FIRST MID TERM EXAMINATION - 2018 | **Exam No.**

Time: 2-30 Hrs. **XI - PHYSICS** *Marks : 70*

PART - I

Note : 1. Answer all the questions. 2. Choose the correct answer. ***(15x1=15)***

1. If the force is proportional to square of velocity, then the dimension of proportionality constant is
   a) MLT^0 b) MLT^{-1}
   b) $ML^{-2}T$ d) $ML^{-1}T^0$
2. Plancu's constant (h), speed of light in vacuum (c) and Newton's gravitational constant (G) are taken as three fundamental constants. Which of the following combinations of these has the dimension of length
   a) $\frac{\sqrt{hG}}{c^{\frac{5}{2}}}$ b) $\sqrt{\frac{hC}{G}}$
   c) $\sqrt{\frac{GC}{h^{\frac{3}{2}}}}$ d) $\frac{\sqrt{hG}}{C^{\frac{3}{2}}}$
3. One of the combination from the fundamental physical constant is $\frac{hc}{G}$. The unit of this expression is
   a) m b) Kg^2 c) m^3 d) s^{-1}
4. Which of the following has the highest number of significant figure
   a) 6.3200J b) $0.007m^2$
   c) $2.64 \times 10^{24}kg$ d) $0.0006032m^2$
5. A Physical Quantity x is given by $\frac{a^2b^3}{c\sqrt{d}}$. If the percentage errors of measurements in a, b, c and d are 4%, 2%, 3% and 1% respectively, then calculate the percentage error in calculation of x
   a) 15.5% b) 17.5% c) 18.5% d) 16.5%
6. Identify the unit vector in the following
   a) $\frac{\hat{i}+\hat{j}}{\sqrt{2}}$ b) $\hat{i}+\hat{j}$ c) $\hat{i}/\sqrt{2}$ d) $\hat{k}-\hat{j}/\sqrt{2}$
7. If the velocity is $\vec{v} = 2\hat{i} + t^2\hat{j} - 9\hat{k}$, then the magnitude of acceleration at t=0.5s is
   a) $1ms^{-2}$ b) $2ms^{-2}$ c) Zero d) $-1ms^{-2}$
8. An object is dropped in an unknown planet from height 50m, it reaches the ground in 2s. The acceleration due to gravity in this unknown planety is
   a) $20ms^{-2}$ b) $25ms^{-2}$ c) $15ms^{-2}$ d) $30ms^{-2}$
9. If an object is thrown vertically up with the initial speed 'u' from the ground, then the time taken by the object to return back to ground is
   a) $\frac{u^2}{2g}$ b) $\frac{u^2}{g}$ c) $\frac{2u}{g}$ d) $\frac{u}{2g}$
10. A particle is in circular motion with an acceleration $\alpha=0.2$ rad s^{-2}. What is the angular displacement made by the particle after 5s?
    a) 5 rad b) 2.5 rad c) 1.5 rad d) Zero
11. If two object of masses 2.5kg and 100kg experience the same force of 5N, what is the acceleration experienced by each of them respectively (in ms^{-2})
    a) 1, 1 b) 0.05, 2 c) 1, 1.5 d) 2, 0.05
12. A particle of mass 2kg experiences two forces $\vec{F}_1 = 5\hat{i} + 8\hat{j} + 7\hat{k}$; $\vec{F}_2 = 3\hat{i} - 4\hat{j} + 3\hat{k}$ what is the acceleration of the particle
    a) $\vec{a} = 2\hat{i} + 4\hat{j} + \hat{k}$ b) $\vec{a} = 4\hat{i} + 2\hat{j} + 5\hat{k}$
    c) $\vec{a} = \hat{i} + \hat{j} + \hat{k}$ d) $\vec{a} = 4\hat{i} + 5\hat{j} + 2\hat{k}$

13. Two masses m_1 and m_2 are experiencing 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

14. The centrifugal force appears to exist
a) Only in initial frames b) Only in rotating frames
c) In any accelerated frame d) Both in inertial and non-inertial frames

15. When the object is moving at constant velocity on the rough surface
a) Net force on the object is ZERO b) No force acts on the object
c) Only external force acts on the object d) Only kinetic friction acts on the object

PART - II

Note:Answer any 6 Questions in which Question No.24 is compulsory. ***(6x2=12)***

16. Define One Newton.
17. State Lami's theorem.
18. Find momentum of the equation $y = ut - \frac{1}{2}gt^2$.
19. Write Range of Time Scale and Messes.
20. Define Triple point of water.
21. Check the correctness of the equation correct/wrong by dimensional method $s = ut + \frac{1}{2}at^2$.
22. State 'Triangular law' of Vector.
23. Write the equation of motion. (only equations)
24. An average speed of train is 54km h^{-1} when applying brake, it stops at 225m. Calculate the retardation of the moving train.

PART - III

Note:Answer any 6 Questions in which Question No is 29 compulsory. ***(6x3=18)***

25. Write down the limitation and applications of Dimentsional analysis.
26. Write down the significant figure of the following.
i) 600800 ii) 5213.0 iii) 400 iv) 2.65×10^{24}m v) 0.007 vi) 0.0006032
27. What is called significant figures of digit? Write any three rules with example.
28. Write down any five proporties of multiplication of vector by SCALAR?
29. If $\vec{r} = 2\hat{i} + 3\hat{j} + 5\hat{k}$ and $\vec{F} = 3\hat{i} - 2\hat{j} + 4\hat{k}$ find the resultant vector of $\vec{\tau} = \vec{r} \times \vec{f}$.
30. Discuss Degree and Radian.
31. What is Inertia? Write down its types.
32. Explain the motion of blocks connected by a string in (i) Vertical motion (ii) Horizontal motion
33. Why it is not possible to push a car from inside?

PART - IV

Note : Answer all the Questions. ***(5x5=25)***

34. Assuming that the frequency (v) of a vibrating string may depend upon
(i) applied force (F) (ii) length (l) (iii) mass per unit length (m), prove that $v \propto \frac{1}{l}\sqrt{\frac{F}{m}}$ using dimensional analysis.

(OR)

What is Errors? Explain its types.

35. If the value of universal gravitational constant is SI is $G_{SI} = 6.6 \times 10^{-11} Nm^2 Kg^{-2}$, then find its value in CGS system.

(OR)

What do you mean by propagation of errors? Explain the propagation errors in addition and multiplication.

36. Derive the equation of motion, range and maximum height reached by the particle thrown at ar oblique angle θ with respect to the horizontal directions.

(OR)

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

37. Define: (i) Displacement (ii) Distance Travelled (iii) Velocity
(iv) Speed (V) Acceleration

(OR)

A bob attached to the string oscillates back and forth. Resolve the forces acting on the bob int components. What is the acceleration experience by the bob at an angle θ.

38. An object is thrown with initial speed of 5ms^{-1}, with an angle of projection 30°. What is the heigh and range reached by the particle.

(OR)

Prove the law of conservation of lineal momentum. Use it to find the recoil velocity of a gun whe a bullet is fixed from it.

