrifugal force

D. cannot be concluded

Answer: C

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6. What is the minimum velocity with a body of mass m must enter a vertical loop of radius R so that it can complete the loop ?

A. $\sqrt{2gR}$

B. $\sqrt{3gR}$

C. $\sqrt{5gR}$

D. $\sqrt{gR}$

Answer: C

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7. A rigid body rotates with an angular momentum L. If its kinetic energy is halved, the angular momentum becomes,

A. L

B. $\frac{L}{2}$

C. 2L

D. $\frac{L}{\sqrt{2}}$

Answer: D

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8. A drum of radius R and mass M, rolls down without slipping along an inclined plane of angle θ. The frictional force:

A. decreases the rotational and transnational motion

B. dissipates kinetic energy as heat

C. converts transnational energy into rotational energy

D. decreases the rotational motion

Answer: C

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9. If R is the radius of the Earth and g is the acceleration due to gravity on the Earth's surface. Find the mean density of the Earth.

A. R

B. $\frac{R}{4}$

C. 2R

D. $\frac{R}{2}$

Answer: D

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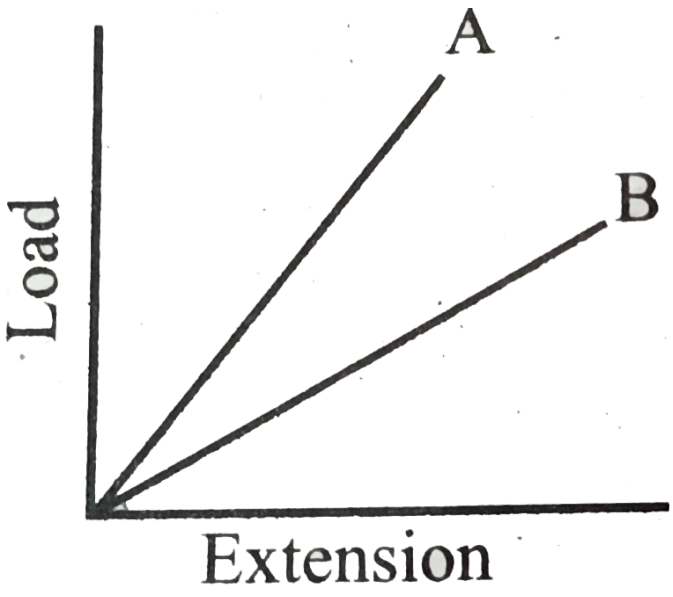
10. If two wires have same dimension but of different materials, the graph between load and extension is as follow, then which of the

following is true:



A. $Y_B = Y_A$

B. $Y_B < Y_A$

C. $Y_B > Y_A$

D. $Y_B = Y_A = 0$

Answer: C

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11. The wettability of a surface by a liquid depends primarily on

A. viscosity

B. surface tension

C. density

D. angle of contact between the surface and the liquid

Answer: D

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12. The efficiency of a heat engine working between $27^\circ C$ and $127^\circ C$ is:

A. $50\ \%$

B. $25\ \%$

C. $12.5\ \%$

D. $75\ \%$

Answer: B

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13. The ratio $\gamma = \frac{C_P}{C_V}$ for a gas mixture consisting of 8 g of helium and 16 g of oxygen is

A. $\frac{23}{15}$

B. $\frac{15}{23}$

C. $\frac{27}{11}$

D. $\frac{17}{27}$

Answer: C

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14. 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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15. A person standing between two parallel hills fires a gun and hears the first echo after

t_1 sec and the second echo after t_2 sec. The distance between the two hills is

A. $\frac{v(t_1 - t_2)}{2}$

B. $\frac{v(t_1 t_2)}{2(t_1 + t_2)}$

C. $v(t_1 + t_2)$

D. $\frac{v}{2}(t_1 + t_2)$

Answer: D

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Part Ii

1. Check the following equation by dimensional analysis method: $E = mc^2$

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2. What is the difference between scalar and vector? Give examples.

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3. Define Lami's theorem.

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4. Define centre of gravity.

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5. An electron moving with velocity 2.2×10^6 m/s, revolving in circular orbit of radius 0.53 Å. Calculate its angular velocity.

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6. What is Reynold's number ? Give its significance.

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7. Define specific heat capacity

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8. Define Root mean square speed .

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

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Part Iii

1. What are the limitations of dimensional analysis?

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2. Find the maximum speed at which a car can turn round a curve of 36 m radius on a level road. Given the coefficient of friction between the tyre and the road is 0.53.

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3. Give the difference between elastic and inelastic collision.

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4. The position vectors particle has length 1m and makes 30° with the x-axis. What are the lengths of the x and y components of the position vector?

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5. State Kepler's three laws.

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6. What are the factors affecting the surface tension of a liquid?

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7. Define the term degrees of freedom.

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8. Select the correct pair stating has applications of reflection of sound waves.

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9. 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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Part Iv

1. Explain in detail the triangle law of addition.

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2. Explain in detail the four different types of oscillations.

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3. Explain the motion of blocks connected by a string in (i) vertical motion (ii) horizontal motion .

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4. What are stationary waves? write down the characteristics of stationary waves.

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5. Derive the expression for moment of inerita of a uniform disc about an axis passing through the centre and perpendicular to the plane.

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6. Ideal gas equation for n mole of gas

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7. Derive an expression for escape speed.

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8. Explain the different types of modulus of elasticity.

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9. Two objects of masses 2 kg and 4 kg are moving with the same momentum of 20 kg ms

(a) Will they have some kinetic energy!

(b) Will they have same speed?

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10. In a series of successive measurements in an experiment, the readings of the period of oscillation of a simple pendulum were found to be 2.63s, 2.56s, 2.42, 2.71s and 2.80 s`. Calculate

(i) the mean value of the period of oscillation

(ii) the absolute error in eah measurement

(iii) The men absolute error (iv) the relative error (v) the percentage error. Expresss the results in proper form.

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