

HIGHER SECONDARY FIRST YEAR



GOVT. MODEL QUESTION PAPER

XI - STANDARD

PHYSICS

Time Allowed: 2.30 hrs Max. Marks: 70

Instructions:

- 1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.
- 2) Use Blue or Black ink to write and underline and pencil to draw diagrams.

PART - I

Note: (i) Answer all the questions.

 $15 \times 1 = 15$

- (ii) Choose the most appropriate answer from the given four alternatives and write the option code with the corresponding answer.
- What is the angular displacement made by a particle after 5 s, when it starts from rest with an angular acceleration 0.2 rad s⁻²?

a) 4 rad

b) 1 rad

c) 2.5 rad

d) 5 rad

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

b) Convection

c) Conduction

d) Radiation

a) Thermal conductivity

3.	Which of the following p the same dimensions?	airs of physical quantities have
	a) Torque and Power	b) Force and Torque
	c) Force and Power	d) Torque and Energy
4.	For a satellite moving in ratio of kinetic energy to poor a) 2	an orbit around the earth, the tential energy is b) $\sqrt{2}$
	c) $\frac{1}{2}$	d) $\frac{1}{\sqrt{2}}$
5.		at one end and bigger bubble
		Which among the following will
	happen?	B)
	a) remains in equilibrium	
	b) smaller will grow until t	hey collapse
	c) bigger will grow until th	ey collapse
	d) none of the above	
6.	<u> </u>	of 3. How much work must be in order to remove 200 J of heat
	a) 33.33 J	b) 44.44 J
	c) 66.67 J	d) 50 J
7.	If the temperature of the Young's Modulus will	he wire is increased, then the
	a) increase rapidly	
	b) increase by very small a	mount
	c) remain the same	
	d) decrease	
8.	If the internal energy of a doubled, then the pressur	an ideal gas U and volume V are re of the gas

a) halves

b) quadruples

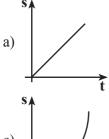
c) doubles

- d) remains same
- 9. A body of mass 5 kg is thrown up vertically with kinetic energy of 1000J. If acceleration due to gravity is 10 ms⁻², find the height at which the kinetic energy becomes half of the original value.
 - a) 10 m

b) 20 m

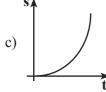
c) 50 m

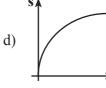
- d) 100 m
- 10. Which graph represents uniform acceleration?











- 11. In an isochoric process, find which is relevant among the following:
 - a) $\Delta U = 0$

b) $\Delta T = 0$

c) W = 0

- d) O = 0
- 12. 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) 0.157 ms⁻¹

b) 0.257 ms⁻¹

c) 0.10 ms⁻¹

- d) 0.025 ms⁻¹
- 13. A closed cylindrical container is partially filled with water. As the container rotates in a horizontal plane about a perpendicular bisector, its moment of intertia

- a) remains constant
- b) depends on the director of rotation
- c) increases
- d) decreases
- 14. Which of the following represents a wave?
 - a) $\frac{1}{x+vt}$

b) $\sin(x+vt)$

c) $(x-vt)^3$

- d) x(x+vt)
- 15. If the linear momentum of the object is increased by 0.1%, then the kinetic energy is increased by
 - a) 0.4%

b) 0.01%

c) 0.1%

d) 0.2%

PART - II

Answer any six questions and Q. No. 24 is compulsory.

 $6 \times 2 = 12$

- 16. Write any two errors of systematic errors. Explain them.
- 17. What is projectile? Give two examples.
- 18. State Newton's Second Law of Motion.
- 19. A car takes a turn with the velocity 50 ms⁻¹ on a circular road of radius of curvature 10 m. Calculate the centrifugal force experienced by a person of mass 60 kg inside the car.
- 20. Why is it more difficult to revolve a stone tied to a longer string than a stone tied to a shorter string?
- 21. State Stefan Boltzmann Law and write its expression.
- 22. List the factors affecting Brownian motion.
- 23. "Soldiers are not allowed to march on a bridge". Give reason.
- 24. 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?

PART - III

Answer any six questions and question No. 33 is compulsory. $6\times3=18$

- 25. 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?
- 26. What are the various types of friction? Suggest few methods to reduce friction.
- 27. A heavy body and a light body have same momentum. Which one of them has more kinetic energy and why?
- 28. 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.
- 29. What do you mean by the term weightlessness? Explain the state of weightlessness of a freely falling body.
- 30. Derive an expression for the terminal velocity of a sphere falling through a viscous liquid.
- 31. Explain linear expansion of solid.
- 32. Write down any six postulates of kinetic theory of gases.
- 33. Two waves of wavelength 99 cm and 100 cm both travelling with the velocity of 396 ms⁻¹ are made of interfere. Calculate the number of beats produced by them per sec.

PART - IV

Answer all the questions.

 $5\times5=25$

34. a) Explain the principle of homogenity of dimensions and derive an expression for the force F acting on a body moving in a circular path depending on the mass of the body (m), velocity (v) and radius (r) of the circular path. Obtain the expression for the force by the dimensional analysis method (take the value k = 1).

(OR)

- b) State and prove Bernoulli's Theorem for a flow of incompressible, non-viscous and streamlined flow of liquid.
- 35. a) Prove the law conservation of momentum. Use it to find the recoil velocity of a gun when a bullet is fired from it.

(OR)

- b) State and prove parallel axes theorem.
- 36. a) What is elastic collision? Derive an expression for final velocities of two bodies which undergo elastic collision in one dimension.

(OR)

- b) How will you determine the velocity of sound using resonance air column apparatus?
- 37. a) Derive Mayer's relation for an ideal gas.

(OR)

- b) Explain the horizontal oscillations of a spring.
- 38. a) (i) Write down the equation of a freely falling body under gravity.
 - (ii) A ball is thrown vertically upwards with the speed of 19.6 ms⁻¹ from the top of a building and reaches the earth in 6 s. Find the height of the building.

(OR)

- b) (i) Define orbital velocity and establish an expression for it.
 - (ii) Calculate the value of orbital velocity for an artificial satellite of earth orbiting at a height of 1000 km (Mass of the earth = $6 \times 10^{24} \text{ kg}$ radius of the earth = 6400 km).

MODEL QUESTION PAPER - 1

XI - STANDARD

PHYSICS

Time Allowed: 3 hrs Max Marks: 70

Instructions:

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- Use Blue or Black ink to write and underline and pencil to 2) draw diagrams.

PART - I

Note: (i) Answer all the questions.

 $15 \times 1 = 15$

- (ii) Choose the most appropriate answer from the given four alternatives and write the option code with the corresponding answer.
- The dimension of $(\mu_0 \varepsilon_0)^{-1/2}$ is _____ 1.
 - a) length

b) time

c) velocity

- d) force
- A particle is in circular motion with an acceleration α = 2. 0.2 rad s⁻², What is the angular displacement made by the particle after 5s?
 - a) 2.5 rad

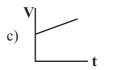
b) 25 rad

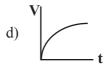
c) 250 rad

- d) 2500 rad
- An object is dropped from rest. Its v-t graph is: 3.









The work done by the conservative force for a closed path 4.

a) always negative

b) always positive

c) zero

- d) not defined
- Find the maximum speed at which a car can turn round a 5. curve of 36 m radius on a level road. Given the coefficient of friction between the tyre and the road is 0.53.
 - a) 26.81 m/s

b) 1.381 m/s

c) 133.8 m/s

- d) 13.81 m/s
- 6. Which of the following is not a scalar?
 - a) Viscosity

b) Surface tension

c) Pressure

- d) Stress
- 7. Choose the correct statement from the following:
 - a) Centrifugal and centripetal force are action reaction pair
 - b) Centripetal force is a natural force.
 - c) Centripetal force acts towards centre and centrifugal appears to act away from the centre in a circular motion.
 - d) Centripetal force acts towards centre and centrifugal force appears to act away from the centre in a circular motion.
- 8. When a ballet dancer folds her arms:
 - a) angular velocity and moment of inertia decreases
 - b) angular velocity and moment of inertial increases
 - c) angular velocity decreases and moment of inertia increases
 - d) angular velocity increases and moment of inertial decreases
 - 9. The Linear momentum and position vector of the planet is perpendicular to each other at:
 - a) perihelion and aphelion b) at all points

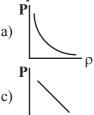
c)	only	at	perihe	lion

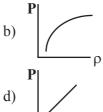
- d) at no point
- 10. When a cycle tyre suddenly bursts, the air inside the tyre expands. This process is called
 - a) isobaric

b) isochoric

c) adiabatic

- d) isothermal
- 11. Which of the following shows the correct relationship between pressure and density of an ideal gas at constant temperature?





