TESTS

&

ASSIGNMENTS

PHYSICS XI

CONTENTS

Name_____Roll No._____ Date_____

TICK THE CORRECT ANSWER

1	The study of nature is classified into a) one branch, b) two branches, c) three branches, d) four branches	**(b)**
2	The branch of science deals with the properties of matter and energy is called : a) biology, b) physics, c) chemistry, d) astronomy	**(b)**
3	The study of physics deals with a) structure of space & time, b) laws of motion, c) the forces in universe, d) all of these	**(d)**
4	Identify which out of the following is not the branch of physics? a) biophysics, b) nuclear physics, c) astrophysics, d) physical chemistry	**(d)**
5	How many frontiers of fundamental science are? a) one, b) two, c) three, d) four	**(c)**
6	Overlapping of physics and other fields gave birth to a) biophysics, b) health sciences, c) astrophysics, d) all of these	**(d)**
7	Branch of physics which deals with structure and properties of atom is a) sound, b) optics, c) molecular physics, d) atomic physics	**(d)**
8	The branch of physics which deals with velocities approaching the velocity of light is, a)wave mechanics, b) relativities mechanics, c) space physics, d) classical mechanics	**(b)**
9	The branch of physics which deals with the atomic nuclei is called a) mechanics, b) medical physics, c) solid state physics, d) nuclear physics	**(d)**
10	The most basic branch of physics is a) geophysics, b) thermodynamics, c) mechanics, d) particle physics	**(c)**
11	Physics is a quantitative science based primarily on a) hypothesis, b) definition, c) experiment & measurement, d) quantities	**(c)**

FILL IN THE BLANKS

1	Physics deals with the study of _____ and _____and the relationship between them.	matter, energy
2	Physics is the discipline of science , which tells us about space, time and _____.	matter
3	The knowledge which is based upon the principle of observations and experiments is called_____	science
4	Relativistic mechanics deals with_____ approaching that of light.	velocities
5	Biological sciences deals with the study of_____things.	living
6	Physical sciences deal with the study of_____things.	non-living
7	Unit of work in SI units is_____	joule
8	Speed of light in free space is _____	3×10^8 m/sec
9	Light year is SI unit of_____	distance
10	The chips are made of_____	silicon
11		

6

TRUE/FALSE STATEMENTS

1	Physics is the most fundamental of all the sciences.	✔ True/False
2	Physical chemistry is not the branch of physics.	True/False ✔
3	Nuclear physics deals with particles.	True/False ✔
4	Physics plays a vital role in development of technology and engineering.	✔ True/False
5	The numbers other than the power of ten are called scientific notation.	True/False ✔
6	Square brackets are used for writing dimensions of any physical quantity.	✔ True/False
7	Velocity, acceleration and mass are derived quantities.	True/False ✔
8	Radian is supplementary unit of plane angle	✔ True/False
9	The branch of physics that deals with atomic nuclei is called mechanics.	True/False ✔
10	The age of universe is 5 x 10^{11} sec	✔ True/False
11		✔ True/False

MATCH THE COLUMNS

Match the column A with column B and write correct answer in column C.

Set 1

Column A	Column B	Column C
1. Foundation of physics is based upon	a. plane angle	1-b
2. System International consists of	b. Physical quantities	2-e
3. Radian is the	c. solid angle	3-a
4. Steradian is the	d. LT^{-1}	4-c
5. The dimensions of velocity	e. three kinds of units	5-d

Set 2

Column A	Column B	Column C
1. Derived quantity of force in SI	a. 0.1 cm	1-c
2. Least count of meter rod	b. 10^{-10} m	2-a
3. Diameter of an atom	c. Newton	3-b
4. Light intensity is measured	d. MLT^{-2}	4-e
5. Dimensions of force	e. candela	5-d

SHORT ANSWERS TO QUESTIONS

Write brief answers of each question in the space provided.

1	*What is Physics?*	Physics deals with the study of matter and energy and relationship between them.
2	*What is physical quantity?*	The quantity, in terms of which, the laws of physics are expressed, e.g., mass, length, and time, etc.
3	*What are significant figures?*	In any measurement, the accurately known digits and the first doubtful digit.
4	*When an equation is dimensionally correct?*	When dimensions on both sides of the equation are the same.
5	*What does base unit mean?*	A base unit is one which is not derived from other units.
6	*What do you mean by unit?*	A unit is a standard, which is used for the measurement of a physical quantity.
7	*Are radian and steradian base units of system international?*	No, radian and streradian are supplementary units of system international.
8	*How random error is reduced?*	Random error can be reduced by repeating the measurement several times and taking an average.
9	*Is it possible to have two quantities with the same dimensions but different units?*	Yes, two quantities having same dimensions can have different units, e.g., work & torque, momentum and impulse.
10	*State the principle of homogeneity of dimensions?*	To show that the dimensions of the quantities on both sides of the equation are the same, for checking its correctness.

PHYSICS 1st Year

Name_____Roll No._____ Date_____

TICK THE CORRECT ANSWER

1	The study of nature is classified into a) one branch, b) two branches, c) three branches, d) four branches
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FILL IN THE BLANKS

1	Physics deals with study of _____ and _____and the relationship between them
2	The knowledge which is based upon the principle of observations and experiments is called_____
3	Biological sciences deals with the study of_____things.
4	Unit of work in SI units is_____
5	The chips are made of_____

TRUE/FALSE STATEMENTS

1	Physics is the most fundamental of all the sciences.	True/False
2	Nuclear physics deals with particles.	True/False
3	The numbers other than the power of ten are called scientific notation.	True/False
4	Velocity, acceleration and mass are derived quantities.	True/False
5	The branch of physics that deals with atomic nuclei is called mechanics.	True/False

MATCH THE COLUMNS
Match the column A with column B and write correct answer in column C.