QUARTERLY EXAMINATION - 2018 | Exam No.

Time: 2-30 Hrs. **XI - PHYSICS** *Marks : 70*

PART - I

Note: *Answer all the questions.* *(15x1=15)*

Choose the best answer.

1. Unit of Angular acceleration is _____
   a) rad s^{-1} b) rad m^{-1}
   c) rad s^{-2} d) rad m^2
2. Triple point of water is _____
   a) 273.16 k b) 237.16c
   c) 273.16c d) 0 k
3. If π=3.14 then the value of π^2 is
   a) 9.8596 b) 9.860
   c) 9.86 d) 9.9
4. Mass, Temperature, Electric current are _____
   a) Fundamental quantities b) Scalar quantities
   c) Vector quantities d) Both a and b
5. If the velocity is $\vec{v} = 2\hat{i} + t^2\hat{j} - 9\hat{k}$ then the magnitude of acceleration at t=0.5s is _____
   a) 1 ms^{-2} b) 2 ms^{-2}
   c) Zero d) –1 ms^{-2}
6. A bus is moving with a speed of 10 ms^{-1} on a straight road. A scooterist wishes to overtake the bus in 100 s. If the bus is at a distance of 1km from the scooterist, with what speed should the scooterist chase the bus?
   a) 40 ms^{-1} b) 25 ms^{-1}
   c) 10 ms^{-1} d) 20 ms^{-1}
7. Earth moving about sun in elliptical orbit is an example for
   a) Force and motion in same direction b) Force and motion in different direction
   c) Force and motion in opposite direction d) Zero net Force
8. When a car takes a sudden left turn in the curved road, passenger is pushed towards the right due to _____
   a) Inertia of direction b) Inertia of motion
   c) Inertia of rest d) Absence of Inertia
9. An object of mass m begins to move on the plane inclined at an angle θ. The co-efficient of static friction of inclined surface is μ_s. The maximum static friction experienced by the mass is
   a) mg b) μ_s mg
   c) μ_s mg sin θ d) μ_s mg cos θ
10. The work done by the conservative force for a closed path is _____
    a) Always negative b) Zero
    c) Always positive d) Not defined
11. 1 kwh is equal to
    a) 3.6×10^4 J b) 3.6×10^5 J
    c) 3.6×10^6 J d) 36×10^6 J
12. Co-efficient of restitution, for an elastic collision is _____
    a) e=–1 b) e=0
    c) e=1 d) e=2
13. A couple produces
    a) Pure rotation b) Pure translation
    c) Rotation and translation d) No motion

14. The moment of inertia of a Thin rod about and axis passing through the centre and perpendicular to the length is _____
a) $Ml^2/3$ b) $Ml^2/12$
c) $Ml^3/12$ d) $M(l^2+b^2)/12$

15. The centre of mass of a system of particles does not depend upon
a) Position of particles b) Relative distance between particles
c) Masses of particles d) Force acting on particle

PART - II

Note:Answer any 6 Question. Question No.19 is compulsory. ***(6x2=12)***

16. What are the advantages of SI system?
17. What is fractional error?
18. Define Position Vector?
19. What is the angle of projection to have a maximum Range in 'kitti pull'? If one strikes kitti pull with the speed of $98ms^{-1}$ what is the maximum Range achieved?
20. What is Impulsive Force?
21. State Lami's Theorem?
22. What is power? Give its Dimensional formula?
23. What is the condition for perfect inelastic collision?
24. State the law of conservation of angular momentum.

PART - III

Note:Answer any 6 Question. Question No is 31 compulsory. ***(6x3=18)***

25. Find the dimensional formula for hC/G?
26. Write the rules for determining significant figures.
27. Drive any two equations of uniformly accelerated motion by calculus Method.
28. Is zero Relative velocity possible? Explain.
29. A mango is hanging from a tree, draw a free body diagram relative to this event. Find the tension acting on the mango. (Mass of the mango is 400g).
30. What is centripetal force? Give its formula.
31. A box is pulled with a force of 25N to produce a displacement of 15m. If the angle between the force and displacement is 30°, find the work done by the force.
32. What are conservative and non-conservative forces?
33. Define centre of Mass and centre of gravity.

PART - IV

Note:Answer all the Questions. ***(5x5=25)***

34. a) What are the applications of dimensional analysis. Verify $S=ut+1/2at^2$ by dimensional analysis.

(OR)

b) Explain the types of equilibrium with suitable examples.

35. a) Explain triangulation method and RADAR method to measure larger distances.

(OR)

b) Arrive at an expression for velocity of objects in one dimensional elastic collision.

36. a) Explain in detail the triangle law of Vector Addition.

(OR)

b) State and prove parallel axis theorem.

37. a) Prove that the path followed by the projectile under an angular projection is a parabola.

(OR)

b) Compare static friction with kinetic friction.

38. a) State Newton's laws of motion and explain briefly.

(OR)

b) State and Explain Work-Energy principle.

SECOND MID TERM EXAMINATION - 2018	Exam No.

Time: 2-30 Hrs. **XI - PHYSICS** Marks : 70

PART - I

Note : 1. Answer all the questions.
2. Choose the correct answer. *(15x1=15)*

1. A couple produces
   a) Pure rotation b) Pure translation
   c) Rotation and translation d) No motion
2. A rigid body rotates with an angular momentum L. It its Kinetic Energy is halved, the angular momentum becomes
   a) L b) $L/2$ c) 2L d) $L/\sqrt{2}$
3. A round object of mass M and radius R rolls down without slipping along an inclined plane. The frictional force
   a) dissipates kinetic energy as heat
   b) decreases the rotational motion
   c) decreases the rotational motion and translational motion
   d) converts the translational energy in to rotational energy
4. A solid sphere of mass 20kg and radius 0.25m rotates about an axis passing through the center what is the angular momentum if the angular velocity is 5 rad s^{-1}
   a) 2.5kg $m^2 s^{-1}$ b) 20kg $m^2 s^{-1}$
   c) 0.5kg $m^2 s^{-1}$ d) 4kg $m^2 s^{-1}$
5. The gravitational potential energy of the moon with respect to earth is
   a) Always positive b) Always negative
   c) Can be positive or negative d) Always zero
6. If the mass and radius of the earth are both doubled, then the acceleration due to gravity g
   a) Remains same b) g/2
   c) 2g d) 4g
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 the ratio of the orbital distance of two planets $d_1/d_2=2$, what is the ratio of gravitational field experienced by these two planets
   a) $E_2=4E_1$ b) $E_2=E_1$
   c) $4E_2=E_1$ d) Zero
9. With an increase in temperature the viscosity of liquid and gas, respectively will
   a) Increase and increase b) Increase and decrease
   c) Decrease and increase d) Decrease and decrease
10. The Young's modulus for a perfect rigid body is
    a) 0 b) 1 c) 0.5 d) Infinity
11. The wettability of a surface by a liquid depends primarily on
    a) Viscosity b) Surface tension
    c) Density d) Angle of contact between the surface and liquid
12. At the critical temperature of water, its surface tension is
    a) 10 Nm^{-1} b) Zero
    c) Infinity d) 72 Nm^{-1}
13. The graph between volume and temperature in Charles Law is
    a) an ellipse b) a circle
    c) a straight line d) a parabola