- 12. Which one of the following represents simple harmonic motion?
 - a) acceleration=kx
- b) acceleration= $k_0x+k_1x^2$
- c) acceleration=-k(x+a)
- d) acceleration =k(x+a)
- 13. Which of the following represents a wave?
 - a) $(x-vt)^3$ c) $\frac{1}{x+vt}$

b) x(x+vt)

- d) $\sin(x+vt)$
- 14. The wavelength of a sine wave is $\lambda=1$ m. Calculate the wave number.
 - a) 62.8 rad m⁻¹

b) 6.28 rad m⁻¹

c) 628.0 rad m⁻¹

- d) 0.628 rad m⁻¹
- 15. The waves produced by a motor boat sailing in water are:
 - a) Transverse
 - b) Longitudinal
 - c) Stationary
 - d) Longitudinal and Transverse

PART - II

Answer any six questions and question No. 24 is compulsory. $6\times2=12$

- 16. State the Principle of Homogeneity of Dimensions.
- 17. A particle moves along the x-axis in such a way that its coordinates x-varies with time 't' according to the equation $x=2-5t+6^2$. What is the initial velocity of the particle?
- 18. State Newton's II Law of Motion.
- 19. Define center of gravity.
- 20. Write any two difference between transverse and longitudinal waves.
- 21. If Earth has no tilt, what happens to the seasons of Earth?
- 22. What are the factors affecting Brownian Motion?
- 23. Which one of these is more elastic, steel or rubber? Why?
- 24. If the length of the simple pendulum is increased by μ G% from original length calculate the percentage.

PART - III

Answer any six questions and question No. 33 is compulsory. $6\times3=18$

- 25. An oxygen molecule is travelling in air at 300 K and 1 atm, and the diameter of oxygen molecule is 1.2x10⁻¹⁰m. Calculate the mean free path of oxygen molecule.
- 26. How will you measure the diameter of the Moon using parallax method?
- 27. Show that the path of a projectile is a parabola.
- 28. A car takes a turn with velocity 50 ms⁻¹ on the circular road of radius of curvature 10m. Calculate the centrifugal force experienced by a person of mass 60 kg inside the car.
- 29. Which is conserved in inelastic collision? Total energy (or) Kinetic energy-Explain.
- 30. State Kepler's Laws.
- 31. State the laws of transverse vibrations in stretched strings.

- 32. Explain the working of refrigerator.
- 33. 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?

PART - IV

Answer all the questions.

 $5\times5=25$

- 34. a) Obtain an expression for the time period T of a simple pendulum. The time period T depends on:
 - i) mass 'm' of the bob ii) length 'l' of the pendulum and
 - iii) acceleration due to gravity 'g' at the place where the pendulum is suspended. [constant $k=2\pi$]

(OR)

- b) State and prove Parallel Axis Theorem.
- 35. a) Discuss the properties of scalar and vector products

(OR)

- b) Derive an expression for escape speed.
- 36. a) Explain in detail Newton's Law of Cooling.

(OR)

- b) (i) Arrive at an expression for power and velocity. Give some examples for the same.
 - (ii) A vehicle of mass 1250 kg is driven with an acceleration 0.2 ms⁻² along a straight level road against an external resistive force 500 N. Calculate the power delivered by the vehicle's engine if the velocity of the vehicle is 30 ms⁻¹.
- 37. a) State and prove Bernoulli's theorem for a flow of incompressible, non-viscous and stream lined flow of fluid.

(OR)

b) Discuss in detail the energy in simple harmonic motion.

38. a) Describe Newton's formula for velocity of sound waves in air and also discuss the Laplace's correction.

(OR)

b) Obtain an expression for acceleration of a particle moving in an inclined plane.

MODEL QUESTION PAPER - 2

XI - STANDARD

PHYSICS

Time Allowed: 3 hrs Max. Marks: 70

Instructions:

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PART - I

Note: (i) All questions are compulsory.

 $15 \times 1 = 15$

- (ii) Choose the most appropriate answer from the given four alternatives and write the option code with the corresponding answer.
- 1. One of the combination from the fundamental physical constants is hc/G. The unit of this expression is

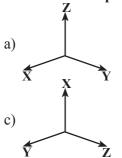
a) kg²

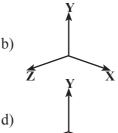
b) m³

c) s⁻¹

d) m

2. Which one of the following Cartesian coordinate system is not followed in physics?





3. When a car take sudden left turn in the cupassengers are pushed towards the right due to		
	a) Inertia of direction	b) Inertia of motion
	c) Inertia of rest	d) absence of inertia
4.	1 kg. The particle disp	$+\hat{j}$) N N acts on a particle of mass places from position $(3\hat{j}+\hat{k})m$ to one by the force on the particle is
	a) 9 J	b) 6 J
	c) 10 J	d) 12 J
5.	The centre of the mass depend upon, a) position of the particle b) relative distance between c) masses of particle d) force acting on particle	een the particles
6.	tuning force, and simult guitar. By keen observa combined sound oscilla	itar by striking a 120 Hz with a caneously plays the 4th string on his tion he hears the amplitude of the string thrice per second. Which of the iting three per second which of the iting three per second the frequency uitar? b) 117 d) 120
7.	•	scillation, the acceleration against complete oscillations will be
	a) an ellipse	b) a circle
	c) a parabola	d) a straight line
8.	Which of the following a given temperature?	gases will have least rms speed at

	a) Hydrogen	b) Nitrogen	
	c) Oxygen	d) CO ₂	
9.	The efficiency of heat engi point and boiling point of	ine working between the freezing f water is	5
	a) 6.25%	b) 20%	
	c) 26.8%	d) 12.5%	
10.	Identify the state variable	es given here?	
	a) Q, T, W	b) P, T, U	
	c) Q, W	d) P, T, Q	
11.	The Young's modulus	for a perfect rigid body is	,
	a) 0	b) 1	
	c) 0.5	d) infinity	
12.	The linear momentum an Perpendicular to each oth	nd position vector of the planet is	5
	a) perihelion and aphelion		
	c) only at perihelion	d) no point	
13.	What is the condition for	water falls from the top of hill to)
	the ground?		
	a) $V_{hill} > V_{ground}$	b) $V_{hill} < V_{ground}$	
	c) $V_{hill} \cong V_{ground}$	$d) V_{hill} = V_{ground}$	
14.			
	a) b)	c) d)	
15.	The SI unit of specific hea	at capacity is,	
	a) $J kg^{-1}K^{-1}$	b) J kg K ⁻¹	
	c) J kg K	d) Jg ⁻¹ K ⁻¹	

PART - II

Answer any six questions and question No. 24 is compulsory. $6\times2=12$

- 16. What are the limitations of dimensional analysis?
- 17. Write a short note on the scalar product between two vectors.
- 18. Why it is not possible to push a car from inside?
- 19. Define the laws of conservation of energy.
- 20. Define couple.
- 21. Calculate the speed of the sound in a steel rod whose Young's modulus y=2x10¹¹ Nm⁻² and P=7800 kgm⁻³.
- 22. Why Moon has no atmosphere?
- 23. State the Second Law of Thermodynamics in terms of entropy.
- 24. A train was moving at the rate of 54 km h⁻¹ where brakes were applied. It came to rest within a distance of 225 m. Calculate the retardation produced in the train.

PART - III

Answer any six questions and question no. 33 is compulsory. $6\times3=18$

- 25. What are geostationary and polar satellites?.
- 26. State the principle and usage of venturimeter.
- 27. Give the expression for the work done by the gas.
- 28. Define Mean Free Path and write down its expression.
- 29. Two vibrating tuning forks produce waves whose equation is given by $y_1 = 5 \sin(240\pi t)$ and $y_2 = 4 \sin(244\pi t)$. Compute the number of beats per second.
- 30. Discuss the simple pendulum in detail.
- 31. Briefly explain the concept of superposition principle.
- 32. State and prove Pascal's law in fluids.
- 33. Calculate the energy of the (i) moon orbiting the earth.
 - ii) Earth orbiting the sun.

PART - IV

Answer all the questions.

 $5\times5=25$

34. a) Discuss the law of transverse vibrations in stretched strings

(OR)

- b) Explain in detail the Maxwell Boltzmann distribution function .
- 35. a) State and prove Bernoulli's theorem for a flow of incompressible Non-Viscous, and streamlined flow of fluid.

(OR)

- b) State and prove Parallel axis theorem.
- 36. a) Explain the need for banking of tracks.

(OR)

- b) Write short note on a) Unit b) Rounding-off c) Dimensionless quantities
- 37. a) Explain in detail the triangle law of addition.

(OR)

- b) State and explain work energy principle.
- 38. a) Derive the time period of satellite orbiting the Earth.

(OR)

b) Derive Meyer's Relation for an ideal gas.

MODEL QUESTION PAPER - 3

XI - STANDARD

PHYSICS

Time Allowed: 3 hrs

Max. Marks: 70

Instructions:

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PART - I

Note: (i) All questions are compulsory.