Column A	Column B	Column C
1. Foundation of physics is based upon	**a**. plane angle	
2. System International consists of	**b**. Physical quantities	
3. Radian is the	**c**. solid angle	
4. Steradian is the	**d**. LT^{-1}	
5. The dimensions of velocity	**e**. three kinds of units	

SHORT ANSWERS TO QUESTIONS
Write brief answers of each question in the space provided.

 1. *What is Physics?* _____

 2. *What are significant figures?*_____

 3. *What does base unit mean?*_____

 4. *Are radian and steradian base units of system international?*_____

 5. *Is it possible to have two quantities with the same dimensions but different units?*_____

 _____

PHYSICS 1st Year

Name_____Roll No._____ Date_____

TICK THE CORRECT ANSWER

1	The study of physics deals with a) structure of space & time, b) laws of motion, c) the forces in universe, d) all of these
2	How many frontiers of fundamental science are? a) one, b) two, c) three, d) four
3	Overlapping of physics and other fields gave birth to a) biophysics, b) health sciences, c) astrophysics, d) all of these
4	Branch of physics which deals with velocities approaching the velocity of light is, a)wave mechanics, b) relativities mechanics, c) space physics, d) classical mechanics
5	The most basic branch of physics is a) geophysics, b) thermodynamics, c) mechanics, d) particle physics

FILL IN THE BLANKS

1	Physics is the discipline of science , which tells us about space, time and _____.
2	Relativistic mechanics deals with_____ approaching that of light.
3	Physical sciences deal with the study of_____things.
4	Speed of light in free space is _____
5	Light year is SI unit of_____

TRUE/FALSE STATEMENTS

1	Physical chemistry is not the branch of physics.	True/False
2	Physics plays a vital role in development of technology and engineering.	True/False
3	Square brackets are used for writing dimensions of any physical quantity.	True/False
4	Radian is supplementary unit of plane angle	True/False
5	The age of universe is 5 x 10^{11} sec	True/False

MATCH THE COLUMNS

Match the column A with column B and write correct answer in column C.

Column A	Column B	Column C
1. Derived quantity of force in SI	**a**. 0.1 cm	
2. Least count of meter rod	**b**. 10^{-10} m	
3. Diameter of an atom	**c**. Newton	
4. Light intensity is measured	**d**. MLT^{-2}	
5. Dimensions of force	**e**. candela	

SHORT ANSWERS TO QUESTIONS

Write brief answers of each question in the space provided.

1. What is physical quantity?_____

2. When an equation is dimensionally correct?_____

3. What do you mean by unit?_____

4. How random error is reduced?_____

5. State the principle of homogeneity of dimensions?_____

_____

Physics Test

Chapter 3   <u>**First Year**</u>   **Total Marks: 25**

Name:_____   Roll No. _____

                                          Section:_____

Q. No. 1 a) Tick the Correct Answer.

  i) When the velocity-time Graph is parallel to the time-axis,
     the acceleration of the moving body is
       a) positive   (b) negative   (c) zero   (d) maximum

  ii) Distance covered by freely falling bodies in 2 seconds is
      (a) 4.9 m   (b) 9.8 m   (c) 19.6 m   (d) 39.2 m

  iii) The force with which the Earth attracts a body towards its center is called its,
      (a) mass   (b) weight   (c) Gravitation   (d) Gravity

  iv) The force of 50 N acts on a body for 10 seconds. What will be the change in momentum.
      (a) 250 N-sec   (b) 500 N-sec   (c) 750 N-sec   (d) 1000 N-sec

  v) The horizontal range of a projectile is maximum when it is projected at an angle of
      (a) 0° (b) 45° (c) 60° (d) 90°

b) Fill in the Blanks

  i) When the value of average and instantaneous velocities are equal, the body is

    said to be moving with _____

  ii) The property of a body due to which it opposes the state of rest or uniform motion

    is called _____

  iii) The collision in which the momentum and KE both are conserved before and after

    collision is called an _____

  iv) The maximum vertical height attained by a projectile is given by the

    formula _____

  v) An un-powered and unguided Missile is called a _____.

Q. No. 2. Give brief Answer of the following statements.

  i) Motion with constant velocity is a special case of motion with constant
    acceleration. Is this a statement true? Discuss.

  ii) Prove that the rate of change of momentum is equal to force applied.

  iii) At what point or points in its path does a projectile have its maximum and
    minimum speed.

Q. No. 3.

  a) Define S.I. unit of force.

  b) Discuss the Elastic collision in one dimension. Prove that the magnitude of relative
    velocity of approach is equal to magnitude of relative velocity of separation.

  c) A foot ball is thrown upward with an angle 30° with respect to the horizontal.
    To throw a 40 m pass, what must be the initial speed of the ball?