14. The volume of one gram mole of a gas at normal temperature and pressure condition is
a) 22.4 liter b) 11.2 liter
c) 2.24 liter d) 10.2 liter

15. SI unit of Stefan's constant
a) Wm^{-2} b) $Wm^{-2}k^{-4}$
c) mk d) $Wm^3 k^4$

PART - II

Note : Answer any 6 questions. *(6x2=12)*
Question No. 17 is compulsory

16. State the law of conservation of angular momentum.
17. A rolling wheel has a velocity of its center of mass as $5ms^{-1}$. If its radius is 1.5m and angular velocity is 3 rad s^{-1}, then check whether it is in pure rolling or not.
18. Define Gravitational Potential.
19. Why is there no lunar eclipse and solar eclipse every month?
20. State Hooke's Law of elasticity.
21. Distinguish between streamlined flow and turbulent flow.
22. Define angle of contact for a given pair of solid and liquid.
23. Define specific heat capacity and give its unit.
24. State Zeroth Law of Thermodynamics.

PART - III

Note : Answer any 6 questions. *(6x3=18)*
Question No. 31 is compulsory

25. Define radius of gyration. Derive an expression for it.
26. How do you distinguish between stable and unstable equilibrium?
27. State Kepler's Law.
28. What is Geo stationary and Polar satellite?
29. Consider a satellite orbiting the earth in a circular orbit of radius 1600km above the surface of the earth. What is the acceleration experienced by the satellite due to earth's gravitational force.
30. Define Three moduli of elasticity.
31. A solid sphere has a radius of 1.5cm and a mass of 0.038kg. Calculate the specific gravity or relative density of the sphere.
32. Obtain an ideal gas law from Boyle's and Charle's Law.
33. Discuss the various modes of heat transfer.

PART - IV

Note : Answer all the questions. *(5x5=25)*

34. Discuss rolling on inclined plane and arrive at the expression for the acceleration.
(OR)
Explain the variation of g acceleration due to gravity with altitude and depth.

35. Define escape velocity. Derive an expression for it.
(OR)
Derive an expression for the time period of an orbiting satellite.

36. Define Terminal Velocity and derive an expression for the same.
(OR)
Define Surface tension. What are it's application.

37. State and prove Bernoulli's theorem for a flow of incompressible, non-viscous and stream lined flow of liquid.
(OR)
Describe the construction and working of venturimeter and obtain an expression for the volume of liquid flowing per second through a wider entry of the tube.

38. Explain in detail Newton's Law of cooling.
(OR)
Derive Mayer's relation for an ideal gas.

HALF YEARLY EXAMINATION - 2018 | Exam No. | | | | | | |

Time : 2-30 Hrs **XI - PHYSICS** *Marks : 70*

PART - I

Note : 1. Answer all the questions. 2. Choose the best answer. ***(15x1=15)***

1. If the length and time period of an oscillating pendulum have errors of 1% and 3% respectively then the error in measurement of acceleration due to gravity is
   a) 4% b) 5% c) 6% d) 7%
2. Which of the following physical quantities have same dimensional formula?
   a) Torque and work done b) Energy and angular momentum
   c) Force and Torque d) Angular momentum and linear momentum
3. If a particle has negative velocity and negative acceleration, its speed
   a) Increases b) Decreases
   c) Remains the same d) Is zero
4. An object is dropped in an unknown planet from height 50m. It reaches the ground in 2s. The acceleration due to gravity in this unknown planet is
   a) g=20 ms^{-2} b) g=25 ms^{-2} c) g=15 ms^{-2} d) g=30 ms^{-2}
5. A force vector applied on a mass is represented as $\vec{F} = 6\hat{i} - 8\hat{j} + 10\hat{k}$ and accelerates with $\sqrt{2}\ ms^{-2}$. What will be the mass of the body?
   a) 10kg b) 20kg c) $10\sqrt{2}$ kg d) $2\sqrt{10}$kg
6. Two masses m_1 and m_2 are experiencing the same force where $m_1 < m_2$. The ratio of their acceleration a_1/a_2 is
   a) 1 b) less than 1 c) greater than 1 d) all the three cases
7. When an object is at rest on the inclined rough surface
   a) Static and kinetic frictions acting on the object is zero
   b) Static friction is zero but kinetic friction is not zero
   c) Static friction is not zero and kinetic friction is zero
   d) Static and kinetic frictions are not zero
8. What is the minimum velocity with which a body of mass m must enter a vertical loop of radius R so that it can complete the loop?
   a) $\sqrt{2gR}$ b) $\sqrt{3gR}$ c) $\sqrt{5gR}$ d) $\sqrt{gR}$
9. The coefficient of restitution (e) for a material is as follows
   a) e=0 b) e=1 c) 0<e<1 d) 0>e>−1
10. A rope is wound around a hallow cylinder of mass 3kg and radius 40cm. What is the angular acceleration of the cylinder if the rope is pulled with a force 30N?
    a) 0.25 rad s^{-2} b) 25 rad s^{-2}
    c) 5 m s^{-2} d) 25 m s^{-2}
11. The magnitude of the Sun's gravitational field as experienced by Earth is
    a) Same over the year
    b) Decreases in the month of January and increases in the month of July
    c) Decreases in the month of July and increases in the month of January
    d) Increases during day time and decreases during night time
12. For a given material, the rigidity modulus is $(1/3)^{rd}$ of young's modulus. Its Poisson's ratio is
    a) 0 b) 0.25 c) 0.3 d) 0.5
13. A hot cup of coffee is kept on the table. After sometime it attains a thermal equilibrium with the surroundings. By considering the air molecules in the room as a thermodynamic system, which of the following is true?
    a) $\Delta U>0, Q=0$ b) $\Delta U>0, w=0$
    c) $\Delta U>0, Q>0$ d) $\Delta U=0, Q>0$

14. The efficiency of a heat engine working between the freezing point and boiling point of water is
a) 6.25% b) 20% c) 26.8% d) 12.5%

15. The dimension of sphere of influence of molecules is
a) 1Å b) 10Å c) 100Å d) 0.1Å

PART - II

Note: Answer any 6 Questions in which Question No.20 is compulsory. ***(6x2=12)***

16. What are the limitations of dimensional analysis?
17. Compare scalars and vectors.
18. Give the various types of friction. Suggest a few methods to reduce friction.
19. Differentiate elastic and inelastic collisions.
20. Calculate the work done by a force of 30 N in lifting a load of 2 kg to a height of 10 m ($g=10\ m\ s^{-2}$).
21. How do you distinguish between stable and unstable equilibrium?
22. Why is the energy of a satellite or any other planet negative?
23. State Hooke's law of elasticity.
24. In an adiabatic process with an equation $PT^{\gamma/1-\gamma}$, the pressure of a gas is found to be proportional to the cube of the temperature. What is the ratio of C_p / C_v of the gas?

