

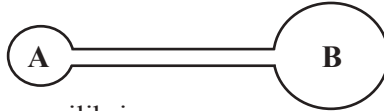
3. Which of the following pairs of physical quantities have the same dimensions?

- a) Torque and Power b) Force and Torque
c) Force and Power d) Torque and Energy

4. For a satellite moving in an orbit around the earth, the ratio of kinetic energy to potential energy is _____

- a) 2 b) $\sqrt{2}$
c) $\frac{1}{2}$ d) $\frac{1}{\sqrt{2}}$

5. 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
6. A refrigerator has COP of 3. How much work must be supplied to a refrigerator in order to remove 200 J of heat from its interior?

- a) 33.33 J b) 44.44 J
c) 66.67 J d) 50 J

7. 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

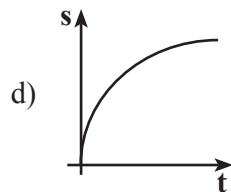
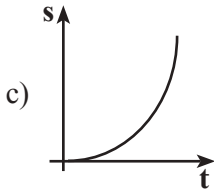
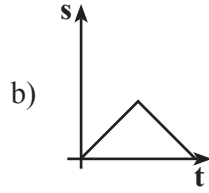
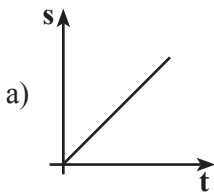
8. If the internal energy of an ideal gas U and volume V are doubled, then the pressure of the gas _____

- a) halves
- b) quadruples
- c) doubles
- d) remains same

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) $Q = 0$

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 inertia _____

PART – III**Answer any six questions and question No. 33 is compulsory.****6×3=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.****5×5=25**

34. a) Explain the principle of homogeneity 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 = 6×10^{24} kg radius of the earth = 6400 km).

MODEL QUESTION PAPER - 1

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

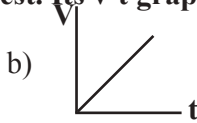
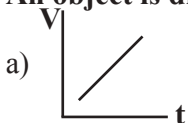
Note: (i) Answer all the questions. 15×1=15

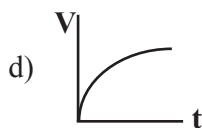
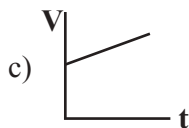
(ii) Choose the most appropriate answer from the given four alternatives and write the option code with the corresponding answer.

1. The dimension of $(\mu_0 \epsilon_0)^{-1/2}$ is _____

a) length	b) time
c) velocity	d) force
2. A particle is in circular motion with an acceleration $\alpha = 0.2 \text{ rad s}^{-2}$, What is the angular displacement made by the particle after 5s?

a) 2.5 rad	b) 25 rad
c) 250 rad	d) 2500 rad
3. An object is dropped from rest. Its v-t graph is:





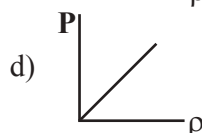
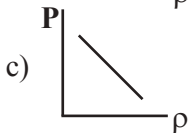
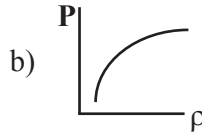
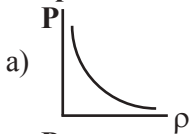
4. The work done by the conservative force for a closed path is _____
- a) always negative b) always positive
c) zero d) not defined
5. Find the maximum speed at which a car can turn round a curve of 36 m radius on a level road. Given the coefficient of friction between the tyre and the road is 0.53.
- 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 inertia increases
c) angular velocity decreases and moment of inertia increases
d) angular velocity increases and moment of inertia 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 perihelion 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) $(x-vt)^3$ b) $x(x+vt)$
c) $\frac{1}{x+vt}$ d) $\sin(x+vt)$

14. The wavelength of a sine wave is $\lambda=1\text{m}$. 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.

6×2=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 $x=2-5t+6t^2$. 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 $\mu G\%$ from original length calculate the percentage.

PART – III

Answer any six questions and question No. 33 is compulsory.

6×3=18

25. An oxygen molecule is travelling in air at 300 K and 1 atm, and the diameter of oxygen molecule is 1.2×10^{-10} m. 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.

