

Roll No. of Candidate: _____

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Physics (New Scheme) (INTERMEDIATE PART-I) 319-(II) Group: I Paper: I
Time: 20 Minutes OBJECTIVE Marks: 17

Code: 6473

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question. Attempt as many questions as given in objective type question paper and leave other blank.

- The magnifying power of convex lens of focal length 10cm is:
A) 7 B) 9.6 C) 3.5 D) 11
- If $AB \sin \theta = AB \cos \theta$ then the angle between \vec{A} and \vec{B} is:
A) 30° B) 45° C) 60° D) 180°
- As the speed of object moving through a fluid increases then the drag force experienced by it:
A) increases B) decreases C) remains constant D) becomes zero
- In a Michelson Interferometer by moving the mirror through a distance of $\lambda/4$, the path difference changes by:
A) $\frac{\lambda}{4}$ B) $\frac{\lambda}{2}$ C) λ D) 2λ
- The ratio of moment of inertia of disc and hoop is:
A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) $\frac{3}{4}$ D) $\frac{3}{2}$
- _____ has the same dimensions.
A) work and power B) momentum and energy
C) work and torque D) power and pressure
- The louder the sound, the greater will be its:
A) wavelength B) amplitude C) speed D) frequency
- If the resultant of two vectors each of magnitude 'F' is also of magnitude 'F' then the angle between them will be:
A) 30° B) 60° C) 90° D) 120°
- _____ is derived unit.
A) candela B) ampere C) kelvin D) newton
- At constant temperature, if pressure is halved then its volume is:
A) constant B) halved C) four times D) doubled
- _____ is non-conservative force.
A) electric force B) magnetic force C) gravitational force D) frictional force
- Change in entropy of reversible process is:
A) positive B) negative C) zero D) maximum
- The total energy of mass-spring system is independent of:
A) mass of the body B) amplitude
C) spring constant D) nature of material of spring
- Pull of earth on a mass of 10 Kg on the surface of the earth is:
A) 95 N B) 96 N C) 97 N D) 98 N
- One radian is equal to:
A) 77.3° B) 67.3° C) 57.3° D) 47.3°
- Pascal is the unit of:
A) pressure B) force C) tension D) weight
- Distance between two adjacent crests and troughs is:
A) λ B) $\frac{\lambda}{2}$ C) $\lambda/4$ D) 2λ

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215-(II)-319-39000

Physics (New Scheme)

(INTERMEDIATE PART-I) 319 Group: I

Paper: I

Time: 2:40 Hours

SUBJECTIVE

Marks: 68

Note: Section I is compulsory. Attempt any THREE (3) questions from Section II.

(SECTION - I)

2. Write short answers to any EIGHT questions.

(2 × 8 = 16)

- i. How many nanoseconds are there in one year?
- ii. Give the drawbacks to use the period of a pendulum as a time standard.
- iii. State right hand rule for the cross product of two vectors.
- iv. If $\vec{A} = \hat{i} - 2\hat{j} + 3\hat{k}$ and $\vec{B} = 2\hat{i} - \hat{j} + \hat{k}$, then find $\vec{A} \cdot \vec{B}$
- v. Can a body rotate about its centre of gravity under the action of its weight?
- vi. What is the biomass? Write the names of two methods to obtain energy from biomass.
- vii. What is Aquifer?
- viii. State Bernoulli's relation for a liquid in motion and describe some of its applications.
- ix. A person is standing near a fast moving train. Is there any danger that he will fall towards it?
- x. Define free oscillations and forced oscillations.
- xi. Can we realize an ideal simple pendulum? Explain briefly.
- xii. Does frequency depends on amplitude for harmonic oscillators?

3. Write short answers to any EIGHT questions.

(2 × 8 = 16)

- i. An object is thrown vertically upward. Discuss the sign of acceleration due to gravity, relative to velocity, while the object is in air.
- ii. Motion with constant velocity is a special case of motion with constant acceleration. Is this statement true? Discuss.
- iii. Which quantity remains same at all points on the trajectory of a projectile; either velocity or acceleration? Explain.
- iv. Define impulse. Does a moving object having uniform velocity has impulse?
- v. Explain how many minimum number of geo-stationary satellites are required for global coverage of T.V transmission?
- vi. Why does a diver change his body positions before and after diving in the pool?
- vii. A disc without slipping rolls down a hill of height 10.0 m. If the disc starts from rest at the top of hill, what is its speed at the bottom?
- viii. Define angular acceleration. Write its unit.
- ix. Why does sound travel faster in solids than in gases?
- x. As a result of a distant explosion, an observer senses a ground tremor and then hears the explosion. Explain the time difference.
- xi. What do you mean by harmonic series?
- xii. What is the effect of density on speed of sound in a gas?