PART - III

Note: Answer any 6 Questions in which Question No is 29 compulsory. ***(6x3=18)***

25. How is the diameter of the Moon measured using parallax metnod?
26. Write a short note on vector product between two vectors.
27. Explain the concept of inertia. Give examples for inertia of motion, inertia of rest and inertia of direction.
28. Compare conservative and non-conservative forces.
29. The position vectors of two point masses 10kg and 5kg are $(3\hat{i} + 2\hat{j} + 4\hat{k})$ m and $(3\hat{i} + 6\hat{j} + 5\hat{k})$ m respectively. Locate the position of center of mass.
30. State Kepler's three laws.
31. Distinguish between streamlined flow and turbulent flow.
32. Obtain an ideal gas equation from Boyle's and Charles' laws.
33. A car moving with a speed of 40km/hr comes to rest at a distance of 2m after applying brakes. If the same car is moving with a speed of 80km/hr, what is the minimum stopping distance.

PART - IV

Note : Answer all the Questions. ***(5x5=25)***

34. a) Explain the principle of homogeniety of dimensions. What are its uses?

(OR)

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

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

(OR)

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

36. a) Explain the motion in a vertical circle.

(OR)

b) State and prove parallel axes theorem.

37. a) What is escape speed? Derive an expression for it.

(OR)

b) State and prove Bernoulli's theorem.

38. a) Discuss the various modes of heat transfer.

(OR)

b) Derive Mayer's relation for an ideal gas.

UNIT TEST -I- 2018

Exam. No.

XI - PHYSICS

Time: 1-30 Hrs. **Marks: 50**

PART - I

Answer all the questions.

I. Choose and write the correct answer. ***(10x1=10)***

1. Two masses m_1 and m_2 are experiencing the same force where $m_1 < m_2$. The ratio of their acceleration a1/a2 is
   a) 1 b) Less than 1
   c) Greater than 1 d) All the three case
2. Tension of the string (Lamis Theorem) (T)
   a) mg cosθ b) $\frac{mg}{2\cos\theta}$ c) $\frac{2\cos\theta}{mg}$ d) mg sinθ
3. The dimension of $(\mu_0 \ \varepsilon_0)^{-\frac{1}{2}}$
   a) Length b) Time c) Velocity d) Force
4. Which of the following has the highest number of significant figures?
   a) $0.007m^2$ b) $2.64x10^{24}kg$
   c) $0.0006032m^2$ d) 6.3200J
5. The velocity of a particle 'v' at an instant 't' is given by $V=at+bt^2$. The dimensions of 'b' is
   a) L b) LT^{-1} c) LT^{-2} d) LT^{-3}
6. If $\pi=3.14$, then the value of π^2 is
   a) 9.8596 b) 9.860 c) 9.86 d) 9.9
7. 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) $\frac{\hat{i}+\hat{j}}{\sqrt{2}}$
8. If an object is dropped from the top of a building and it reaches the ground at t=4s, then the height of the building in ($g=9.8\ ms^{-2}$)
   a) 77.3m b) 78.4m c) 80.5m d) 79.2m
9. A Train was moving at the rate of 54 km h^{-1}. When brakes are applied. It came to rest within a distance of 225m. Calculate the retardation in the Train
   a) $0.1ms^{-2}$ b) $0.5ms^{-2}$ c) $0.8ms^{-2}$ d) $1ms^{-2}$
10. Vector producer of $\vec{A}x\vec{B}$ and $\vec{B}x\vec{A}$ are equal in magnitude even resultant direction is
    a) Along b) Opposite c) Perpendicular d) Parallel

PART - II

II. Answer any 5 questions in which Question No.1 compulsory. ***(5x2=10)***

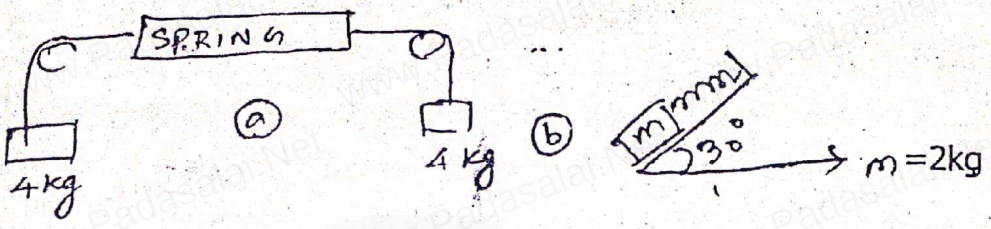
11. Any two features of SI units. L1
12. What is called Chandresekhar limit? (CSL) L1
13. Calculate the percentage of errors of $KE=1/2\ mv^2$ if mass and velocity are varies the percentage of error 3%, 4% respectively. L1

14. Define: i) Vector ii) Scalar
15. State Triangular law of vectors.
16. Calculate the Resultant vector producers of vectors $\vec{A}=4\hat{i}-2\hat{j}+\hat{k}$ and $\vec{B}=5\hat{i}+3\hat{j}-4\hat{k}$
17. State Lami's Theorem.
18. When walking on ice one should take short steps. Why?

PART - III

III. Answer any 5 questions. Question No.23 is Compulsorily. ***(5x3=15)***

19. State Newton's Third Law. Moreover Define Newton.
20. What is the reading shown in spring balance?



21. Write Kinematic equation of an object for constant acceleration.
22. Define (Horizantal Projection) (i) Path (ii) Time of flight
23. Two Trains A and B moving along parallel Tracks with the same velocity in the same direction, the velocity of each train be 50 km h^{-1}. Find the relative velocities of the Train.
24. Write limitations of Dimensional analysis.
25. Check dimensionally the equations are correct (or) wrong $1/2mv^2=mgh$.
26. Write down any three Rules of 'Significant Figures'.

PART - IV

IV. Answer all the questions. ***(3x5=15)***

27. Obtain an expression for the Time period T of a simple pendulum. The time period T depends upon
i) Mass 'm' ii) Length 'l' and
(iii) Acceleration due to gravity 'g' at the place ($K=2\pi$)

(OR)

If the value of universal gravitational constant in SI is 6.6×10^{-11} Nm^2 Kg^{-2}, the find its value in CGS system.

28. Write down any five properties of scalar product of (vector) or vector product of (vector). ***(OR)***
A particle moves in a circle of radius 10m. Its linear speed is given by v=3t, where t is second and v is in ms^{-1}.
a) If t=2s; find tangential acceleration.
b) Angle between the resultant acceleration and the radius vector.
29. If two objects of masses 25kg and 100kg experience the same forces 5N, what is the acceleration experienced by each of them? ***(OR)***
Find the acceleration of an object, moving in an inclined plane.

UNIT TEST -II- 2018

Exam. No.