 $15 \times 1 = 15$

- (ii) Choose the most appropriate answer from the given four alternatives and write the option code with the corresponding answer.
- 1. If the error in the measurement of radius is 2%, then the error in the determination of volume of the sphere will be

a) 8%

b) 2%

c) 4%

d) 6%

2. Identify the unit vector in the following.

a) $\hat{i} + \hat{j}$

b) $\frac{\hat{i}}{\sqrt{2}}$

c) $\hat{k} - \frac{\hat{j}}{\sqrt{2}}$

d) $\frac{\hat{i} + \hat{j}}{\sqrt{2}}$

3. Two masses m_1 and m_2 are representing the same force where $m_1 < m_2$. The ratio of their acceleration $\frac{a_1}{a_2}$ is

a) 1

b) less than 1

c) greater than 1

d) all the three Cases.

a) always negative	b) zero
c) always positive	d) not defined
A Couple produces	,
a) pure rotation	b) pure translation
c) rotation and translation	, .
The time period of a sate orbit in independent ofa) Radius of the orbit b) The mass of the satellite c) Both mass and radius of d) Neither the mass nor the	the orbit
If the wire is stretched then the strain in the wire	to double of its original length, e is
a) 1	b) 2
c) 3	d) 4
The graph between the Charles' law is	e volume and temperature in
a) an ellipse	b) a circle
c) a straight line	d) a parabola
•	
following quantity is zero	h) Average cheed
a) RMS speedc) Average velocity	b) Average speedd) Most Probable speed

_	_	
7	\mathbf{n}	
_		

`	4	_	
a)	1	5	S

b) 6 s

d) 9 s

11. A sound wave whose frequency is 5000 Hz travels in air and then hits the water surface. The ratio of its wavelength in water and air is

a) 4.30

b) 0.23

c) 5.30

- d) 1.23
- 12. The specific heat capacity of human body at 1 atm (20°c) is

a) 3470

b) 900

c) 4186

- d) 840
- 13. The SI unit of molar specific heat capacity is _____

a) J mol⁻¹K⁻¹

b) J kg⁻¹

c) J kg⁻¹k⁻¹

- d) J molk⁻¹
- 14. The moment of Inertia of Ring is equal to, _____

a) $\frac{1}{2}MR^2$

b) MR²

c) $\frac{M}{12}l^2$

- d) $\frac{Ml^2}{2}$
- 15. Determine the value of T from the given vector equation. $5\hat{j} - T\hat{j} = 6\hat{j} + 3T\hat{j}$

a) $T = \frac{1}{2}$

b) $T = \frac{1}{4}$

c) $T = -\frac{1}{4}$

d) $T = \frac{3}{2}$

PART - II

Answer any six questions and question No. 24 is compulsory. $6\times2=12$.

- 16. Write the rules for determining significant figure.
- 17. Define displacement and distance.

- 18. State Newton's second law.
- 19. Define the Coefficient of restitution.
- 20. 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)
- 21. Define center of mass.
- 22. State Newton's Universal Law of Gravitation.
- 23. Define Poisson's ratio.
- 24. A solid sphere has a radius of 1.5 cm and a mass of 0.38 kg. Calculate the specific gravity or relative density of the sphere.

ART - III

Answer any six questions and question No. 33 is compulsory. $6\times3=18$

- 25. Explain the principle of homogeniety if dimensions.
- 26. Explain the concept of precision and accuracy.
- 27. Briefly explain the difference between travelling waves and standing waves.
- 28. Explain resonance. Give an example.
- 29. Write down the postulates of kinetic theory of gases.
- 30. Explain in detail Newton's Law of Cooling.
- 31. Water rises in capillary tube to a height of 2.0 cm, How much will the water rise through another capillary tube whose radius is one-third of the first tube?
- 32. Derive an expression for escape speed.
- 33. Moon is the natural satellite of Earth and it takes 27 days to go once around it orbit. Calculate the distance of the moon from the surface of the Earth assuming the orbit of the moon as circular.

PART - IV

Answer all the questions.

 $5 \times 5 = 25$

34. a) Derive an expression for energy of satellite.

(OR)

- b) Derive an expression for Carnot engine efficiency.
- 35. a) Explain the different types of modulus of elasticity.

(OR)

- b) Explain Horizontal Oscillations of spring.
- 36. a) 'Explain in detail the kinetic interpretation of temperature.

(OR)

- b) Explain the method of finding the Centre of gravity of a irregularly shaped lamina.
- 37. a) Arrive at an expression for power and velocity. Give some examples for the same.

(OR)

- b) Derive the properties of scalar and vector product.
- 38. a) Describe the method of measuring angle of repose.

(OR)

b) Explain in details various types of errors.



MODEL QUESTION PAPER - 4

XI - STANDARD

PHYSICS

Time Allowed: 3 hrs Max. Marks: 70

Instructions:

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PART - I

Note: (i) Answer all the questions.

 $15 \times 1 = 15$

- (ii) Choose the most appropriate answer from the given four alternatives and write the option code with the corresponding answer.
- 1. A planet moving along an elliptical orbit is closest to the sun at distance r_1 and farthest away at a distance of r_2 . If V_1 and V_2 are linear speeds at these point respectively. Then the ratio $\frac{V_1}{V_2}$ is
 - Then the ratio $\frac{{\color{red} v_1}}{{\color{blue} V_2}}$ is _____ b) $\left(\frac{{\color{blue} r_2}}{{\color{blue} r_1}}\right)^2$
 - c) $\frac{\mathbf{r}_1}{\mathbf{r}_2}$ d) $\left(\frac{\mathbf{r}_1}{\mathbf{r}_2}\right)^2$
- 2. For a given material, the rigidity modulus is $\left(\frac{1}{3}\right)^{rd}$ of Young's modulus. Its Poisson's ratio is ______
 - a) 0

b) 0.25

c) 0.3

d) 0.5

3.	When a uniform rod is I quantity of the rod will inc	heated, which of the following crease
	a) Mass	b) Weight
	c) Centre of mass	d) Moment of inertia
4.	depends on	kinetic energy of gas molecules
	a) number of moles and T	b) only on T
	c) P and T	d) Ponly
5.	the Earth is 0.9 m. The le surface of planet x such th	d pendulum on the surface or ength of the same pendulum or eat the acceleration of the plane
	x is n times greater than th	
	a) 0.9 n	b) $\frac{0.9}{n}$ m
	c) $0.9 \text{ n}^2\text{m}$	d) $\frac{0.9}{n^2}$
6.	below 1000 Hz, only four h	nong six harmonic frequencies narmonic frequencies are given and 900 Hz. What are the two from this list? b) 150 Hz, 450 Hz d) 700 Hz, 800 Hz
7.	accuracy is 0.01 m, then measurement is	is measured as 3.51 m, if then the percentage error in the
	a) 351%	b) 1%
	c) 0.28%	d) 0.035%
8.	If π =3.14, then the value of	$f \pi^2 is$
	a) 9.8596	b) 9.860
	c) 9.86	d) 9.9

9. Which of the physical quantities cannot b		s cannot be represented by		
).	scalar?	ititic,	s cannot be represented by	
	a) mass	b)	length	
	c) momentum	d)	magnitude of acceleration	
10.	The centrifugal force appear	ars t	o exist	
	a) only in inertial frames			
	b) only in rotating frame			
	c) in any accelerated frame			
	d) both in inertial and non-in	ertia	l frame	
11.	A body of mass 1 kg is thro	wn i	upwards with a velocity 20	
	ms ⁻¹ . It momentarily comes	to r	est after attaining a height	
	of 18 m. How much energy	is lo	est due to air friction?	
	a) 20 J	b)	30 J	
	c) 40 J	d)	10 J	
12.	A rigid body rotates with an angular momentum L. If its			
kinetic energy is halved, the angular momentum bed				
	a) L	b)	L/2	
	c) 2L	d)	L/2	
13.	The kinetic energy can be	defin	ed in terms of momentum	
	which is given by			
	a) $\frac{P^2}{a}$	b)	$\frac{1}{2m}$	
	2m	U)	2m	
	c) <u>P</u>	d)	<u>P</u>	
14.	2m The vector product of tw	, vo	m octor will have maximum	
17.	magnitude	UVC	ctor win have maximum	
	a) $\sin \theta = 1$	b)	$\cos \theta = i$	
	c) $8m \theta = 0$		$\cos \theta = 0$	
	,)	-	

- 15. The two resistances R_1 =(100±3) Ω , R_2 (150±2) Ω are connected in series. What is this equivalent resistance?
 - a) $R = (250 \pm 5)\Omega$

b) $(240\pm5)\Omega$

c) $(260\pm5) \Omega$

d) $(265\pm5) \Omega$

PART - II

Answer any six questions and question No. 24 is compulsory. $6\times2=12$

- 16. Define acceleration and radian.
- 17. What are inertial frame?
- 18. Define the law of conservation and power.
- 19. Find the dimensions of mass in terms of energy, length and time.
- 20. What are transverse wave give one example.
- 21. Write down the time period of simple pendulum.
- 22. What is the relation between average kinetic energy and pressure?
- 23. What is PV diagram.
- 24. The velocity of a body is given by the equation $v = \frac{b}{t} + ct^2 + dt^3$ Find the dimensional formula for b.