5×5=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:

- 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

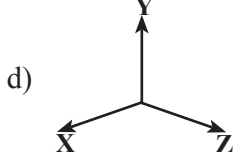
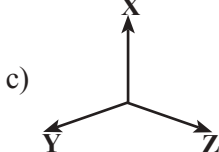
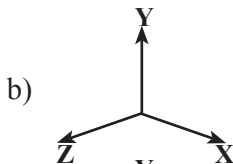
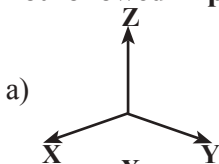
Note: (i) All questions are compulsory. 15×1=15

(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) kg^2 | b) m^3 |
| 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 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. A uniform force of $(2\hat{i} + \hat{j})\text{N}$ acts on a particle of mass 1 kg. The particle displaces from position $(3\hat{j} + \hat{k})\text{m}$ to $(5\hat{i} + 3\hat{j})\text{m}$. The work done 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 of a system of particle does not depend upon, _____
- a) position of the particle
b) relative distance between the particles
c) masses of particle
d) force acting on particles
6. A student tunes his guitar by striking a 120 Hz with a tuning force, and simultaneously plays the 4th string on his guitar. By keen observation he hears the amplitude of the combined sound oscillating thrice per second. Which of the following frequencies is the most likely the frequency of the 4th string on his guitar?
- a) 130 b) 117
c) 110 d) 120
7. In a simple harmonic oscillation, the acceleration against displacement for one complete oscillations will be _____
- a) an ellipse b) a circle
c) a parabola d) a straight line
8. Which of the following gases will have least rms speed at a given temperature?

- | | |
|-------------|--------------------|
| a) Hydrogen | b) Nitrogen |
| c) Oxygen | d) CO ₂ |

9. The efficiency of heat engine working between the freezing point and boiling point of water is _____

- | | |
|----------|----------|
| a) 6.25% | b) 20% |
| c) 26.8% | d) 12.5% |

10. Identify the state variables 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 and position vector of the planet is Perpendicular to each other at, _____

- | | |
|----------------------------|------------------|
| a) perihelion and aphelion | b) at all points |
| c) only at perihelion | d) no point |

13. What is the condition for water falls from the top of hill to the ground?

- | | |
|--|--|
| a) $V_{\text{hill}} > V_{\text{ground}}$ | b) $V_{\text{hill}} < V_{\text{ground}}$ |
| c) $V_{\text{hill}} \cong V_{\text{ground}}$ | d) $V_{\text{hill}} = V_{\text{ground}}$ |

14.

- | | |
|-------|-------|
| a) b) | c) d) |
|-------|-------|

15. The SI unit of specific heat 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.

6×2=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 $y=2 \times 10^{11} \text{ Nm}^{-2}$ and $P=7800 \text{ kgm}^{-3}$.
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.

6×3=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.

5×5=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:

- 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) All questions are compulsory. 15×1=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. |

4. **The work done by the conservative force for a closed path is _____**
 - a) always negative
 - b) zero
 - c) always positive
 - d) not defined

5. **A Couple produces _____**
 - a) pure rotation
 - b) pure translation
 - c) rotation and translation
 - d) no motion

6. **The time period of a satellite orbiting Earth in a circular orbit is independent of _____**
 - a) Radius of the orbit
 - b) The mass of the satellite
 - c) Both mass and radius of the orbit
 - d) Neither the mass nor the radius of its orbit.

7. **If the wire is stretched to double of its original length, then the strain in the wire is _____**
 - a) 1
 - b) 2
 - c) 3
 - d) 4

8. **The graph between the volume and temperature in Charles' law is _____**
 - a) an ellipse
 - b) a circle
 - c) a straight line
 - d) a parabola

9. **A sample of ideal gas is at equilibrium. Which of the following quantity is zero?**
 - a) RMS speed
 - b) Average speed
 - c) Average velocity
 - d) Most Probable speed

10. **A particle executing SHM crosses point A and B with the same velocity. Having taken 3s in passing from A to B, it returns to B after another 3s. The time period is _____**

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 $g=10\text{ms}^{-2}$)
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.

6×3=18

25. Explain the principle of homogeneity of 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 its 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.