XI - PHYSICS

Time: 1-30 Hrs. **Marks: 50**

PART - I

Answer all the questions.

I. Choose and write the correct answer. ***(10x1=10)***

1. The center of mass of a system of particles does not depend upon
   a) Position of particles
   b) Relative distance between particles
   c) Masses of particles d) Force acting or particle

2. The speed of the center of a wheel rolling on a horizontal surface in V_0. A point on the rim in level with the center will be moving at a speed of
   a) Zero b) V_0 c) $\sqrt{2}\,V_0$ d) $2V_0$

3. The movement of Inertia about an axis passing through the center of a thin hollow sphere
   a) $\frac{3}{5}MR^2$ b) $\frac{5}{3}MR^2$ c) $\frac{2}{3}MR^2$ d) $\frac{2}{5}MR^2$

4. A couple produces
   a) Pure rotation b) Pure translation
   c) Rotation and translation d) No motion

5. What is the minimum velocity with which a body of mass in must enter a vertical loop of radius R so that it can complete the loop?
   a) $\sqrt{2gR}$ b) $\sqrt{3gR}$ c) $\sqrt{5gR}$ d) $\sqrt{gR}$

6. The workdone by the conservative force for a closed path is
   a) Always negative b) Zero
   c) Always positive d) Not defined

7. A spring of force constant K is cut into two pieces such that one piece is double the length of the other. Then the long piece will have a force constant of
   a) 2/3K b) 3/2K c) 3K d) 6K

8. If the potential energy of the particle is $\alpha-\frac{\beta}{2}x^2$ then the force experienced by the particle is
   a) $F=\frac{\beta}{2}x^2$ b) $F=\beta x$ c) $F=-\beta x$ d) $F=-\frac{\beta}{2}x^2$

9. The centrifugal force appears to exist
   a) Only in inertial frames b) Only in rotating frames
   c) In any accelerated frame
   d) Both in inertial and non inertial frames

10. Force acting on the particle moving with constract speed is
    a) Always zero b) Need not be zero
    c) Always non zero d) Cannot be concluded

PART - II

II. ***Answer any 5 questions.*** ***Question No.15 is compulsory.*** ***(5x2=10)***

11. What is impulse.
12. Define static friction.
13. Write the differences between conservative and non conservative forces.
14. Derive the relation between momentum and kinetic energy.
15. A weight lifer lifts a mass of 250kg with a force of 5000N to the height of 5m. What is the workdone by the weight lifter?
16. Define center of mass.
17. Define torque and mention his unit.
18. What is equilibrium.

PART - III

III. ***Answer any 5 questions.*** ***Question No.21 is Compulsory.*** ***(5x3=15)***

19. Give relation between rotation kinetic energy and angular momentum.
20. State the law of conservation of angular momentum.
21. A cyclist while negotiating a circular path with speed $20ms^{-1}$ is found to bend an angle by 30° with vertical. What is the radius of the circular path. (given $g=10ms^{-2}$)
22. Compare elastic collision and inelastics collision.
23. State the relation between power and velocity.
24. Compare concervative forces and non conservative forces.
25. What is angle of Repose.
26. Identify the internal and external forces acting along the earth alone as a system.

PART - IV

IV. ***Answer all the questions.*** ***(3x5=15)***

27. The moon orbits the Earth once in 27.3 days is an almost circular orbit. Calculate the centripetal acceleration experienced by the Earth? ($R=6.4x10^6m$) ***(OR)***
    Explain the need for banking of tracks.
28. Explain the elastic collisions is one dimention. ***(OR)***
    State and explain work energy principle. Mention any three examples for it.
29. Derive the expression for moment of Inertia of a uniform ring about an axis passing the center and perpendicular to the plane. ***(OR)***
    State and explain parallel axis theorem and perpendicular axis theorm.

UNIT TEST -III- 2019

Exam. No.

XI - PHYSICS

Time: 1-30 Hrs. **Marks: 50**

PART - I

Answer all the questions.

I. Choose and write the correct answer. ***(10x1=10)***

1. A couple produces
   a) pure rotation b) pure translation
   c) rotation & translation d) nomotion
2. A rigid body rotates with an angular momentum (L) if its kinetic energy is halved, the angular momentum becomes
   a) L b) L/2 c) 2L d) $L/\sqrt{2}$
3. If the masses of the earth and sun suddenly double, the gravitation force between them will
   a) remain the same b) increase two times
   c) increase 4 times d) decrease two times
4. If the distance between the earth and sun were to be doubled from its present value the number of days in a year would be
   a) 64.5 b) 1032 c) 182.5 d) 730
5. If a wire is streached to double of its original length then a strain in the wire is
   a) 1 b) 2 c) 3 d) 4
6. Which of the following is not a scaler
   a) viscosity b) surface tension
   c) pressure d) stress
7. The graph between the volume and temperature in Charle's Law is
   a) an ellipse b) a circle
   c) a straight line d) a parabola
8. In an isochoric process, we have
   a) W=0 b) Q=0
   c) U=0 d) T=0
9. Unit of specific heat capacity
   a) $J\ kg^{-1}\ k^{-2}$ b) $J\ kg^{-1}\ k^{-1}$
   c) $J^{-1}\ kg\ k^{-1}$ d) $J^{-1}\ kg^{-1}\ k$

10. Dimensional formula for co-efficient of viscosity

a) $M^{-1}LT^{-2}$ b) $M^{0}L^{1}T^{-2}$

c) $M^{1}L^{2}T^{-1}$ d) $ML^{-1}T^{-1}$

PART - II

II. Answer any 5 questions.
Question No.14 is compulsory. *(5x2=10)*

11. Define Torque and mention its unit.
12. State conservation of angular momentum.
13. State Newton's universal law of gravitation.
14. Why is there no lunar eclipse and solar eclipes?
15. A wire of length 2m with the area a cross section $10^{-6}m^2$ is used to suspend a load of 980N. Calculate stress.
16. Defind One mole.
17. State Zeroth Law of Thermodynamics.

PART - III

III. Answer any 5 questions.
Question No.21 is Compulsory. *(5x3=15)*

18. How do you distinguish between stable and unstable equlibrium?
19. What are geostationary and polar satellites?
20. Explain the variation of "g" with altitude.
21. A solid sphere has a radius of 1.5cm and a mass of 0.038kg calculate the specific gravity or relative density of sphere.
22. Write the applications of surface tension.
23. Discuss the ideal gas laws.
24. Explain in detail Newton's law of Cooling.

PART - IV

IV. Answer all the questions. *(3x5=15)*

25. a) Derive Mayer's Relation for an ideal gas.

(OR)

b) Compare Translation motion and Rotational motion.

26. a) State and prove parallel axis theorem and perpendicular axis theorem.

(OR)

b) Explain in detail the Erathosthemes method of finding the radius of Earth.

27. a) Derive and expression for escape speed.

(OR)

b) State and prove Bernouli's theorm.