PART – III

Answer any six questions and question No. 33 is compulsory. $6\times3=18$

- 25. If human were to settle on other planets which of the fundamental quantities will be in trouble? Why?
- 26. Calculate the area of the triangle for which two of its sides are given by the vector $\vec{A} = 5\hat{i} 3\hat{j}$, $\vec{B} = 4\hat{i} + 6\hat{j}$
- 27. Briefly explain "rolling friction".
- 28. Write down the various types of potential energy. Explain the formula.

- 29. Derive the equation for moment of inertia of a uniform ring about an axis passing through the center and perpendicular to plane.
- 30. Explain the variation of g with depth from the Earth's surface.
- 31. Explain in detail the thermal expansion.
- 32. Describe the Brownian motion
- 33. A gas is at temperature 80° c and pressure 5×10^{-10} Nm⁻². What is the number of molecules per m³ if Boltzmann's constant is 1.38×10^{-23} JK⁻¹.

PART - IV

Answer all the questions.

 $5\times5=25$

34. a) Explain the propagation of errors in addition and multiplication.

(OR)

- b) Derive the expression for centripetal acceleration.
- 35. a) What are concurrent forces? State Lami's theorem.

(OR)

- b) Derive the expression for elastic collision in one dimension.
- 36. a) State and prove perpendicular axis theorem.

(OR)

- b) Derive the expression for gravitational potential energy.
- 37. a) State and prove Archimedes principle.

(OR)

- b) Discuss various modes of hear transfer.
- 38. a) Explain in detail the kinetic interpretation of temperature.

(OR)

b) Show that the velocity of a travelling wave is produced in a string is $V = \sqrt{\frac{T}{u}}$

MODEL QUESTION PAPER - 5

XI - STANDARD

PHYSICS

	11.	IISICS	
Tim	ne Allowed: 3 hrs		Max. Marks: 70
Inst	tructions:		
1)	Check the question paper any lack of fairness, infor		
2)	Use Blue or Black ink to draw diagrams.	write and un	derline and pencil to
	PA	ART – I	
Not	te: (i) Answer all the q	uestions.	15×1=15
	with the correspo	natives and wo	rite the option code
1.	The dimension of $(\mu_0 \varepsilon_0)^{1/2}$		_
	a) length	b) time	
	c) velocity	d) force	
2.	If the particle has acceleration its speed	_	city and negative
	a) increases	b) decrea	ases
	c) remain same	d) zero	
3.	Force acting on the part	icle moving w	ith constant speed is
	a) always zero	b) need i	not be zero
	c) always non zero	d) canno	t be concluded

What is the minimum velocity with which a body of mass

in must enter a vertical loop of radius R so that it can

4.

	complete the loop?	
	complete the loop? a) $\sqrt{2gR}$	b) $\sqrt{3gR}$
	c) $\sqrt{5gR}$	d) \sqrt{gR}
5.	As the container rotates	ner is partially filled with water. in a horizontal plane about a s moment of inertia
	a) increases	
	b) decreases	
	c) constant	
	d) depends on direction of I	Rotate
6.		the Earth and sun were to be value, the number of days in
	a) 64.5	b) 1032
	c) 182.5	d) 730
7.	With increase in tempera gas, respectively will	ture, the viscosity of liquid and
	a) increase and increase	b) increase and decrease
	c) decrease and increase	d) decrease and decrease
8.	When uniform rod is h	eated, which of the following
	quantities of the rod will i	ncreases,
	a) mass	b) weight
	c) center of mass	d) moment of inertia
9.	The ratio $\gamma = \frac{C_p}{C_V}$ for a s	gas mixture consisting of 8g of
	helium and 16 g of oxygen	is
	a) $\frac{23}{15}$	b) $\frac{15}{23}$
	15	23

	27		17
	c) $\frac{27}{17}$	d)	$\frac{17}{27}$
10.	The damping force on an osc		
	to the velocity. The unit of the		
	is		
	a) kgms ⁻¹	b)	kgms ⁻²
	c) kgs ⁻¹	d)	kgs
11.	A person standing between	tw	o parallel hills fires a gun
	and hears the first echo aft	er t	sec and the second echo
	after t ₂ sec and the second of	echo	o after t ₂ sec. The distance
	between the two hill is		$\frac{1}{1}$
	a) $\frac{u(t_1 - t_2)}{2}$	b)	$\frac{u(t_1t_2)}{2(t_1+t_2)}$
	2		\ 1
	$c) u(t_1 + t_2)$	d)	$\frac{\mathrm{u}(\mathrm{t_1}+\mathrm{t_2})}{2}$
12.	A particle moving in space l		
	a) one degrees of freedom		three degrees of freedom
	c) six degrees of freedom	d)	two degrees of freedom
13.	In an Isochoric process we l	iavo	2,
	a) $W = 0$		Q = 0
	c) $\Delta U = 0$	d)	$\Delta T = 0$
14.	The stokes formula is		
	a) 9πηαν	b)	
	c) 6πην	d)	4πηαν
15.	The (escape) speed of any o	bje	ct required to escape from
	the Earth's gravitational fie		
	a) $\sqrt{2gR_e}$	b)	$\sqrt{4g\mathrm{R}_\mathrm{e}}$
	c) $\sqrt{5gR_e}$	d)	$\sqrt{4g\mathrm{R}_{\mathrm{e}}}$ $\sqrt{g\mathrm{R}_{\mathrm{e}}}$
	PART		

Answer any six questions and question No. 24 is compulsory.

 $6 \times 2 = 12$

- 16. An athlete covers 3 rounds on a track of radius 50 m. Calculate the total distance and displacement travelled by him.
- 17. Write down the applications of dimensional analysis.
- 18. Show that impulse is the change of capillary action?
- 19. Define terminal velocity.
- 20. What do you mean by capillary or capillary action?
- 21. Define the term degrees of freedom.
- 22. What is an epoch?
- 23. Define wave length.
- 24. A bullet of mass 20 g strikes a pendulum of mass 5 kg. The center of mass or pendulum refer vertical distance of 10 cm. If the bullet gets embedded into the pendulum. Calculate its initial speed.

PART - III

Answer any six questions and question No. 33 is compulsory. $6\times3=18$

- 25. Explain the uses of Screw Gauge and Vernier Caliper in measuring smaller distance.
- 26. Explain the motion of Block connected in vertically.
- 27. Define the following. i) Coefficient of restitution
 - ii) Loss of kinetic energy in inelastic collision.
- 28. Derive the work done in an adiabatic process.
- 29. Obtain an expression for the excess pressure inside
 - i) liquid drop ii) liquid bubble
- 30. List the factors affecting the mean free path.
- 31. Write a short note on the oscillation of liquid column in U-tube.
- 32. Describe the formation of beats.

- 33. Which of the following represent SHM.
 - i) $x = A \sin wt + \cos wt$ ii) $x = A \sin wt + B \cos 2wt$.

PART - IV

Answer all the questions.

 $5 \times 5 = 25$

34. a) Explain the principle of homogeneity of dimensions. What are its uses. Give example.

(OR)

- b) Explain the need for banking of tracks.
- 35. a) Derive an equation for the total pressure at a depth 'h' below the liquid surface.

(OR)

- b) Discuss the anomalous expansion of water. How is it helpful in our lives?
- 36. a) Derive the ratio of two specific heat capacities of mono atomic, diatomic and triatomic molecules.

(OR)

- b) Discuss in detail the energy in simple harmonic motion.
- 37. a) Describe Newton's formula for velocity of sound waves in air and also discuss the Laplace's Correction.

(OR)

- b) Discuss the conservation of angular momentum.
- 38. a) What is inelastic collision? In which way it is different from elastic collision.

(OR)

b) Describe the method of measuring angle of repose.

 $15 \times 1 = 15$

MODEL QUESTION PAPER - 6

XI - STANDARD

PHYSICS

Time Allowed: 3 hrs Max. Marks: 70

Instructions:

- Check the question paper for fairness of printing. If there is 1) any lack of fairness, inform the Hall Supervisor immediately.
- Use Blue or Black ink to write and underline and pencil to 2) draw diagrams.

PART - I

Note: (i) Answer all the questions. Choose the most appropriate answer from the (ii) given four alternatives and write the option code with the corresponding answer.

