



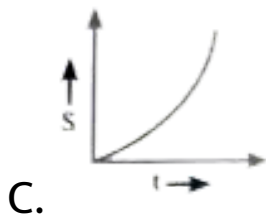
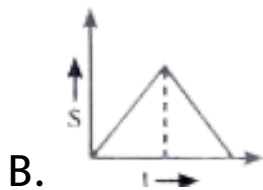
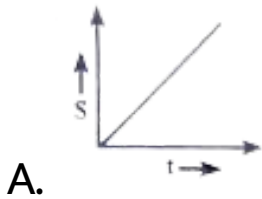
# PHYSICS

## BOOKS - FULL MARKS PHYSICS (TAMIL ENGLISH)

### EXAMINATION QUESTION PAPER MARCH 2019

**Part I**

1. Which graph pertains to uniform acceleration .



**Answer: C**



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2. A body of mass  $5kg$  is thrown up vertically with a kinetic energy of  $1000J$ . If acceleration due to gravity is  $10ms^{-2}$ , find the height at which the kinetic energy becomes half of the original value.

A. 10m

B. 20 m

C. 50 m

D. 100 m

**Answer: A**



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**3.** The process in which heat transfer is by actual movement of molecules in fluids such as liquids and gases is called :

A. Thermal conductivity

B. Convection

C. Conduction

D. Radiation

**Answer: B**



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4. If the temperature of the wire is increased, then the Young's modulus will

A. increase rapidly

B. increase by very small amount

C. remain the same

D. decrease

**Answer: D**



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5. The amplitude and time period of a simple pendulum bob are  $0.05m$  and  $2s$  respectively.

Then the maximum velocity of the bob is :

A.  $0.157ms^{-1}$

B.  $0.257ms^{-1}$

C.  $0.10ms^{-1}$

D.  $0.025ms^{-1}$

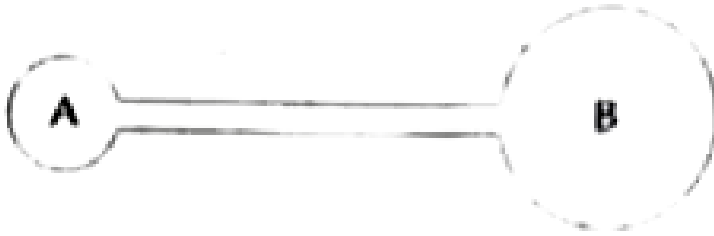
**Answer: A**



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6. There is a small bubble at one end and bigger bubble at other end of a pipe. Which

among the following will happen?



- A. remains in equilibrium
- B. smaller will grow until they collapse
- C. bigger will grow until they collapse
- D. none of the above

**Answer: B**



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7. A closed cylindrical container is partially filled with water. As the container rotates in a horizontal plane about a perpendicular bisector, its moment of inertia.

- A. remains constant
- B. depends on the direction of rotation
- C. increases
- D. decreases

**Answer: C**



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8. Which of the following represents a wave?

A.  $\frac{1}{1 + vt}$

B.  $\sin(x + vt)$

C.  $(x - vt)^3$

D.  $x(x + vt)$

**Answer: B**



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9. Which of the following pairs of physical quantities have same dimension?

A. Torque and Power

B. Force and Torque

C. Force and Torque

D. Torque and Energy

**Answer: D**



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10. If the internal energy of an ideal gas  $U$  and volume  $V$  are doubled, then the pressure of the gas :

A. halves

B. quadruples

C. doubles

D. remains same

**Answer: D**



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

A. 2

B.  $\sqrt{2}$

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

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

**Answer: C**



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12. A refrigerator has COP of 3 . How much work must be supplied to a refrigerator in order to remove  $200J$  of heat from its interior?

A. 33.33 J

B. 44.44 J

C. 66.66 J

D. 50 J

**Answer: C**



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13. If the linear momentum of the object is increased by  $0.1\%$ , then the kinetic energy is increased by :

A. 0.004

B. 0.0001

C. 0.001

D. 0.002

**Answer: D**



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14. What is the angular displacement made by a particle after  $5s$ , when it starts from rest with an angular acceleration  $0.2$  and  $s^{-2}$  ?

A.  $4\text{rad}$

B.  $1\text{ rad}$

C.  $2.5\text{ rad}$

D.  $5\text{ rad}$

**Answer: C**





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15. In an isohoric process, find which is relevant among the following :

A.  $\Delta U$

B.  $\Delta T = 0$

C.  $W = 0$

D.  $Q = 0$

**Answer: C**



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## Part II

1. Write any two errors of systematic errors.  
Explain them.



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2. What is projectile ? Give it's examplees.



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3. State newton's second law



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4. A car takes a turn with velocity  $50 \text{ ms}^{-1}$  on the circular road of radius of curvature 10 m. Calculate the centrifugal force experienced by a person of mass 60 kg inside the car?



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5. Why is it more difficult to revolve a stone tied to a longer string than a stone tied to a shorter string ?



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6. State Stefan-Boltzmann law.



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7. What are the factors which effect Brownian motion?



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8. "Soldiers are not allowed to march on a bridge". Give reason.



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9. The surface tension of a soap solution is  $0.03Nm^{-1}$  . How much work is done in producing soap bubble of radius  $0.05m$  ?



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## Part Iii

1. What is the torque of the force  $\vec{F} = 3\hat{i} - 2\hat{j} + 4\hat{k}$  acting at a point  $\vec{r} = 2\hat{i} + 3\hat{j} + 5\hat{k}$  about the origin?



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2. Explain various types of friction suggest a few methods to reduce friction



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3. A heavy body and a light body have same momentum. Which one of them has more kinetic energy and why?



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4. Find the rotational kinetic energy of a ring of mass 9 kg and radius 3 m rotating with 240 rpm about an axis passing through its centre and perpendicular to its plane.



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5. What do you mean by the term weightlessness ? Explain the state of weightlessness of a freely falling body.



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6. Derive an expression for the terminal velocity of a sphere falling through a viscous liquid.



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7. Explain linear expansion of solid.



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8. Write down the postulates of kinetic theory of gases.



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9. Two waves of wavelength  $99\text{cm}$  and  $100\text{cm}$  both travelling with the velocity of  $396\text{m s}^{-1}$  are made to interfere. Calculate the number of beats produced  $b$  then per sec.



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1. The force  $F$  acting on a body moving in a circular path depends on mass of the body ( $m$ ) velocity( $v$ ) and radius ( $r$ ) of the circular path. Obtain the expression for the force by dimensional analysis method ( $k = 1$ )



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2. State and prove Bernoulli's theorem for a flow of incompressible, non-viscous, and

streamlined flow or fluid.



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**3.** Prove the law of conservation of linear momentum use it to find the recoil velocity of a gun when a bullet is fired from it



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**4.** State and prove parallel axis theorem



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



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6. How will you determine the velocity of sound using resonance air column apparatus ?



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7. Derive Mayer's relation for an ideal gas.



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8. Explain the horizontal oscillations of a spring.



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9. Write down the equation of a freely falling body under gravity.





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**10.** Define orbital velocity and establish an expression for it.



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