FIRST REVISION TEST - 2019	Exam No.						
Time : 2-30 Hrs	XI - PHYSICS						Marks : 70

PART - I

Note : 1. Answer all the questions.
2. Choose the most suitable answer from the given four alternatives and write the option code and the corresponding answer. ***(15x1=15)***

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. If a particle has Negative velocity and Negative acceleration, its speed
   a) Increases b) Decreases c) Remains the same d) Zero
3. If a person moving from pole to equator, the centrifugal force acting on him
   a) Increases b) Decreases
   c) Remains the same d) Increases and then Decreases
4. The workdone by the conservative force for a closed path is
   a) Always negative b) Zero c) Always positive d) nor defined
5. A rigid body rotates with an angular momentum L. If its kinetic energy is halved, the angular momentum becomes
   a) L b) L/2 c) 2L d) $L/\sqrt{2}$
6. Moment of force is called
   a) Angular momentum b) Torque c) Couple d) None
7. Two masses of 2g and 6g are moving with equal Kinetic energy. The ratio of the magnitudes of their linear momentum is
   a) 1:2 b) 2:1 c) 2:6 d) 1:3
8. A ball with an initial momentum 'p' collides normally with a rigid wall. If P_1 is the lineal momentum after the perfectly elastic coillision then
   a) $P_1=p$ b) $P_1=-p$ c) $P_1=2p$ d) $P_1=-2p$
9. If the mass and radius of the Earth are both doubled, then the acceleration due to gravity
   a) Remains the same b) g/2 c) 2g d) 4g
10. Which of the following is not a scalar?
    a) Viscosity b) Surface Tension c) Pressure d) Stress
11. Identify the state variables given here?
    a) Q, T, W b) P, T, U c) Q, W d) P, T, Q
12. A container has one mole of monoatomic ideal gas each molecules has 'f' degrees of freedom. What is the ratio of $r=c_p/c_v$?
    a) f b) f/2 c) f/f+2 d) f+2/f
13. Which of the following differential equations represents a damped harmonic oscillator?
    a) $\frac{d^2y}{dt^2}+y=0$ b) $\frac{d^2y}{dt^2}+r\frac{dy}{dt}+y=0$
    c) $\frac{d^2y}{dt^2}+k^2y=0$ d) $\frac{dy}{dt}+y=0$
14. Which of the following represents a wave?
    a) $(x-vt)^3$ b) x(x+vt) c) 1/x+vt d) sin(x+vt)
15. An organ pipe 'A' closed at one end in allowed to vibrate in its first harmonic and another pipe 'B' open at both ends is allowed to vibrate in its third harmonic. Both 'A' and 'B' are in resonance with a given tuning force. The ratio of the length of A and B is
    a) 8/3 b) 3/8 c) 1/6 d) 1/3

PART - II

Note: ***Answer any 6 Questions in which Question No.21 is compulsory.*** ***(6x2=12)***

16. A gas made of mixture of 2 moles of oxygen and 4 moles of argon at Temperature T. Calculate the energy of the gas in terms of RT. Neglect the vibrational mode.
17. Differentiate Simple Harmonic Motion and Angular Harmonic Motion. (Only Two points)
18. Define Intensity of sound and loudness of sound.
19. What is Error? Write its types.
20. Write down the Kinematic equations for angular motion? (only equation)
21. A rocket with a life off mass 2.5×10^4 kg is blast upward with an initial acceleration of $5 ms^{-2}$. Then the initial thrust of the blast is?
22. What is meant by Negative work? Give example.
23. State Parallel axis. (Theorem only)
24. If the ratio of the orbital distances of Two planets $\frac{d_1}{d_2} = 2$, what is the ration of gravitational field experience by these two planets.

PART - III

Note: ***Answer any 6 Questions in which Question No.27 is compulsory.*** ***(6x3=18)***

25. Explain Doppler effect.
26. Why dimensional methods are applicable only up to three Quantities?
27. The resultant of Two vectors A and B is perpendicular to vector A and its magnitude is equal to half of the magnitude of vector B. Then the angle between A and B is?
28. What are various types of friction and write methods to reduced the friction.
29. Differentiate conservative force and Non-conservative force.
30. Distinguish stable and unstable equillibrium.
31. State Kepler's Law (only).
32. Expression for elastic energy stored per unit volume of a wire.
33. Give the expression for Linear, Area and Volume thermal expansions.

PART - IV

Note : Answer all the Questions. ***(5x5=25)***

34. Jupiter is at a distance of 824.7 million km from the Earth. Its angular diameter is measured to be 35.72". Calculate the diameter of Jupiter.

(OR)

Derive the Kinematics equations of motion for constant acceleration.

35. Explain the similarities and difference of centripetal and centrifugal force.

(OR)

Explain elastic collision in one dimension and discuss various cases.

36. A uniform rod of mass 'm' and length 'l' makes a constant angle Q with an axis of rotation which passes through one end of the rod. Find the moment of inertia about this axis.

(OR)

Explain the variation of 'g' with depth from the Earths Surface.

37. State and prove Bernouillis theorem.

(OR)

Explain in detail Newton's law of cooling.

38. Describe the Maxwell Boltzmann distribution function.

(OR)

Discuss in detail the energy in Simple Harmonic Motion.

SECOND REVISION TEST - 2019	Exam No.						
Time : 2-30 Hrs	XI - PHYSICS						Marks : 70

PART - I

Note : 1. Answer all the questions. 2. Choose the best answer. **(15x1=15)**

1. Unit of gravitational constant
   a) $M^{-1}L^3T^2$ b) $M^{-1}L^3T^{-3}$
   c) $M^{-1}L^3T^{-2}$ d) $M^{-1}LT^{-1}$
2. The resultant of two vectors which are mutually perpendicular to each other
   a) A^2+B^2 b) $\sqrt{A^2+B^2}$
   c) A+B d) A–B
3. Relation between maximum height and range of an inclined projectile projected at an angle of projection 45°
   a) H=4R b) H=R
   c) H=R/4 d) H=R/2
4. If potential energy of a body is $\alpha-\beta/2\ x^2$, then the force experienced by it is
   a) $F=\beta/2\ x^2$ b) $F=\beta x$
   c) $F=-\beta x$ d) $F=-\beta/2\ x^2$
5. Potential energy gained by an object of mass 2kg raised to the height of 5m
   a) 100J b) 1000J
   c) 50J d) 200J
6. A particle is subjected to the circular motion. Angular momentum is independent of the following
   a) centre of cirle b) any point on the perimeter
   c) any point inside the circle d) any point outside the circle
7. A body of mass M and radius R is rolling down in an enclined plane, then the frictional force
   a) connerts kinetic energy into heat
   b) reduces rotational motion
   c) reduces rotational and translational motions
   d) connerts kinetic energy into rotational energy
8. An amount of work done on earth by the sun in an year
   a) zero b) not zero
   c) positive value d) negative value
9. Ratio of escape speed to orbital speed
   a) 2:1 b) $\sqrt{2}$:1
   c) 1:$\sqrt{2}$ d) 1:2
10. The place at which gravity is maximum when earth rotats about an axis
    a) equator b) pole
    c) both d) not in both
11. When the length of a rod is doubled then the strain
    a) 1 b) 2 c) 3 d) 4
12. Young's modulus of a rod when the temperature is raised
    a) doesnot change b) decreases
    c) increases a lot d) increase feebly
13. Which of the following system has state variables system
    a) Q, T, W b) P, T, U
    c) Q, W d) P, T, Q