5×5=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:

- 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. 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 _____
 - a) $\frac{r_2}{r_1}$
 - b) $\left(\frac{r_2}{r_1}\right)^2$
 - c) $\frac{r_1}{r_2}$
 - d) $\left(\frac{r_1}{r_2}\right)^2$
2. For a given material, the rigidity modulus is $\left(\frac{1}{3}\right)^{\text{rd}}$ of Young's modulus. Its Poisson's ratio is _____
 - a) 0
 - b) 0.25
 - c) 0.3
 - d) 0.5

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

- a) $R=(250\pm 5)\ \Omega$ b) $(240\pm 5)\ \Omega$
 c) $(260\pm 5)\ \Omega$ d) $(265\pm 5)\ \Omega$

PART – II

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

6×2=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.

6×3=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 $5 \times 10^{-10} \text{Nm}^{-2}$. What is the number of molecules per m^3 if Boltzmann's constant is $1.38 \times 10^{-23} \text{JK}^{-1}$.

PART – IV

Answer all the questions. **5×5=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 heat 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 $v = \sqrt{\frac{T}{\mu}}$



$6 \times 2 = 12$

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.

 $6 \times 3 = 18$

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) $x = A \sin \omega t + \cos \omega t$ ii) $x = A \sin \omega t + B \cos 2\omega t$.

PART – IV

Answer all the questions.

5×5=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.

- a) $\Delta U > 0, W > 0$ b) $\Delta U < 0, W > 0$
 c) $\Delta U < 0, W < 0$ d) $\Delta U = 0, W > 0$
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 n^{th} mode is _____
- a) $\lambda/2$ b) 2λ
 c) λ d)

PART – II

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

6×2=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.

6×3=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 rays?
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 $\frac{1}{2} mv^2 = mgh$ using dimensional analysis method.

PART – IV

Answer all the questions.

5×5=25

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

(OR)

b) State Newton's three laws and discuss their significance.

35. a) Explain with a 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.



MODEL QUESTION PAPER - 7**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. 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_s : The maximum Stalic friction experienced by

the mean free path of the gas molecules _____

- a) remains same b) doubled
c) tripled d) quadrupled

11. The damping force on an oscillator is directly proportional to the velocity the unit 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 in resonance with the 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. Find the angular frequency for the following Simple Harmonic Oscillation $y=0.3 \sin(40 \pi t+1.1)$ _____

- a) $\omega= 40\pi \text{ rad s}^{-1}$ b) $\omega= 40\pi t \text{ rad s}^{-1}$
c) $\omega=41.1\pi \text{ rad s}^{-1}$ d) $38.9 \pi t \text{ rads}^{-1}$

14. The SI unit of thermal conductivity is _____

- a) $\text{JS}^{-1}\text{m}^{-1}\text{K}^{-1}$ b) JSm^{-1}K
c) $\text{JSm}^{-1}\text{K}^{-1}$ 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.

6×2=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.

6×3=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) 3.996×10^5 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°

PART – IV

Answer all the questions.

5×5=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 in 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.

□ □ □

MODEL QUESTION PAPER - 8

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. 15×1=15

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

1. The velocity of a particle v at and instant t is given by $V=at+bt^2$. The dimension of b is _____

a) $[L]$	b) $[LT^{-1}]$
c) $[LT^{-2}]$	d) $[LT^{-3}]$
2. If the velocity is $\vec{V} = 2\hat{i} + t^2\hat{j} - 9\hat{k}$ the magnitude of the acceleration at $t=0.5$ s is _____

a) 1ms^{-2}	b) 2ms^{-2}
c) zero	d) -1ms^{-2}
3. The 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
4. The work done by the 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 b) pure translation
 c) rotation and translation d) no motion

6. The dimensional formula for velocity is _____

- a) $[LT^{-1}]$ b) $[LT]$
 c) $[MLT^{-1}]$ d) $[ML^{-1}T]$

7. The kinetic energy of the satellite orbiting around the Earth is _____

- a) Equal to potential energy b) less than potential energy
 c) greater than kinetic energy d) zero

8. If a wire is stretched to double of its original length, then the strain in the wire is _____

- a) 1 b) 2
 c) 3 d) 4

9. In an isochoric process, we have _____

- a) $W = 0$ b) $Q = 0$
 c) $\Delta U = 0$ d) $\Delta T = 0$

10. If the inertial mass and gravitational mass of the simple pendulum of length l are not equal, then the time period of the period _____

- a) $T = 2\pi \sqrt{\frac{m_i l}{m_g g}}$ b) $T = 2\pi \sqrt{\frac{m_g l}{m_i g}}$
 c) $T = 2\pi \frac{m_g}{m_i} \sqrt{\frac{l}{g}}$ d) $T = 2\pi \frac{m_i}{m_g}$

PART – II**Answer any six questions and question No. 24 is compulsory.****6×2=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 $T_1=273\text{k}$)

PART – III**Answer any six questions and question No. 33 is compulsory.****6×3=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 13°).