Physics Test

Chapter 4 <u>**First Year**</u> **Total Marks: 25**

Name:_____ Roll No. _____

Section: _____

Q. No. 1 **Encircle the Correct Answer.**

i) The work done will be negative, if the angle between force $\vec{F}$ and displacement $\vec{d}$ is
     a) 0^0 (b) 60° (c) 90° (d) 180°

ii) The Dimensions of Power are
     (a) $ML^2 T^2$ (b) $ML^{-1} T^{-1}$ (c) $ML^2 T^{-3}$ (d) $ML^2 T^{-2}$

iii) A field in which the work done in moving an object along a closed path is equal to zero is called,
     (a) Electric field   (b) Magnetic field   (c) Conservative field   (d) Nuclear field

iv) A body of m = 0.5 kg is moving with velocity of 200 cm s^{-1} . Its KE is
     (a) 1 J   (b) 2 J   (c) 3 J   (d) 4 J

v) Solar cells are made up of the material called,
     (a) carbon   (b) iron   (c) silicon   (d) calcium

vi) A body at rest may have
     (a) speed   (b) velocity   (c) momentum   (d) energy

vii) The intensity of the solar energy reaching the Earth's surface is
     (a) 0.5 K watt m^{-2} (b) 1 K watt m^{-2} (c) 2K watt m^{-2} (d) 1.5 K watt m^{-2}

viii) 25000 Watt Power is equal to
     (a) 10 hp   (b) 30 hp   (c) 33.5 hp   (d) 40 hp

ix) One kilowatt hour is equal to
     (a) 1.6 M J   (b) 2.6 M J   (c) 3.6 M J   (d) 5.6 M J

x) The consumption of Energy by 100 watt bulb in 2 seconds is
     (a) 200 J   (b) 400 J   (c) 600 J   (d) 800 J   **(10)**

Q. No. 2. **Give brief Answer of the following statements.**

i) Prove that 1 hp = 746 watt.
ii) Power is the dot product of force and velocity.
iii) When the rocket enters the atmosphere the nose cone becomes very hot. Where does this energy come from?   **(6)**

Q. No. 3.

a) What is a Gravitational Field?
b) What is an Absolute Potential Energy. Determine its value of on the surface of the Earth.
c) 100 m^3 of water is pumped from a reservoir into a tank 10 meters higher than the reservoir in 20 minutes. If the density of water is 1000 kg^{-3} . Find
     i) Increase in PE   ii) The Power delivered by the pump.

<div align="center">**or**</div>

Q. No. 4.

a) Define the law of conservation of Energy.
b) What is an Escape velocity? Derive its mathematical expression. Determine its value.
c) A car of mass 800 kg traveling at 54 kmh^{-1} is brought to rest in 60 m. Find the average retarding force on the car. What has happened to the original kinetic energy.
                                                1+5+3 = (9)

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Physics Test

Name:_____   Roll No. _____

Section: _____

Q. No. 1. a) Encircle the Correct Answer.

i) The Dimensions of Power are,

   (a) $ML^2 T^2$ (b) $ML^{-1} T^{-1}$ (c) $ML^2 T^{-3}$ (d) $ML^2 T^{-2}$

ii) A field in which the work done in moving an object along a closed path is equal

   to zero is called,

   (a) Electric field   (b) Magnetic field   (c) Conservative field (d) Nuclear field

iii) The intensity of the solar energy reaching the Earth's surface is,

   (a) 0.5 K watt m^{-2} (b) 1 K watt m^{-2} (c) 2K watt m^{-2} (d) 1.5 K watt m^{-2} **(3)**

b) Fill in the Blanks

   i) Work done along the closed path is equal to _____

   ii) Solar cells are thin wafers made from_____

   iii) An example of non-conservative field is_____   **(3)**

Q. No. 2. Give brief Answers of the following statements.

   i)   When the work done is maximum or minimum.

   ii) Power is the dot product of force and velocity.

   iii) When the rocket enters the atmosphere the nose cone becomes very hot.

   Where does this energy come from?   **(6)**

Q. No. 3.

   a) Is the gravitational force between the Earth and the Sun the same at all times of

   the year? Explain.

   b) What is an Absolute Potential Energy. Determine its value on the surface

   of the Earth.

   c) A car of mass 800 kg traveling at 54 kmh^{-1} is brought to rest in 60 m. Find the average

   retarding force on the car. What has happened to original kinetic energy.

   2+**8**+**3** = **(13)**

Physics Test

Chapter 5   **First Year**   **Total Marks: 25**

Name:_____   Roll No. _____

Section: _____

Q. No. 1. Encircle the Correct Answer.

i) The angle subtended at the center of the circle by an arc equal to its radius is equal to,
   (a) one degree   (b) one Radian   (c) one rotation   (d) one revolution

ii) When a body moves in a circle the angle between v and ω is always,
   (a) 0° (b) 45° (c) 90° (d) 180°

iii) If a car moves with a uniform speed of 2 ms^{-1} in a circle of radius 0.4 m. Its angular velocity is,
   (a) 1 rad s^{-1} (b) 2.5 rad s^{-1} (c) 4.5 rad s^{-1} (d) 5 rad s^{-1}

iv) If a stone is whirled in a vertical circle at the end of a string when the stone is at the highest position, the tension in the string is,
   (a) zero   (b) max   (c) minimum   (d) less than the weight of the stone

v) S.I. unit of Angular Momentum is,
   (a) kg m s^{-1} (b) kg m^2 s^{-1} (c) kg m^2 s^{-2} (d) kg m^{-1} s^{-1}

vi) A man in an elevator is descending with an acceleration will conclude that his weight has
   (a) decreased   (b) increased   (c) remains constant   (d) reduces to zero

vii) Minimum number of communication satellites required to cover the whole Earth is,
   (a) 1   (b) 2   (c) 3   (d) 4

viii) The value of g is maximum,
   (a) at the equator   (b) at the poles   (c) at the center of the Earth
   (d) between the poles and the equator

ix) The angular speed for the daily rotation of the Earth in rad s^{-1} is,
   (a) π   (b) 2π   (c) 4π   (d) 7.3 x 10^{-5} rad s^{-1}

vi) The linear velocity of a hoop rolling down an inclined plane is,
   (a) $\sqrt{2gh}$ (b) $\sqrt{gh}$ (c) $\sqrt{\frac{1}{2}gh}$ (d) $\sqrt{\frac{4}{3}gh}$ **(10)**