Which of the following has the highest number of 1. significant figure?

a) 0.007 m^2

b) $2.64 \times 10^{24} \text{ kg}$

c) 0.0006032 m²

d) 6.3200 J

If the velocity is $\vec{V} = 2\hat{i} + t^2\hat{j} - 9\hat{k}$ then the magnification of 2. acceleration at t=0.5 s is

a) 1ms⁻²

b) 2 ms²

c) zero

d) -1 ms^{-2}

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

a) always zero

b) need not be zero

c) always not zero

d) cannot be concluded

If the linear momentum of the object is increases by 0.1%, 4.

	then the kinetic energy is increased by	
	a) 0.1%	b) 0.2%
	c) 0.4%	d) 0.01%
5.	When a mass is rotating in a plane about a fixed point, its angular momentum is directed along a) a line perpendicular to the plane of rotation.	
		e of 45° to the plane of rotation.
6.	In translational equilibrium the net force is	
	a) constant	b) zero
	c) increase	d) decrease
7.	1 electrical unit is equal to	
	a) 1 kWh	b) 10 kWh
	c) 1 Wh	d) 10 Wh
8.	The gravitational potential energy of the moon with respect to Earth is	
	a) always positive	b) negative
	c) can be positive or negati	ve d) always zero
9.	The Young's modulus	for a perfect rigid body is
	a) 0,	b) 1
	c) 0.5	d) infinity
10.	Which of the following is not scalar?	
	a) viscosity	b) surface tension
	c) pressure	d) stress
11.	When you exercise in the morning, by considering your body as thermodynamic system, which of the following is true?	

a) $\Delta U > O$, W > O

b) $\Delta U < O, W > O$

c) $\Delta U < O$, W < O

- d) $\Delta U=O, W>O$
- 12. A container has one mole of mono atomic ideal gas. Each molecule has f degrees of freedom. What is the ratio of

$$\gamma = \frac{C_p}{C_V}$$

a) f

b) $\frac{f}{2}$

c) $\frac{f}{f+2}$

- d) $\frac{f+2}{f}$
- 13. Which of the following differential equations represents a damped harmonic oscillator?
 - a) $\frac{d^2y}{dt^2} + y = 0$

- b) $\frac{d^2y}{dt^2} + \gamma \frac{dy}{dt} + y = 0$
- c) $\frac{d^2y}{dt^2} + k^2y = 0$
- d) $\frac{dy}{dt} + y = 0$
- 14. Which of the following represent a wave?
 - a) $(x-vt)^3$

b) x(x+vt)

c) $\frac{1}{(x+vt)}$

- d) $\sin(x+vt)$
- 15. The distance between anti node and neighbouring node for the nth mode is ______
 - a) $\lambda/2$

b) 2λ

c) \(\lambda / \)

d)

PART – II

Answer any six questions and question No. 24 is compulsory.

 $6 \times 2 = 12$

- 16. How will you measure the diameter of the moon using parallax method.
- 17. Define scalar. Give examples.
- 18. What is the meaning by 'Pseudo force'?

- 19. Explain the characteristic of elastic collision.
- 20. Give any two examples of torque in day-to-day life.
- 21. Define the gravitational field. Give its unit.
- 22. Explain elasticity using intermolecular force.
- 23. What is black body?
- 24. Calculate the volume of one mole of any gas at STP and at room temperature (300 k) with same pressure 1 atm.

PART - III

Answer any six questions and question No. 33 is compulsory. $6\times3=18$

- 25. If the value of Universal Gravitational Constant in SI is $6.6 \times 10^{-11} \, \text{Nm}^2 \, \text{kg}^{-2}$, then find its value in CGS system.
- 26. Explain the similarities and differences of centripetal and centrifugal forces.
- 27. Explain the types of equilibrium with suitable example.
- 28. State and prove Bernoulli's theorem.
- 29. Explain Wien's law and why our eyes are sensitive only to visible says?
- 30. Derive the expression for mean free path of the gas.
- 31. State the law of simple pendulum.
- 32. Explain how the interference of waves is formed.
- 33. Check the correctness of the equation 1/2 mv²=mgh using dimensional analysis method.

PART – IV

Answer all the questions.

 $5\times5=25$

34. a) Derive the kinetic equations of motion for constant acceleration.

(OR)

- b) State Newton's three law and discuss this significance.
- 35. a) Explain with graph the difference between work done by a constant force and by a variable force.

(OR)

- b) Discuss rolling on inclined plane and arrive at the expression for the acceleration.
- 36. a) Explain in detail Geostationary and Polar satellite.

(OR)

- b) State and prove Pascal's law.
- 37. a) Discuss the ideal gas law.

(OR)

- b) Explain in detail kinetic interpretation of temperature.
- 38. a) Describe SHM as a projection of uniform circular motion.

(OR)

b) Explain the concepts of fundamental frequency, harmonics and overtones in detail.



XI - STANDARD

PHYSICS

Marks: ′	70
١	/larks: ˈ

Instructions:

- 1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.
- 2) Use Blue or Black ink to write and underline and pencil to draw diagrams.

PART-I

Note: (i) Answer all the questions. 15×1=15

(ii) Choose the most appropriate answer from the given four alternatives and write the option code with the corresponding answer

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

- a) force and power
- b) torque and energy
- c) torque and power
- d) force and torque

2. If the object is dropped vertically down ward and another object is thrown horizontally from the same height, the ratio of vertical distance covered by both object at any instant t is

a) 1

b) 2

c) 4

d) 0.5

3. An object of mass m begins to move on the plane inclined at an angle θ . The efficient of static friction of inclined surfaced μ : The maximum Stalic friction experienced by

	the mass is		
	a) mg		μ_s mg
	c) $\mu_s \text{ mg sin}\theta$	d)	$\mu_s \operatorname{mg} \operatorname{cos} \theta$
4.	If the potential energy of	the	particle is $\alpha - \frac{\beta}{2}x^2$, then
	force experienced by the pa	rtic	le is2
	a) $F = \frac{\beta}{2}x^2$		$F = \beta x$
	c) $F = -\beta x$	d)	$F = \frac{-\beta}{2}x^2$
5.	The speed of the centre of a	wh	eel rolling on a horizontal
	surface is V_0 . Point on the r	im i	n level with the centre will
	be moving at a speed of		
	a) zero	b)	V _o 2V _o
	c) $\sqrt{2v_0}$	d)2	$2V_{o}$
6.	Calculate the work done by		_
	of 2 kg to a height of 10 m (g=1	0ms^{-2}).
	a) 300 J	b)	400 J
	c) 100 J	d)	200 J
7.	If the mass and the radius of	of th	e Earth are both doubled,
	then the acceleration due to	gra	vity g,
	a) remains same	b)	$\frac{g}{2}$
	c) 2g		4g
8.	Which of the following is no	ot a	scalar quantities?
	a) viscosity	b)	surface tension
	c) pressure	d)	stress
9.	A distant star emits radiation	on v	vith maximum intensely at
	350 nm. The temperature o	f th	e star in
	a) 8280 K	b)	5000 K
	c) 7260 K	d)	9044 K
10.	If the temperature and the	pre	ssure of the gas is doubled

	the mean free path	of the gas molecules	
	a) remains same	b) doubled	
	c) tripled	d) quadrapoled	
11.	The damping force	on an oscillator is directly proportional	
	to the velocity the u	nit of the constant of proportionality	
	are		
	a) kgms ⁻¹	b) kg ms ⁻²	
	c) kgs ⁻¹	d) kgs	
12.	An air column in a	pipe which is closed at one end, will be	
		he vibrating body of frequency 83 Hz	
	the length of the air	column is	
	a) 1.5 m	b) 0.5 m	
	c) 1.0 m	d) 2.0 m	
13.	_	frequency for the following Simple on y=0.3 $\sin(40 \pi t+1.1)$	
	a) $\omega = 40\pi \text{ rad } 5^1$	b) $\omega = 40\pi t \text{ rad s}^{-1}$	
	c) $\omega = 41.1\pi \text{ t rad}5^{-1}$	d) $38.9 \pi \text{t } \text{ rads}^{-1}$	
14.	The SI unit of therm	nal conductivity is	
	a) $JS^{-1}m^{-1}K^{-1}$	b) JSm ⁻¹ K	
	c) JSm ⁻¹ K ⁻¹	d) JS ⁻¹ mK	
15.	The Poisson's ratio	of copper is	
	a) 0.33	b) 3.3	
	c) 33	d) 3.4	
		PART – II	
Answer any six questions and question No. 24 is compulsory. $6\times2=12$			

16. Define gravitational potential.

- 17. Two streamlined cannot cross each other. Why?
- 18. Which one of these is more elastic, steel or rubber. Why?
- 19. Define the quasi static process.
- 20. Write short note on two springs connected in series.
- 21. Define intensity of sound and loudness.
- 22. Sketch the function y = x+a. Explain your sketch.
- 23. What is non uniform circular motion.
- 24. A train was moving at the rate of 54 kmh⁻¹ when brakes were applied. If came to rest within a distance of 225 m. Calculate the retardation produced in the train.