PART – IV

Answer all the questions.

5×5=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 Poiseuille's formula for the volume of a liquid flowing 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.

MODEL QUESTION PAPER - 9

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.

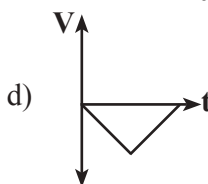
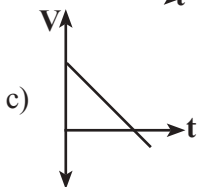
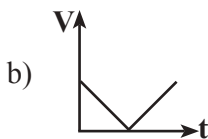
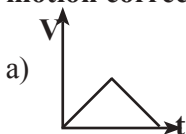
PART – I

Note: (i) Answer all the questions. 15×1=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) $[MLT^0]$
 - b) $[MLT^{-1}]$
 - c) $[ML^{-2}T]$
 - d) $[ML^{-1}T^{-0}]$

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 from pole to equator, the centrifugal force acting on him _____
- increases
 - decreases
 - remains same
 - increases and then decreases
4. A spring of force constant k is cut into two parts such that one part is double the length of the other. Then, the longer part will have a force constant of _____
- $\frac{2}{3}k$
 - $\frac{3}{2}k$
 - $3k$
 - $6k$
5. A rigid body rotates with an angular momentum L . If its kinetic energy is halved, the angular momentum becomes _____.
- L
 - $\frac{L}{2}$
 - $2L$
 - $\frac{L}{\sqrt{2}}$
6. The force experienced by a body of mass 100 kg moving with an acceleration of 50 cm s^{-2} is _____
- 45 N
 - 50 N
 - 55 N
 - 60 N
7. If a person moves from Chennai to Trichy, his weight, _____
- increase
 - decrease
 - remains same
 - increase and then decrease
8. For a given material, the rigidity modulus is $(\frac{1}{3})^{\text{rd}}$ of Young's modulus. Its Poisson's ratio is _____
- 0
 - 0.25
 - 0.3
 - 0.5

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 $6.4 \times 10^6 \text{ m}$)

PART – IV

Answer all the questions.

5×5=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 collision 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 tuning fork using sonometer.

□ □ □

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 $3 \times 10^{-10}m$.

PART – III

Answer any six questions and question No. 33 is compulsory.

$6 \times 3 = 18$

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 $1.2 \times 10^{-10}m$. 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-viscous and streamlined flow of fluid.

37. a) Describe the 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.

□ □ □

MODEL QUESTION PAPER - 11**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

PART – II**Answer any six questions and question No. 24 is compulsory.****6×2=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 a 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 a room of capacity 25m^3 at a temperature of 27°C .

PART – III**Answer any six questions and question No. 33 is compulsory.****6×3=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 vectors.
33. An object of mass 1 kg is falling from the height $h=10\text{m}$. Calculate the total energy of an object and potential energy and kinetic energy of an object at when it is at $h=4\text{m}$.

PART – IV

Answer all the questions.

5×5=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) Derive 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

Govt. Model Question Paper														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Model Question Paper - 1														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

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

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

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

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

Model Question Paper - 6

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
d	a	b	b	a	b	a	b	d	d	b	d	b	a	c

Model Question Paper - 7

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
b	a	d	b	c	a	b	d	a	b	c	c	a	a	a

Model Question Paper - 8

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
d	a	b	b	a	a	b	b	a	a	b	a	a	a	d

Model Question Paper - 9

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
d	c	a	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
c	c	c	b	b	c	b	d	b	d	a	a	b	b	a

Model Question Paper - 11

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
a	d	a	a	d	a	b	b	b	c	a	d	a	c	a