Q. No. 2. Give brief Answers of the following statements.

i)   Describe what should be the minimum velocity for a satellite to orbit close to the earth around it.

ii) Explain what is meant by centripetal force and why it must be furnished to an object. If the object is to follow a circular path.

iii) When mud flies off the tyre of a moving bicycle, in what direction does it fly off? Explain.   **(6)**

Q. No. 3.

a) Define Moment of Inertia. Give its S.I. units.

b) What is an Artificial Gravity? How is it created in a space ship? Prove the frequency of the satellite when it is rotated around its own axis is given by, $f = \frac{1}{2\pi}\sqrt{\frac{g}{R}}$

c) What is the least speed at which an aero plane can execute a vertical loop of 1.0 km radius so that there will be no tendency for the pilot to fall down at the highest point.

1+5+3 = (9)

Physics Test

Chapter 6   **First Year**   **Total Marks: 25**

Name:_____   Roll No. _____

                                               Section: _____

Q. No. 1. Encircle the Correct Answer.

i) The dimensions of coefficient of viscosity are,

(a) MLT   (b) $ML^{-1}T^{-1}$ (c) ML^2T^2 (d) $ML^{-2}T^{-2}$

ii) If each particle of fluid passing through a point follows the same path, then the flow is called,

(a) irregular flow   (b) stream line flow   (c) turbulent flow   (d) regular flow

iii) The pressure will be low where the speed of the fluid is,

(a) zero   (b) high   (c) low   (d) constant

iv) A two meter high tank is full of water, a hole appears at the middle. What is the speed of the efflux?

(a) 3.42 ms^{-1} (b) 4.42 ms^{-1} (c) 5.42 ms^{-1} (d) 6.42 ms^{-1}

v) The drag force increases as the speed of the object,

(a) increases   (b) decreases   (c) remains constant   (d) none of these   **(5)**

Q. No. 2. Give brief Answers of the following statements.

i) Explain the difference between laminar flow and turbulent flow.

ii) Why the fog droplet appear to be suspended in air?

iii) Explain how the swing is produced in a fast moving cricket ball.

iv) Two boats moving parallel in the same direction are pulled towards each other. Explain.

v) Explain the working of a carburetor of a motor car using by Bernoulli's Equation.

                                                                           (10)

Q. No. 3.

a) Define Equation of continuity.
b) State and prove Bernoulli's Equation.
c) Certain globular protein has a density 1246 kg m^3 through a pure water, $\eta = 8 \times 10^{-4}$ N m^{-2}s with terminal velocity of 3.0 cm hour^{-1} . Find the radius of the particle.   **1+1+5+3 = (10)**

Physics Test

Chapter 6   <u>**First Year**</u>   **Total Marks: 25**

Name:_____   Roll No. _____

                                                  Section: _____

Q. No. 1. Encircle the Correct Answer.

i) The SI unit of viscosity is,

    (a) $kg\ m^{-1}\ s^{-1}$ (b) $kg\ m^{-1}\ s^{-2}$ (c) $kg\ m\ s^{-1}$ (d) $kg\ m^{-2}\ s^{-1}$

ii) The smooth or steady streamline flow is known as,

    (a) turbulent flow (b) simple flow (c) laminar flow (d) regular flow

iii) The pressure will be low where the speed of the fluid is,

    (a) zero   (b) constant   (c) low   (d) high

iv) A two meter high tank is full of water, a hole appears at the middle. What is the speed of the efflux?

    (a) $6.42\ ms^{-1}$ (b) $4.42\ ms^{-1}$ (c) $5.42\ ms^{-1}$ (d) $3.42\ ms^{-1}$

v) The drag force increases as the speed of the object,

    (a) decreases   (b) increases (c) remains constant   (d) none of these   **(5)**

Q. No. 2. Give brief Answers of the following statements.

i)   Explain what do you understand by the term viscosity?

ii) Why the fog droplet appear to be suspended in air?

iii) Explain how the swing is produced in a fast moving cricket ball.

iv) Two boats moving parallel in the same direction are pulled towards each other. Explain.

v) Explain the working of a carburetor of a motor car using by Bernoulli's Equation.

                                                                   (10)

Q. No. 3.

a) What is venturi meter? Apply Bernoulli's equation on it.

b) State and prove Equation of Continuity.

c) Water flows through a hose, whose internal diameter is 1 cm at a speed of $1\ m\ s^{-1}$. What should be the diameter of the nozzle if the water is to emerge at $21\ m\ s^{-1}$?