PART - III

Answer any six questions and question No. 33 is compulsory. $6\times3=18$

- 25. Explain in detail the triangle law of addition.
- 26. Calculate the average velocity of the particle whose position vector changes from $\vec{r}_1 = 5\hat{i} + 6\hat{j}$ to $\vec{r}_2 = 2\hat{i} + 3\hat{j}$ in a time 5 second.
- 27. The momentum of a system of particles is always conserved. True or False?
- 28. What are conservative and non-conservative forces.
- 29. What is the difference between sliding and slipping?
- 30. Round-off the following numbers as indicated.
 - a) 17.234 to 3 digits
- b) 3. 996 $\times 10^5$ to 3 digits
- c) 124783 to 5 digits.
- 31. Explain the variation of g with latitude.
- 32. Explain in details Carnot heat engine.
- 33. Show that for a simple harmonic motion, the phase difference between a) displacement and velocity is $\pi/2$ radian or 90° . b) velocity and acceleration is $\pi/2$ radian or 90°

Answer all the questions.

 $5 \times 5 = 25$

34. a) What is meant by Doppler effect and explain the effect when source in motion and observer at rest.

(OR)

- b) Discuss the simple pendulum is detail.
- 35. a) Explain in details the Maxwell Boltzmann distribution function.

(OR)

- b) Discuss (i) the thermal equilibrium (ii) mechanical equilibrium
- 36. a) Obtain an equation of continuity for a flow of fluid on the basis of conservation of mass.

(OR)

- b) Explain in detail the idea of weightlessness using lift as an example.
- 37. a) Explain in detail the various types of error.

(OR)

- b) State and explain Newton's three laws.
- 38. a) Write the various types of potentials-energy. Explain the formula.

(OR)

b) Derive the equation for centripetal acceleration.

XI - STANDARD

PHYSICS

	1.1	113103
Tin	ne Allowed: 3 hrs	Max. Marks: 70
Ins	tructions:	
1)		er for fairness of printing. If there is rm the Hall Supervisor immediately.
2)	Use Blue or Black ink to draw diagrams.	o write and underline and pencil to
	P	ART – I
No	te: (i) Answer all the q	uestions. 15×1=15
	` '	st appropriate answer from the natives and write the option code onding answer.
1.	The velocity of a parti V=at+bt ² . The dimension	cle v at and instant t is given by on of b is
	a) [L]	b) [LT ⁻¹]
	c) [LT ⁻²]	d) [LT ⁻³]
2.	If the velocity is $\vec{V} = 2$ acceleration at t=0.5 s is	$\hat{i} + t^2 \hat{j} - 9\hat{k}$ the magnitude of the s
	a) 1ms ⁻²	b) 2 ms ⁻²
	c) zero	d) -1ms ⁻²
3.	The force acting on the speed is	ne particle moving with constant
	a) always zero	b) need not be zero
	c) always not zero	d) cannot be concluded
4.	The work done by the o	conservative force for a close path

	is		
	a) always negative	b)	zero
	c) always positive	d)	not defined
5.	A couple produces		
	a) pure rotation		pure translation
	c) rotation and translation	d)	no motion
6.	The dimensional formula fo	r ve	elocity is
	a) [LT ⁻¹]	b)	[LT]
	c) [MLT ⁻¹]	d)	$[ML^{-1}T]$
7.	The kinetic energy of the	sate	ellite orbiting around the
	Earth is		
	a) Equal to potential energy		
	c) greater than kinetic energy	d)	zero
8.	If a wire is stretched to dou		of its original length, then
	the strain in the wire is		
	a) 1	b)	
	c) 3	d)	4
9.	In an isochoric process, we l	hav	e
	a) $W = O$		Q = O
	c) $\Delta U = O$	d)	$\Delta T = O$
10.	If the inertial mass and grapendulum of length l are no		_
	of the period		
	a) $T = 2n \sqrt{\frac{m_i l}{m_g g}}$	b)	$T = 2\pi \sqrt{\frac{m_g l}{m_i g}}$ $T = 2\pi \frac{m_i}{m_g}$
	c) $T = 2\pi \frac{m_g}{m_i} \sqrt{\frac{l}{g}}$	d)	$T = 2\pi \frac{m_i}{m_g}$

11. Let $y = \frac{1}{1 + r^2}$ at t=0 s be the amplitude of the wave propagating in the positive x-direction. At t = 2s, the amplitude of the wave propagating becomes $y = \frac{1}{1 + (x - 2)^2}$. Assure that the shape of the wave does not change during propagation. The velocity of the wave

a) 0.5 ms⁻¹

b) 1.0 ms⁻¹

c) 1.5 ms⁻¹

d) 2.0 ms⁻¹

12. What is 3 given the vector $\vec{A} = 2\hat{i} + 3\hat{j}$

a) $6\hat{i} + 9\hat{i}$

b) $3\hat{i} + 6\hat{i}$

c) $2\hat{i} + 3\hat{i}$

d) $6\hat{i} + 6\hat{i}$

13. The potential energy of a system increases, If work is done

The moment of inertia of Rod is,

$$a) I = \frac{1}{12} M l^2$$

b)
$$I = Ml^2$$

c)
$$I = \frac{M}{2}l^2$$

15. 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) 2 L

d) $\frac{L}{\sqrt{2}}$

a) by the system against a conservative force

b) the system against a non-conservative force

c) upon a system by a non-conservative force

d) upon the system by a conservative force

PART - II

Answer any six questions and question No. 24 is compulsory. $6\times2=12$

- 16. What is dimensionless quantity.
- 17. Define a Vector. Give examples.
- 18. Show the impulse is the change of momentum.
- 19. Define power.
- 20. A solid sphere of mass 20 kg and radius 0.25m rotates about a axis passing through the center. What is the angular momentum if the angular velocity is 5 rad s⁻¹.
- 21. Will the angular momentum of a planet be conserved? Justify.
- 22. State Bernoulli's theorem?
- 23. What is the microscopic origin of temperature?
- 24. Calculate the temperature at which the RMS velocity if a gas triples its value at STP (Standard temperature T_1 =273k)

PART - III

Answer any six questions and question No. 33 is compulsory. $6\times3=18$

- 25. Derive an expression for energy of satellite.
- 26. State and prove Pascal's law in fluids.
- 27. Explain Newton's law of cooling?
- 28. Write down the time period of simple pendulum.
- 29. What is Doppler effect when source and observer approaches each other.
- 30. Arrive at an expression for elastic collision in one dimension and discuss various cases.
- 31. A spider of mass 50 g is hanging on a string of a cobweb what is the tension in the string?
- 32. State and prove perpendicular axis theorem.

33. Calculate the centrifugal force experienced by a man of 60 kg standing at Chennai? (Give Latitude of Chennai is 13⁰).

PART - IV

Answer all the questions.

 $5 \times 5 = 25$

34. a) Discuss how ripples are formed in still water.

(OR)

- b) Discuss in detail the energy in Simple Harmonic Motion.
- 35. a) Derive the expression of pressure exerted by the gas on the walls of the container.

(OR)

- b) Explain the isobaric process and derive the work done.
- 36. a) Explain the Poiselille's formula for the volume of a liquid flowering per second through a pipe under streamlined flow.

(OR)

- b) Derive expression for escape speed.
- 37. a) Explain the various types of error.

(OR)

- b) Explain the triangle law of addition.
- 38. a) Briefly explain Rolling friction.

(OR)

b) State the explain work energy principle mention any three examples for it.

XI - STANDARD

PHYSICS

Time Allowed: 3 hrs Max. Marks: 70

Instructions:

- 1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.
- 2) Use Blue or Black ink to write and underline and pencil to draw diagrams.

PART-I

Note: (i) Answer all the questions.

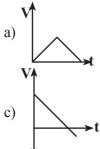
 $15 \times 1 = 15$

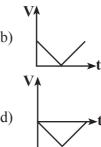
- (ii) Choose the most appropriate answer from the given four alternatives and write the option code with the corresponding answer.
- 1. If the force is proportional to square of velocity, these the dimension of proportionality constant is ______
 - a) [MLT⁰]

b) [MLT⁻¹]

c) [ML⁻²T]

- d) [ML⁻¹T⁻⁰]
- 2 A ball is projected vertically upwards with a velocity v. It comes back to ground in time t. Which v-t graph shows motion correctly?