14. Value of r=Cp/Cv of 8g helium and 16g oxygen mixture
a) 23/15 b) 15/23
c) 27/11 d) 17/27
15. Damping force of an oscillator is directly proportional to velocity, then the unit of force constant
a) kg ms^{-1} b) kg ms^{-2}
c) kg s^{-1} d) kg s

PART - II

Note: Answer any 6 Questions in which Question No.20 is compulsory. ***(6x2=12)***

16. What are dimensional constants? Give examples.
17. What is projectile? Mention types.
18. Define One Newton.
19. What is Kinetic energy? Obtain its equation.
20. A satellite is revolving around the earth at a height of 1600km find the acceleration due to gravity attained by the satellite.
21. Which is having more elasticity rubber or steel? Why?
22. What is black boady?
23. What are degrees of freedom?
24. What is doppler effect?

PART - III

Note: Answer any 6 Questions in which Question No. 29 is compulsory. ***(6x3=18)***

25. State law of Triangle.
26. Two forces are acting of 2kg are $\vec{F}_1 = 5\hat{i} + 8\hat{j} + 7\hat{k}, \vec{F}_2 = 3\hat{i} - 4\hat{j} + 3\hat{k}$ find acceleration of a body.
27. Explain conservative and non conservative forces with examples.
28. State parallel axis theorem. Give its equation.
29. Find the relative density of a solid sphere having radius 15cm and mass 0.038kg.
30. What is change of state? Give examples.
31. What is resonance? Give examples.
32. State laws of vibrations of stretched string.
33. Explain how acceleration due to gravity due to altitude.

PART - IV

Note : Answer all the Questions. ***(5x5=25)***

34. Derive an expression to determine time period of a simple pendulum using dimensional analysis.

(OR)

i) State Lami's theorem. ii) Explain the methods to reduce friction.

35. Show that the projectory of a inclined projectile is a parabola.

(OR)

Calculate the minimum speed at top and bottom points in a vertical circular motion.

36. Explain the dimensional elastic collision.

(OR)

i) Obtain the relation between angular velocity and angular momentum.
ii) Find the acceleration of a roling body in an inclined plane.

37. i) Explain the variation of 'g' due to depth.
ii) Calculate 'g' value at a height 200km above the earth and depth 200km below earth. At what point 'g' less?

(OR)

i) Obtain Mayer's equation. ii) Calculate work done in isothermal process.

38. Derive an expression to calculate terminal velocity of a solid sphere in a high visivous liquid.

(OR)

Derive an expression for total energy of a simple harmonic oscillator.

PART - I

I. **Choose the correct answer.** **15 x 1 = 15**

1. 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
2. With an increase in temperature , the viscosity of liquid and gas , respectively will
   a) Increase and decrease
   b) Decrease and increase
   c) Increase and increase
   d) Decrease and decrease
3. The kinetic energy of the satellite orbiting around the earth is
   a) Zero b)greater than kinetic energy c)less than potential energy d)equal to potential energy.
4. In a horizontal pipe of non-uniform cross section , water flows with a velocity of 1 ms^{-1} at a point where the diameter of the pipe is 20 cm. the velocity of water (ms^{-1}) at a point where the diameter of the pipe is
   a) 8 b)16 c)24 d)32
5. A planet moving along an elliptical orbit is closest to the sun at distance of r_1 and farthest away at a distance r_2 . If v_1 and v_2 are linear speeds at these points respectively. Then the ratio v_1/v_2 is
   a) $\frac{r_1}{r_2}$ b) $\frac{r_2}{r_1}$ c) $\left(\frac{r_1}{r_2}\right)^2$ d) $\left(\frac{r_2}{r_1}\right)^2$
6. The ratio of the acceleration for a solid sphere (mass m and radius R) rolling down an incline of angle θ without slipping and slipping down the incline without rolling is
   a) 7:5 b)2:5 c)5:7 d)2:3
7. The speed of the center of a wheel rolling on a horizontal surface is V_0 . A point on the rim in level with the center will be moving at a speed of
   a) V_0 b)zero c)$2V_0$ d)$\sqrt{2}\,V_0$
8. The dimension of $\frac{1}{\sqrt{\mu_0 \varepsilon_0}}$ is
   a) Force b)time c)length d)velocity
9. A body of mass 1kg is thrown upwards with a velocity 20ms^{-1} . It momentarily comes to rest after attaining a height of 18m. How much energy is lost due to air friction?
   a) 40J b)30J c)20J d)10J
10. Which of the following physical quantities cannot be represented by a scalar?
    a) Momentum b)mass c)length d)acceleration
11. Force acting on the particle moving with constant speed is
    a) Always zero b)need not be zero c)always non zero d)cannot be concluded
12. Work done by a simple pendulum in one complete oscillation is
    a) Zero b)$\sqrt{mg}$ c)mg cosθ d)mg sinθ
13. A man weights 80kg . He stands on a weighting scale in a lift which is moving upward with a uniform acceleration of 5ms^2 . What would be the reading on the scale?
    a) 800N b)1200N c)zero d)400N
14. The length of a body is measured as 3.15m. If the accuracy is 0.01m , then the percentage error in the measurement is
    a) 35% b)1% c)0.28% d)0.03%
15. The condition for the distance and displacement of a moving object to be equal is when the body moves along a
    a) Circle b)hyperbola c)parabola d)straight

PART – II

II. Answer any 6 of the following questions : Q.No : 20 is compulsory **6 x 2 = 12**

16. State the number of significant figures in the following .
    i) 600800 ii)5213.0 iii)0.0006032 iv)2.65×10^{24}
17. Define angular displacement and angular velocity.
18. Distinguish between static friction and kinetic friction.
19. Define co-efficient of restitution.
20. Find the moment of inertia of a disc of mass 3kg and radius 50cm about the axis passing through the center and perpendicular to the plane of the disc.
21. Distinguish between gravitational potential energy and gravitational potential.
22. Will the angular momentum of a planet be conserved ? Justify your answer.
23. What is Reynold's number? Give its significance.
24. Define poisson's ratio.

PART – III

III. Answer any 6 of the following questions. Q.No : 32 compulsory. **6 x 3 = 18**

25. Explain the use of screw guage and vernier caliper in measuring smaller distances.
26. Derive an expression for centripetal acceleration.
27. Show that in an inclined plane , angle of friction is equal to angle of repose.
28. State and explain work-energy principle (Theorem).
29. State and prove parallel axes theorem
30. Explain in detail the Eratosthenes method of finding the radius of earth.
31. State Hooke's law and verify it with the help of an experiment.
32. Water rises in a capillary tube to be 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?
33. Obtain an expression for the excess of pressure inside a (i)liquid drop (ii)Liquid bubble (soap bubble).