                                                2+5+3 = (10)

Physics Assignment

Chapter 7   **First Year**   **Total Marks: 25**

Name:_____   Roll No. _____

                                              Section: _____

Q. No. 1 Encircle the Correct Answer.

i) In S.H.M. the acceleration of the body is directly proportional to,
   a) applied force   (b) amplitude   (c) displacement   (d) restoring force

ii) The frequency of the second's pendulum is,
   (a) 0.5 hertz   (b) 1 hertz   (c) 1.5 hertz   (d) 2 hertz

iii) Total energy of the mass attached at one end of a spring executing S.H.M. at any displacement x is given by,
   (a) $\frac{1}{2}kx$ (b) $\frac{1}{2}kx_o$ (c) $\frac{1}{2}kx_o^2$ (d) kx

iv) Angular frequency is given by the expression
   (a) $\omega = \frac{v}{r}$ (b) $\omega = \frac{2\pi}{T}$ (c) $\omega = \sqrt{\frac{k}{m}}$ (d) all of them

v) When the damping is small, the amplitude of vibration at resonance will be,
   (a) small   (b) large   (c) remains constant   (d) none of the above

vi) In microwave oven, heating is produced by the phenomenon of,
   (a) free oscillation (b) forced oscillation (c) damped oscillation (d) resonance

vii) The time period of the mass attached to the end of a spring is T:_____

viii) Frequency of vibratory motion _____ of the time period.

ix) The sharpness of resonance curve of a resonating system depends upon the frictional loss of _____   **(9)**

Q. No. 2. Give brief Answer of the following statements.

i) Can we realize an ideal simple pendulum?

ii) Explain the relation between total energy, potential energy and kinetic energy for a body oscillating with SHM.

iii) Describe some common phenomenon in which resonance plays an important role.   **(6)**

Q. No. 3.

a) Define S.H.M. Give three examples.

b) What is a simple pendulum? Prove that its motion is S.H.M. Derive an expression for its time period.

c) A simple pendulum is 1 meter long. What will be the frequency of vibration at a place where the value of $g = 9.8$ m s^{-2} .   **1+1+1+4+3 = (10)**

or

Q. No. 4.

a) Define time period, frequency, displacement and amplitude.

b) Discuss the motion of projection of point P moving along the circular path with constant speed. Show that its motion is S.H.M. Derive an expression for
   i) Instantaneous displacement
   ii) Instantaneous velocity
   iii) acceleration in terms of ω **½ +½ +½ +½ +5+3= (10)**

Physics Test

Chapter 8   <u>**First Year**</u>   **Total Marks: 25**

Name:_____   Roll No. _____

Section: _____

Q. No. 1. Encircle the Correct Answer.

i) The waves produced on the surface of water are

(a) electromagnetic waves   (b) longitudinal waves   (c) stationary waves   (d) transverse waves

ii) If 25 waves pass through a medium in one second with a speed of 50 ms^{-1}, then λ is,

(a) 1 m   (b) 2 m   (c) 3 m   (d) 4 m

iii) The velocity of sound in vacuum is,

(a) 300 ms^{-1} (b) 332 ms^{-1} (c) zero   (d) 324 ms^{-1}

iv) When the temperature is increased by $1 \,^{o}C$. The velocity of sound is increased by,

(a) 0.61 ms^{-1} (b) 0.61 cm s^{-1} (c) 2 ms^{-1} (d) 2.6 ms^{-1}

v) The distance between two consecutive node and antinode is,

(a) λ (b) 2λ (c) $\lambda/2$ (d) $\lambda/4$ **(5)**

b) Fill in the Blanks

i) Two waves of equal frequency traveling in opposite direction give rise to _____

ii) Stars moving away from the Earth show a _____

iii) When a particle of the medium is simultaneously acted upon by two or more waves, then the resultant displacement of the particles is the algebraic sum of their individual displacement is called_____

iv) Find the temperature at which the velocity of sound in air is two times its velocity of sound at $10 \,^{o}C$ _____   **(5)**

v) A string of length ℓ maintains stationary waves of wavelength λ_n is given by_____

Q. No. 2. Give brief Answers of the following statements.

i) How beats are useful in tuning the musical instruments?

ii) Why does sound travel faster in solids than in gases?

iii) How should a sound source move with respect to an observer so that its frequency of sound does not change.   **2+2+2 = (6)**

Q. No. 3.

a) Define Doppler's effect.

b) Describe Newton's Formula for the velocity of sound and explain how was it corrected by Laplace.

c) An organ pipe has a length of 50 cm. Find the frequency of its fundamental note and the next harmonic, when it is,
i) open at both ends,   ii) close at one end,
The speed of sound is 350 m s^{-1} **1+2½ + 2½ +3 = (9)**

Physics Test

Chapter 9   **First Year**   **Total Marks: 30**

Name:_____   Roll No. _____
                                               Section: _____

Q. No. 1. Encircle the Correct Answer.

i) Electromagnetic wave theory was proposed by,

   (a) Hertz   (b) Huygen   (c) Newton   (d) Maxwell

ii) Which one of the properties of light does not change with the nature of the medium,

   (a) velocity (b) wavelength (c) amplitude (d) frequency

iii) According to Einstein light travels from one place to another place in the form of,