3.	If a person moving tone acting on line	from pole to equator, the centrifugal
	a) increases	
	b) decreases	
	c) remains same	
	d) increases and then	decreases
4.	that one piece is dou	onstant k is cut into two places such able the length of the others. Then, the a force constant of
	a) 2/3 k	b) 3/2 k
	c) 3k	d) 6k
5.		s with an angular momentum L. If its lved, the angular momentum becomes
	a) L	b) $\frac{L}{2}$
	c) 2L	d) $\frac{L}{\sqrt{2}}$
6.		ced by the by a body of mass 100 kg
		ration of 50 cm s ² is
	a) 45 N	b) 50 N
	c) 55 N	d) 60 N
7.	If a person moves	from Chennai to Trichy, his weight,
	a) increase	b) decrease
	c) remains same	d) increase and then decrease
8.		tal, the rigidity modulus is $(1/3)^{rd}$ of ts Poisson's ratio is
	a) 0	b) 0.25
	c) 0.3	d) 0.5

		51
9.		sees from one equilibrium stoke $(P_1, V_1, Q_2, S_1, S_2, S_2, S_3, S_4, S_2, S_4, S_4, S_5, S_6, S_6, S_6, S_6, S_6, S_6, S_6, S_6$
	a) T ₁ =T ₂	b) $T_1 = \frac{T_2}{6}$
	c) $T_1 = 6T_2$	d) $T_1 = 3T_2$
10	When a down	d harmania agaillatan aammlataa 100

10. When a damped harmonic oscillator completes 100 Oscillations, its amplitude is reduced to of its initial value. What will be its amplitude when it completes 200 **Oscillations?**

a)	$\frac{1}{5}$	b)	$\frac{2}{3}$
c)	$\frac{1}{6}$	d)	$\frac{1}{\alpha}$

11. Which of the following represents a wave ____

a)
$$(x-vt)^3$$

b)
$$x(x+vt)$$

c)
$$\frac{1}{(x+vt)}$$

12. The two vectors are given as $\vec{r} = 2\hat{i} + 3\hat{j} + 5\hat{k}$ $\vec{F} = 3\hat{i} - 2\hat{j} + 4\hat{k}$ find the resultant vector $\vec{\tau} = \vec{r} \times \vec{f}$

a)
$$\vec{\tau} = 20\hat{i} + 7\hat{j} - 13\hat{k}$$
 b) $22\hat{i} + 7\hat{j} - 13\hat{k}$

b)
$$22\hat{i} + 7\hat{j} - 13\hat{k}$$

c)
$$22\hat{i} - 7\hat{j} + 13\hat{k}$$

c)
$$22\hat{i} - 7\hat{j} + 13\hat{k}$$
 d) $-22\hat{i} - 7\hat{j} - 13\hat{k}$

13. The coefficient of restitution for an elastic collision for no loss of kinetic energy.

a)
$$e = 0$$

b)
$$e = 1$$

c)
$$e = 0.5$$

d)
$$e = 2$$

14. A train 100 m long is moving with a speed of 60 km⁻¹. In how many seconds will it cross a bridge of 1 km long?

- 15. A body of mass 10 kg at rest is subjected to a force of 16N. Find the kinetic energy at the end of 10S.
 - a) 1280 J

b) 1250 J

c) 1260 J

d) 1240 J

PART - II

Answer any six questions and question No. 24 is compulsory.

 $6 \times 2 = 12$

- 16. What is meant by propagation of error.
- 17. Define scalar quantity, Give example.
- 18. When walking on ice and should take short steps. Why?
- 19. What is Conservative and Non concservative force.
- 20. A gun fires 8 bullets is 3 g and its speed 600 ms⁻¹, then calculate the power delivered by the bullets.
- 21. Define weight.
- 22. Distinguish between cohesive and adhesive forces.
- 23. What is the reaction for Brownian motion.
- 24. A fresh air is composed of nitrogen N_2 (78%) and oxygen 0_2 (21%). Find the RMS speed of N_2 and N_2 at 20°C.

PART - III

Answer any six questions and question No. 33 is compulsory. $6\times3=18$

- 25. Explain in detail the Eratosthenes method of finding the radius of Earth.
- 26. State and prove Archimedes principle.
- 27. Discuss the ideal gas law.
- 28. Discuss simple pendulum in detail.
- 29. Write a note on loudness and intensity.

- 30. Distinguish between stable and unstable equilibrium.
- 31. A ball with a velocity of 5 ms⁻¹ imping at angle of 60° with the vertical on a smooth horizontal plane. If the efficient of restitution is 0.5, Find the velocity and direction after the impact.
- 32. Write down the kinematic equation for angular motion.
- 33. The moon orbit the Earth once n 27.3 days in an almost circular orbit. Calculate the centripetal acceleration experienced by the moon?(Radius of the Earth is 6.4x10⁶m)

PART - IV

Answer all the questions.

 $5 \times 5 = 25$

34. a) Explain the principle of Homogeneity of dimension. What are its uses? Give example.

(OR)

- b) Derive the equation of motion for a particle projected vertically.
- 35. a) Briefly explain the origin of friction. Show that in an inclined plane angle of friction is equal to angle of repose.

(OR)

- b) Arrive and expression for elastic collection in one dimension
- 36. a) Discuss the rolling on inclined plane and arrive the expression for the acceleration.

(OR)

- b) Describe the construction and working of Venturi-meter.
- 37. a) Derive Meyer's relation for ideal gas.

(OR)

- b) Write down the postulates of kinetic theory of gas.
- 38. a) Describe vertical oscillation of aspiring.

(OR)

b) What is Sonometer? give construction and working and explain how to determine the frequency of tunning fork using sonometer.

XI - STANDARD

PHYSICS

Time Allowed: 3 hrs	Max. Marks: 70
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Instructions:

- 1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.
- 2) Use Blue or Black ink to write and underline and pencil to draw diagrams.

PART - I

Not	given four alte	questions. ost appropriate answer in the operatives and write the operation of the control of th	
1.	The dimension of (μ_0	$(\epsilon_0)^{1/2}$ is	
	a) length	b) time	
	c) velocity	d) force	
2.	-	uniform circular motion rection, then the angular v	•
	a) +y direction	b) +z direction	
	c) -z direction	d) -x direction	
3.	The masses m_1 and force where $m_1 < m_2$,	m ₂ are experiencing t the ratio of this accelerat	he same ion $\frac{a_1}{a_2}$ is
	a) 1	b) less than 1	
	c) greater than 1	d) all the three cases	3

4.	ne particle is α - $\beta/2$ x^2 , then the article is	
	a) $F = \beta/2 x^2$	b) F=βx
	c) F=β-x	d) $F = -\beta/2x^2$
5.	and radius 40 cm what is the cylinder. If the rope is pulled	
	a) 0.25 rad s ⁻²	b) 25 rad s ⁻²
	c) 5 ms^2	d) 25 ms^{-2}
6.	The unit of Torque is	
	a) N/m	b) N/m ²
	c) Nm	d) Nms ⁻¹
7.	If the acceleration due to original value, then escape	gravity becomes 4 times its speed
	a) remains same	b) 2 times of original value
	c) becomes halved	d) 4 times origin value
8.	The Young's modulus for	or a perfect rigid body is
	a) 0	b) 1
	c) 0.5	d) infinity
9.	When a cycle tyre suddenly expands. This process is	y burst, the air inside the tyre
	a) isothermal	b) adiabatic
	c) isobaric	d) isochoric
10.	-	oscillation, the acceleration
	against displacement for or	ne complete oscillation will be
	against displacement for on a) an ellipse	b) a circle

	and this hits the water surfa	ce.	The ratio of its wavelength
	in water and air is		
	a) 4.30	b)	0.23
	c) 5.30	d)	1.23
12.	Find the value of T from $5\hat{j} - T\hat{j} \neq 6\hat{j} + 3T\hat{j}$	n tl	ne given vector equation
	a) $T = -\frac{1}{4}$	b)	$T = \frac{1}{4}$
	c) T=4	d)	$\frac{2}{3}$
13.	The force acting on the passed is	arti	cle moving with constant
	a) zero	b)	need not be zero
	c) always non zero	d)	can not be conducted
14.	If the linear momentum of tl	he o	bject is increased by 0.1%,
	then the kinetic energy is in		•
	a) 01.%	b)	0.2%
	c) 0.4%	d)	0.01%
15.	In rotational equilibrium th	e n	et torque is
	a) zero	b)	increases
	c) decreases	d)	constant
	PART	– I)	I
Ans	swer any six questions and qu	iest	ion No. 24 is compulsory. 6×2=12
16.	Briefly explain the types of pl	hysi	cal qualities.
17.	Define velocity and speed.		
18	Define one Newton		

19. Define coefficient of restitution.

11. A sound wave whose frequency is 5000 Hz travels in air

- 20. A wooden box is lying on an inclined plane. What is the coefficient of friction, If the box starts sliding when the angle of inclination is 45°.
- 21. State Universal Law of Gravitation.
- 22. State the Law of Flotation.
- 23. Define Mean free path and write down its expression.
- 24. Calculate the mean free path of air molecules at STP. The diameter of N_2 and O_2 is about $3x10^{-10}$ m.