PART – IV

IV. Answer the followings. **5 x 5 = 25**

34. (a)i)Write the rules for determining significant figures.
    ii)In a submarine equipped with sonar, the time delay between the generation of a pulse and its echo after reflection from an enemy submarine is observed to be 80 sec. If the speed of sound in water is 1460 ms^{-1} what is the distance of enemy submarine?

[OR]

(b)Explain in detail the triangle law of addition.

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

[OR]

(b)Explain the motion in a vertical circle and obtain an expression for minimum speed at the highest point and minimum speed at lowest point.

36. (a)Explain why a cyclist bends while negotiating a curve road? Arrive at the expression for angle of bending for a given velocity.

[OR]

(b)Discuss rolling on inclined plane and arrive at the expression for the acceleration and velocity.

37. (a)Explain the variation of g with latitude.

[OR]

(b)Derive the time period of satellite orbiting the earth.

38. (a)Derive Poiseuille's formula for the volume of a liquid flowing per second through a pipe under streamlined flow.

[OR]

(b)Describe the construction and working of venturimeter and obtain an equation for the volume of liquid flowing per second through a wider entry of the tube.

FINAL REVISION TEST - 2019 | **Exam No.** | | | | | | |

Time : 2-30 Hrs | **XI - PHYSICS** | **Marks : 70**

PART - I

Note : 1. Answer all the questions. 2. Choose the best answer. **(15x1=15)**

1. Which of the following has the highest number of significant figures?
   a) 0.007 m^2 b) 2.64×10^{24} kg c) 0.0006032 m^2 d) 6.3200 J

2. ***Match List I with List II and select the correct answer.***

List I	-	List II
A) Acceleration	-	1) $[ML^{-1}T^{-2}]$
B) Pressure (or) stress	-	2) $[ML^{-1}T^{-1}]$
C) Moment of Inertia	-	3) $[LT^{-2}]$
D) Co-efficient of viscosity	-	4) $[ML^2]$

	A	B	C	D
a)	1	2	3	4
b)	3	1	4	2
c)	2	4	3	1
d)	4	3	2	1

3. Which of the following can be represented by a scalar?
   a) Force b) Momentum c) Mass d) Torque

4. Two masses m_1 and m_2 are experiencing the same force where $m_1 < m_2$. The ratio of their acceleration a_1/a_2 is
   a) 1 b) less than 1 c) greater than 1 d) all the above

5. One electrical unit is
   a) 1 W Hr b) 1 KW Hr c) 1MW Hr d) 1 GW Hr

6. If the force acts at the reference point, the torque is
   a) Maximum b) Minimum c) Zero d) Infinite

7. **Assertion :** Moon has no atmosphere.
   Reason : The escape speed of gases on the surface of moon is much less than the root mean square speeds of gases due to low gravity.
   a) Both Assertion and Reason are true
   b) Assertion is true and Reason is not the correct explanation for Assertion
   c) Both Assertion and Reason are false d) Assertion is false and Reason is true

8. A Hollow Sphere is filled with water. It is hung by a long thread. As the water flows cut of a hole at the bottom, the period of oscillation will
   a) First increase and then decrease b) First decrease and then increase
   c) Increase continuously d) Decrease continuously

9. ***Pict the odd one.***
   a) Sound waves b) X rays c) Radiowaves d) Light waves

10. When a uniform rod is heated, which of the following quantity of the rod will increase
    a) Mass b) Weight c) Center of mass d) Moment of Inertia

11. Density of water is maximum at
    a) 0°C b) 1°C c) –1°C d) 4°C

12. The principle used in Hydraulic lift is
    a) Boyle's law b) Charle's law c) Pascal's law d) Newton's law

13. ***Match List I with List II and select the correct answer. "A man is standing in the elevator"***

List I	-	List II
A) When the elevator is at rest	-	1) Apparent weight is less than actual weight N=m(g–a)
B) When the elevator is uniformly moving upward or downward	-	2) Apparent weight is greater than his actual weight N=m(g+a)
C) When the elevator is accelerated upwards	-	3) Apparent weight of the man is equal to his actual weight (N=mg)
D) When the elevator is accelerated downwards	-	4) Apparent weight is equal to actual weight

	A	B	C	D
a)	3	4	1	2
b)	1	2	3	4
c)	2	1	4	3
d)	3	4	2	1

14. A couple produces
a) Pure rotation b) Pure translation
c) Rotation and Translation d) No motion

15. What is the minimum velocity with which a body of mass 'm' must leave a vertical loop of radius R, so that it can complete the loop?
a) $\sqrt{2gR}$ b) $\sqrt{3gR}$ c) $\sqrt{5gR}$ d) $\sqrt{gR}$

PART - II

(6x2=12)

Note: Answer any 6 Questions in which Question No.20 is compulsory.

16. Define intensity of sound and loudness of sound.
17. What is an epoch?
18. State Kelvin-Planck statement of second law of thermodynamics.
19. What are the factors affecting the surface tension of a liquid?
20. From a point on the ground, the top of a tree is seen to have an angle of elevation 60°. The distance between the tree and a point is 50m. Calculate the height of the tree.
21. What is the difference between velocity and average velocity?
22. Under what condition will a car skid on a levelled road?
23. A weight lifter lifts a mass of 250 kg with a force 5000N to the height of 5m. What is the workdone by the weight lifter?
24. Give any two examples of torque in day-to-day life.

PART - III

(6x3=18)

Note: Answer any 6 Questions in which Question No. 29 is compulsory.

25. What are the limitations of dimensional analysis.
26. State Newton's Three Laws.
27. In the cricket game, a batsman strikes the ball such that it moves with the speed 30 m/s, at an angle 30° with the horizontal. The boundary line of the cricket ground is located at a distance of 75m from the batsman. Will the ball go for a six.
28. Write the various types of potential energy. State the formulae.
29. Explain the types of equilibrium with suitable examples.
30. State Kepler's Three Laws.
31. Which one of these is more elastic, steel or rubber? Why?
32. A refrigerator has Cop of 3. How much work must be supplied to the refrigerator in order to remove 200J of heat from its interior.
33. What is meant by Resonance? Give an example.

PART - IV

(5x5=25)

Note : Answer all the Questions.

34. What do you mean by propagation of errors? Explain the propagation of errors in addition and multiplication?

(OR)

What are concurrent forces? State Lami's theorem.

35. Derive an expression for escape speed.

(OR)

Derive Mayer's relation.

36. Discuss the properties of scalar and vector products. (each five points)

(OR)

State and explain Work energy principle.

37. State and prove Parallel axis theorem.

(OR)

State and prove Bernoullis theorem for a flow of incompressible, non-visious and steamlined flow of liquid.

38. i) Write down the postulates of Kinetic theory of gases. (any 6 points)
ii) Distinguish simple harmonic motion and angular simple harmonic motion. (any 2 points)

(OR)

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