   (a) waves   (b) particles   (c) photons   (d) radiation

iv) Longitudinal waves do not exhibit,

   (a) reflection   (b) refraction   (c) diffraction   (d) polarization

v) The distance between two bright fringes is called,

   (a) wavelength   (b) fringe spacing   (c) wavelet   (d) amplitude

vi) Michelson Interferometer can be used to find the,

   (a) velocity of light (b) wavelength of light (c) order of the spectrum (d) none of these

vii) The path difference for constructive interference should be,

   (a) $d = \lambda /2$ (b) $d = 3/2 \lambda$ (c) $d = 5/2 \lambda$ (d) $d = m \lambda$

viii) One Angstrom is equal to,

   (a) 10^{-8} cm   (b) 10^{-6} cm   (c) 10^{-10} nm   (d) 10^{-8} nm

ix) Which of the following can not be polarized,

   (a) radio waves   (b) ultraviolet rays   (c) x-rays   (d) sound waves

x) If 5000/cm are ruled on the diffraction grating, then the slit spacing will be,

   (a) 5×10^{-3} A°   (b) $5 \times 10^{+3}$ A°   (c) 2×10^{-4} A°   (d) 2×10^{4} A°   **(10)**

b) Fill in the Blanks

   i) Huygen's Principle is used to locate the _____
   ii) The central point of the Newton's ring is _____
   iii) The blue sky is due to _____
   iv) Polarization of light show that light is _____   **(4)**

Q. No. 2. Give brief Answers of the following statements.

   i) Can visible light produce interference of light?
   ii) How would you manage to get more orders of spectra using diffraction grating?
   iii) Why the Polaroid sun glasses are better than ordinary sun glasses ?
   iv) How would you distinguish between unpolarized and plane polarized light ?   **(8)**

Q. No. 3.

   a) What is polarization ?
   b) Describe Young's Double Slit experiment to demonstrate the interference of light. Derive an expression for Fringe Spacing.
   c) In Double Slit experiment, the second order maximum occur at $\theta = 0.25^{0}$. The wavelength is 650 nm. Determine the slit separation.   **1 + 5 + 2 = (8)**

Physics Test

Chapter 10   **First Year**   **Total Marks: 35**

Name:_____   Roll No. _____   Section: _____

Q. No. 1. Encircle the Correct Answer.

i) Image formed is twice of object size for convex lens with f = 10 cm. Object position is,
   (a) 10 cm   (b) 15 cm   (c) 20 cm   (d) 25 cm

ii) Michelson used the equation to determine the speed of light,
   (a) c = 4 fd   (b) c = 8 fd   (c) c = 12 fd   (d) c = 16 fd

iii) The least distance of distinct vision for the normal human eye is,
   (a) 10 cm   (b) 15 cm   (c) 20 cm   (d) 25 cm

iv) The final image produced by the compound microscope is ,
   (a) real & inverted (b) real & erect (c) virtual & erect (d) virtual & inverted

v) For an Astronomical Telescope, f_o = 4 m & f_e = 25 mm. The magnifying power is ,
   (a) 60   (b) 100   (c) 160   (d) 200

vi) The speed of light in vacuum is,
   (a) 3×10^8 ms^{-1} (b) 3×10^9 ms^{-1} (c) 3×10^{10} ms^{-1} (d) 3×10^{12} ms^{-1}

vii) Multimode step index fibre is useful for ,
   (a) long distance (b) short distance (c) neither long nor short (d) none of these

viii) Light entering glass will not suffer a change in ,
   (a) frequency   (b) wavelength   (c) distance   (d) velocity

ix) The diameter of a single mode step index is,
   (a) 2.5 μ m   (b) 5 μ m   (c) 10 μ m   (d) 15 μ m

x) The angular magnification of an optical instrument is given by the formula,
   (a) θ_o / θ_i (b) θ_i / θ_o (c) $\theta_i / 2\theta_o$ (d) $2\theta_o / \theta_i$ (10)

b) Fill in the Blanks

i) When object lies within focus and optical center of a convex lens. It acts as a _____

ii) Magnifying power of a simple microscope is given by formula M = _____

iii) Object's maximum details can be seen by a microscope with light of _____

iv) For normal adjustment, the length of the astronomical telescope is _____

v) An image formed by a concave lens is always _____

vi) At some angle of incidence when the angle of refraction becomes 90^0, called _____

vii) Layer of lower refractive index over central core of high refractive index is _____

viii) The light emitted from (LED) has a wavelength _____

ix) The magnifying power of a convex lens of focal length 20 cm is _____

x) Spherical and chromatic aberration is found in _____   (10)

Q. No. 2. Give brief Answers of the following statements.

i) What do you understand by linear magnification and angular magnification?

ii) How the light signal is transmitted through optical fibre?

iii) How the power is lost in optical fibre through dispersion. Explain.   **2+2+2 = (6)**

Q. No. 3.

a) Distinguish between a telescope and a microscope.

b) Describe the construction of a compound microscope. Draw a neat diagram.
   Derive an expression for the magnifying power of a compound microscope.

c) An astronomical telescope having a magnifying power of 5 consists of two thin
   lenses 24 cm apart. Find the focal length of the lenses.   **2+ 4 +3 = (9)**