PART - III

Answer any six questions and question No. 33 is compulsory. $6\times3=18$

- 25. Explain in detail the Geostationary and Polar satellites.
- 26. Explain the different types of modulus of elasticity.
- 27. Explain in detail Carnot heat engine.
- 28. Explain Resonance.
- 29. Discuss the law of transverse vibrations in stretched string.
- 30. Briefly explain 'rolling friction'.
- 31. Calculate the average velocity of the particle whose position vector changes from $\vec{r}_1 = 5\hat{i} + 6\hat{j}$ to $\vec{r}_2 = 2\hat{i} + 3\hat{j}$ in a time 5 second.
- 32. Explain the triangle law of addition.
- 33. An oxygen molecule is traveling in air at 300 k and 1 atm, the diameter of oxygen molecule is 1.2x10⁻¹⁰m. Calculate the mean free path of oxygen molecule.

PART - IV

Answer all the questions.

 $5 \times 5 = 25$

34. a) Discuss the properties of scalar and vector products.

(OR)

b) A bob attached to the string oscillates back and forth.

Resolve the forces acting on the bob into components. What is the acceleration experienced by the bob at an angle θ .

35. a) What is inelastic collision? In which way it is different from elastic collision.

(OR)

- b) Derive an expression for moment of inertia of a uniform disc about an axis passing through the center and perpendicular to the plane.
- 36. a) Explain the variation of g with depth from Earth's surface.

(OR)

- b) State and prove Bernoulli's theorem for a flow of incompressible, non-viscus and streamlined flow of fluid.
- 37. a) Desire an work done in adiabatic process.

(OR)

- b) Describe the total degrees of freedom for mono atomic diatomic molecules.
- 38. a) Write down the short note on oscillation of liquid column in U-tube.

(OR)

b) Explain the interference of waves is formed.

XI - STANDARD

PHYSICS

Time Allowed: 3 hrs Max. Marks: 70

Instructions:

- 1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.
- 2) Use Blue or Black ink to write and underline and pencil to draw diagrams.

PART - I

Note: (i) Answer all the questions.

 $15 \times 1 = 15$

- (ii) Choose the most appropriate answer from the given four alternatives and write the option code with the corresponding answer.
- 1. The dimensional formula of Planck's constant h is
 - a) $[ML^2T^{-1}]$

b) $[ML^2T^{-3}]$

c) [MLT⁻¹]

- d) $[ML^3T^{-3}]$
- 2. Identify the unit vector in the following.
 - a) $\hat{i} + \hat{j}$

b) $\frac{\hat{i}}{\sqrt{2}}$

c) $\hat{k} - \frac{\hat{j}}{\sqrt{2}}$

- d) $\frac{\hat{i} + \hat{j}}{\sqrt{2}}$
- 3. When a car takes a sudden left turn in the curved road, passengers are pushed towards the right due to
 - a) inertia of direction
- b) inertia of motion

c) inertia of rest

d) absence of inertia

4.	Water leaves the hose v	ter continuously through a hose. with a velocity v and m is the mass vater of the jet. What is the rate at imported to water?
	a) $\frac{1}{2}$ mv ³	b) mv ³
	c) $\frac{3}{2}$ mv ²	d) $\frac{5}{2}$ mv ²
5.	2	system of particle does not depend
	upon	
	a) position of particles	
	b) relative distance betw	een particles
	c) masses of particles	
	d) form acting on particl	es
6.	The total energy of an	object of mass 1 kg is falling from
	the height h=10 m is	· · · · · · · · · · · · · · · · · · ·
	a) E=100 J	b) E=150J
	c) E=50J	d) E=200 J
7.	If the mass and radius of the acceleration due to	of the Earth are both doubled, then gravity g
	a) remains same	b) g/2
	c) 2 g	d) 4 g
8.	If the temperature of	the wire is increased, then the
	Young's modulus will _	
	a) remain same	b) decrease
	c) increase rapidly amount	d) increase by very small
9.	The graph between vollaw is	ume and temperature in Charles'
	a) an ellipse	b) a circle
	c) a straight line	d) a parabola

a) 1.609 km

c) 1.80 km

10.	The acceleration	on of the particle in SHM is given by
	a) -kr	b) ma
	c) $-\omega^2 \vec{r}$	d) $\sqrt{\frac{k}{m}}$
11.	Which of the fo	ollowing option is correct options for (1)
	(2), (3) respectiv	
	a) (B), (C) and (A	a) b) (C),(A),(B)
	c) (A), (B) and (
	A	В
	1. Quality	A) Intensity
	2. Pitch	B) Waveform
	3. Loudness	C) Frequency
12.	The dimensions	l formula for "work" is
	a) [ML ⁻¹ T ⁻¹]	b) [ML ² T ²]
	c) [MLT ⁻¹]	d) $[ML^2T^{-2}]$
13.	,	rium the linear momentum and angula
101	momentum are	_
	a) zero	b) constant
	c) decrease	d) increase
14.	The Poission's 1	ratio of Rubber is
	a) 0.506	b) 0.456
	c) 0.499	b) 0.433
15.	One mile is equ	al to,

b) 1.509 km

d) 1.2 km

PART - II

Answer any six questions and question No. 24 is compulsory. $6\times2=12$

- 16. Define precision and accuracy.
- 17. Write a short note on the scalar product between two vectors.
- 18. What are inertial frames?
- 19. Define laws of kinetic energy in elastic collision.
- 20. A force $\vec{F} = \hat{i} + 2\hat{j} + 3\hat{k}$ N acts on ∂ particle and displaces it through a distance $\vec{S} = 4\hat{i} + 6\hat{j}$ m Calculate the work done.
- 21. State Kepler's three laws.
- 22. Define surface tension of a liquid.
- 23. What is the microscopic origin of pressure?
- 24. Estimate the total number of air molecules in room of capacity 25m³ at a temperature of 27°c.

PART - III

Answer any six questions and question No. 33 is compulsory. $6\times3=18$

- 25. Derive an expression for gravitational potential energy.
- 26. State the principle and usage of venturi meter.
- 27. Explain the Second Law of Thermodynamics.
- 28. Explain Damped Oscillation.
- 29. Explain Doppler effect, when observer moves towards source.
- 30. What are concurrent forces? State Lami's theorem.
- 31. Derive the kinematic equations of motion for constant acceleration.
- 32. Write a short note on vector product between two vector.
- 33. An object of mass 1 kg is falling from the height h=10m. Calculate the total energy of an object and potential energy and kinetic energy of an object at when it is at h=4m.

PART - IV

Answer all the questions.

 $5 \times 5 = 25$

34. a) Discuss the law of transverse vibration in stretched strings.

(OR)

- b) Describe Simple Harmonic Motion as a projection of uniform circular motion.
- 35. a) Explain in detail kinetic interpretation of temperature.

(OR)

- b) Explain in detail the working of a refrigerator.
- 36. a) Derive an expression for the elastic energy stored per unit volume of a wire.

(OR)

- b) Explain the variation of g with altitude.
- 37. a) State and prove parallel axis theorem.

(OR)

- b) State and explain work energy principle.
- 38. a) Prove that law of conservation of linear momentum use it to find the recoil velocity of a gun when a bullet is fired from it.

(OR)

b) Desire the equation of motion range and maximum height reached by the particle thrown at an oblique angle ϕ with respect to the horizontal direction.

Key Answers for Objective Questions

				Gov	t. M	odel	Que	estic	n Pa	per				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

				Мс	del	Que	stio	n Pa	per	- 1				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

				Мс	del	Que	stio	n Pa	per	- 2				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
а	d	а	С	d	b	d	d	С	b	d	а	а	а	а

					Мс	del	Que	stio	n Pa	per	- 3				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ī	d	d	С	b	а	b	а	С	С	С	а	а	а	b	С

				Мс	del	Que	stio	n Pa	per	- 4				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
а	d	d	а	а	b	С	С	С	b	а	d	а	а	а

				Мс	del	Que	stio	n Pa	per	- 5				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
С	а	b	С	а	b	С	а	С	С	d	b	а	b	а

					Мс	del	Que	stio	n Pa	per	- 6				
Γ	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Γ	d	а	b	b	а	b	а	b	d	d	b	d	b	а	С

					Мс	del	Que	stio	n Pa	per	- 7				
1	L	2	3	4	5	6	7	8	9	10	11	12	13	14	15
b	,	а	d	b	С	а	b	d	а	b	С	С	а	а	а

				Мс	del	Que	stio	n Pa	per	- 8				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
d	а	b	b	а	а	b	b	а	а	b	а	а	а	d

					Мс	odel	Que	stio	n Pa	per	- 9				
ĺ	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	d	С	а	b	d		b	d	b	d	d	b	b	b	d

	Model Question Paper - 10														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ì	С	С	С	b	b	С	b	d	b	d	а	a	b	b	а

	Model Question Paper - 11													
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
а	d	а	а	d	a	b	b	b	С	а	d	а	С	а