Physics Test

Chapter 11   <u>**First Year**</u>   **Total Marks: 25**

Name:_____   Roll No. _____ Section: _____

Q. No. 1. Encircle the Correct Answer.

   i) At constant pressure, the graph between volume and absolute temperature is ,
      (a) hyperbola   (b) straight line   (c) parabola   (d) ellipse

   ii) For a gas obeying the Boyle's law. If the pressure is doubled, the volume becomes,
      (a) double   (b) one half   (c) four times   (d) remains constant

   iii) The KE of the molecule of an ideal gas at absolute zero will be,
      (a) below zero   (b) infinite   (c) zero   (d) above zero

   iv) The expression for pressure exerted by an ideal gas is given as ,

   (a) $P = \dfrac{1}{3} N_0 < \dfrac{1}{2} mv^2 >$ (b) $P = \dfrac{2}{3} N_0 < \dfrac{1}{2} mv^2 >$ (c) $P = \dfrac{2}{3} N_A < \dfrac{1}{2} mv^2 >$

   (d) $P = \dfrac{1}{2} N_o < \dfrac{1}{2} mv^2 >$

   v) The temperature scale which is independent of the nature of substance used in the thermometer is called ,
      (a) Centigrade scale   (b) Fahrenheit scale   (c) Kelvin scale
      (d) Thermodynamic scale   **(5)**

b) Fill in the Blanks

   i) The total sum of all the energies of all molecules in an object is known as _____

   ii) The ideal gas law is given in the form of _____

   iii) The value of the universal gas constant R in S.I. units is _____

   iv) The efficiency of the Carnot engine depends on _____

   v) When the temperature of the source and sink of a heat engine become equal, the entropy will be _____   **(5)**

Q. No. 2. Give brief Answers of the following statements.

   i) Why is the average velocity of the molecules in a gas is zero, but the average of the squares of the velocities is not zero?

   ii) Specific heat of a gas at constant pressure is greater than the specific heat at constant volume. Why ?

   iii) Give an example of a process in which no heat is transferred to or from the system but the temperature of the system changes.   **2+2+2 = (6)**

Q. No. 3.

   a) Define C_P and C_V.
   b) Prove that $C_P - C_V = R$
   c) Estimate the average speed of Nitrogen molecules in air under standard conditions of temperature and pressure.   **1+ 5 +3 = (9)**

Physics Paper

Time: 20 minutes   **<u>Intermediate Part-I</u>**   **Marks: 17**

Roll No.

In Figures _____

In words_____

Objective

<u>Note</u>**: Write your Roll No. in the space provided. Cutting, over writing,**

erasing, using lead pencil will have no credit.

Q. No. 1. Each question has four possible answers. Select the correct answer and encircle it.

   i) The dimensions of viscosity is,
       (a) MLT   (b) $ML^2 T^{-1}$ (c) $ML^{-1} T^{-1}$ (d) $ML^{-2} T^{-2}$

   ii) The dimensions of torque is,
       (a) $ML^{-1} T$ (b) $ML^2 T^{-1}$ (c) $ML^2 T^{-2}$ (d) $ML^2 T^2$

   iii) Two forces each of 10 N act on a body. If the forces are inclined at 30° and 60° with x-axis, then the x-component of their resultant is,
       (a) 10 N   (b) 20 N   (c) 13.66 N   (d) 16.33 N

   iv) If the vector $\vec{A}$ and $\vec{B}$ are of magnitude 4 cm and 3 cm making angles of 30° and 90° with X-axis, their scalar product will be,
       (a) 0 cm^2 (b) 6 cm^2 (c) 18 cm^2 (d) 21 cm^2

   v) Distance covered by a freely falling body in 2 seconds is,
       (a) 4.9 m   (b) 19.6 m   (c) 39.2 m   (d) 44.1 m

   vi) Motion of a projectile is,
       (a) one dimensional (b) two dimensional (c) three dimensional (d) four dimensional

   vii) A field in which the work done in moving a body along a closed path is zero is called,
       (a)electric field (b)nuclear field (c) electromagnetic field   (d) conservative field

   viii) The scalar product of force and displacement is called,
       (a) power   (b) watt   (c) work   (d) momentum

   ix) When a body moves with a circle, the angle between its linear velocity and angular velocity ω is,
       (a) 0° (b) 45° (c) 90° (d) 180°

   x) If a car moves with a uniform speed of 2 m s^{-1} in a circle of radius 0.4 m. Its angular speed is,
       (a) 4 rad s^{-1} (b) 1.6 rad s^{-1} (c) 2.8 rad s^{-1} (d) 5 rad s^{-1}

xi) The pressure will be low where the speed of the fluid is,

    (a) zero   (b) low   (c) high   (d) constant

xii) The velocity of efflux is measured by the relation,

    (a) $\sqrt{gh}$ (b) $\sqrt{2gh}$ (c) $\sqrt{\dfrac{1}{2}gh}$ (d) $\sqrt{\dfrac{1}{3}gh}$

xiii) If the length of second's pendulum becomes four times, then the time period will become,

    (a) two times   (b) four times   (c) six times   (d) eight times

xiv) Total energy of the particle executing S.H.M. at any displacement x is given by,

    (a) kx   (b) ½ kx   (c) kx_o (d) ½ kx_o^2

xv) The distance between two consecutive nodes and antinodes is,

    (a) λ (b) 2λ (c) $\lambda/2$ (d) $\lambda/4$

xvi) The velocity of sound in vacuum is,

    (a) 300 m s^{-1} (b) 332 m s^{-1} (c) 200 m s^{-1} (d) zero m s^{-1}

xvii) Which one of the following properties of light does not change with the nature of medium,

    (a) velocity   (b) wavelength   (c) amplitude   (d) frequency

xviii) The distance between the optical center and the principal focus of a lens is called,

    (a) principal axis   (b) aperture   (c) focal length   (d) radius of curvature

xix) For normal adjustment, the length of the astronomical telescope is,

    (a) $f_o - f_e$ (b) $f_o + f_e$ (c) $\dfrac{f_o}{f_e}$ (d) $\dfrac{f_e}{f_o}$

xx) An absolute scale of temperature was first proposed by,

    (a) Carnot   (b) Celsius   (c) Kelvin   (d) Joule

xxi) If the temperature of the sink is decreased, the efficiency of the Carnot engine,

    (a) decreases   (b) increases   (c) remains constant   (d) none of these

Physics Paper

Time: 2.10 minutes   **Intermediate Part-I**   **Marks: 68**

Subjective

Section-I

Q. No. 2. Write short answers to any twenty two of the following questions.

i) Give the draw backs to use the period of a simple pendulum as a time standard.
ii) What are the units and the dimensions of Gravitational constant G?
iii) Show that the formula of Einstein's Equation $E = m c^2$ is dimensionally consistent. ?
iv) Name three different conditions that could make $\vec{A}_1 \times \vec{A}_2 = 0$
v) Can a body rotate about its center of gravity under the action of its weight?
vi) If $\vec{A} + \vec{B} = 0$ what can you say about the components of the two vectors?
vii) At what point or points in its path does a projectile have its minimum speed and maximum speed ?
viii) Can the velocity of an object reverses its direction when the acceleration is constant. If so give an example.
ix) Define Impulse and show that how it is related to linear momentum?
x) Prove that power is the dot product of force and velocity.
xi) Calculate the work done in kilo Joules in lifting a mass of 10 kg through a vertical height of 10 m.
xii) An object has one Joule of PE. Explain what does it mean?
xiii) What is moment of Inertia? Explain its significance.
xiv) When mud flies of the tyre of a moving bicycle in what direction does it fly? Explain.
xv) Why does a diver change his body positions before and after diving in swimming pool?
xvi) Explain the difference between laminar flow and turbulent flow.
xvii) Explain the working of a carburetor of a motor car using Bernoulli's Principle.
xviii) Two boats are moving parallel in the same direction are pulled to each other. Explain.
xix) Name two characteristics of S.H.M.
xx) Describe the common phenomenon in which resonance plays an important roll.
xxi) Explain the relation between total energy, potential energy and kinetic energy for a body oscillating with S.H.M.
xxii) What features do longitudinal waves have in common with transverse waves?
xxiii) Explain the terms; i) crest, ii) trough, iii) node, iv) anti node.
xxiv) Why does sound travel faster in solids than in gases.
xxv) Explain the difference between angular magnification and resolving power of an optical instrument. What limits the magnification of an optical instrument?
xxvi) How the light signal is transmitted through the optical fibre?
xxvii) How the power is lost in optical fibre through dispersion?
xxviii) Can visible light produce interference fringes? Explain.
xxix) How would you manage to get more orders of spectra using a diffraction grating.?
xxx) How would you distinguish between unpolarized and plane polarized light?
xxxi) Under what conditions two or more sources of light behave as a coherent sources.
xxxii) Why is the average velocity of the molecules in a gas is zero, but the average of the square of the velocities is not zero.
xxxiii) Specific heat of a gas at constant pressure is greater than the specific heat at constant volume. Why?
xxxiv) Is it possible to construct a heat engine that will expel heat into the atmosphere?

Section-II

Note: Attempt three questions. All questions carry equal marks.

Q. No. 3.
   a) Define scalar product of two vectors with two examples.
   b) Discuss the characteristics of scalar product.
   c) The magnitude of the dot and cross product of two vectors are $6\sqrt{3}$ and 6 respectively. Find the angle between them.

Q. No. 4.
   a) Define kilowatt hour and determine its value.
   b) What is an Absolute PE. Calculate value of the Absolute PE on the surface of the Earth.
   c) 100 m^3 of water is pumped from a reservoir into a tank 10 m higher than the reservoir in 20 minutes. If the density of water is 1000 kg m^{-3}. Find
      i) The increase in PE, ii) The power delivered by the pump.

Q. No. 5.
   a) Define viscosity and drag force.
   b) Determine the terminal velocity v_t of a fog droplet of radius r, having viscosity η and mass m. Prove that $v_t \propto r^2$.
   c) Water flows through a hose, whose internal diameter is 1 cm at a speed of 1 m s^{-1} . What should be the diameter of the nozzle if the water emerges out at 21 m s^{-1} .

Q. No. 6.
   a) Define S.H.M. Give two examples.
   b) What is a simple pendulum? Prove that its motion is S.H.M. Derive an expression for its time period.
   c) A simple pendulum is 50 cm long. What will be the frequency of vibration at a place where the value of g = 9.8 m s^{-2}.

Q. No. 7.
   a) Define and explain least distance of distinct vision.
   b) What is a compound microscope? Draw a neat diagram. Derive an expression for the magnifying power of a compound microscope.
   c) An astronomical telescope having magnifying power of 5 consists of two thin lenses 24 cm apart. Find the focal length of the lenses.

Q. No. 8.
   a) Give the assumptions of Kinetic Theory of Gases.
   b) What is a Carnot engine? Describe the operating steps of Carnot Cycle. Derive an expression for its efficiency.
   c) 336 J of energy is required to melt 1 gm of ice at 0 ^{o}C What is the change in the entropy of 30 gms of water at 0 ^{o}C as it is changed to ice at 0 ^{o}C by a refrigerator.