4. Write short answers to any SIX questions.

(2 × 6 = 12)

- i. Explain whether the Young's experiment is an experiment for studying interferences or diffraction effect of light.
- ii. What is the function of collimator in a spectrometer?
- iii. Why central spot of Newton's ring is dark?
- iv. Could you obtain Newton's ring with transmitted light? If yes, would the pattern be different from that obtained with reflected light?
- v. How the light signal is transmitted through the optical fibre?
- vi. Give an example of natural process that involves an increase in entropy.
- vii. A thermo flask containing milk as a system is shaken rapidly. Does the temperature of milk rise?
- viii. Is it possible to convert internal energy into mechanical energy? Explain with an example.
- ix. Define triple point, what is triple point of water?

(Turn Over)

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(SECTION - II)

5. (a) Differentiate between precision and accuracy with example. 5
(b) Find the average speed of Nitrogen molecules in air under standard conditions of pressure and temperature. 3
6. (a) What are rectangular components, explain. How a vector is obtained from its rectangular components. 5
(b) A truck weighing 2500 Kg and moving with velocity of 21 ms^{-1} collides with a stationary car weighing 1000 Kg. The truck and the car move together after the impact. Calculate their common velocity. 3
7. (a) Define standing waves. Find the relations for frequencies of these waves in different air columns. 5
(b) A force (thrust) of 400 N is required to overcome road friction and air resistance propelling an automobile at 80 Km h^{-1} . What power must the engine develop? 3
8. (a) Derive the relation for Artificial Gravity. 5
(b) What should be the length of a simple Pendulum whose period is 1.0 second at a place where $g = 9.8 \text{ ms}^{-2}$? What is the frequency of such a pendulum? 3
9. (a) What is a bandwidth? Discuss the fibre optic principles? 1+4
(b) A light is incident normally on a grating which has 2500 lines per centimeter. Compute the wavelength of a spectral line for which the deviation in a second order is 15.0° ? 3

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Roll No. of Candidate: _____

Physics (New Scheme)
Time: 20 Minutes

(INTERMEDIATE PART-I) 319-(III)
OBJECTIVE
Code: 6476

Group: II

Paper: I
Marks: 17

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question. Attempt as many questions as given in objective type question paper and leave other blank.

1. A layer over the central core of the jacket is called:
A) jacket B) plastic C) cladding D) rubber
2. The direction of angular momentum of a body moving along a circle is:
A) along the tangent B) perpendicular to the plane of the circle
C) radially outward D) radially inward
3. When the temperature increases, the viscosity of the gases:
A) decreases B) remains constant C) increases D) none of these
4. For which of the following colours will the fringe width be minimum in the double slit experiment:
A) violet B) red C) green D) yellow
5. Choose the quantity which plays the same role in angular motion as that of mass in linear motion:
A) angular acceleration B) torque C) moment of inertia D) angular momentum
6. The dimension $[M^0L^1T^0]$ represents the quantity:
A) Length B) Mass C) Time D) Velocity
7. Tuning fork is a source of:
A) energy B) heat C) light D) sound
8. If a force of 10 N is acting along x-axis then its component along y-axis is:
A) zero B) 5 N C) 10 N D) 15 N
9. The significant figures in 0.0004813 are:
A) 8 B) 7 C) 4 D) 3
10. According to first law of thermodynamics the quantity which is conserved is:
A) force B) momentum C) power D) energy
11. If the velocity of an object is doubled then its K.E becomes:
A) double B) constant C) four times D) sixteen times
12. What remains constant in adiabatic process?
A) volume B) pressure C) entropy D) temperature
13. When the bob of simple pendulum is at extreme position then its K.E is:
A) maximum B) minimum C) zero D) small
14. If the force acting on a body is doubled, then the acceleration becomes:
A) constant B) double C) half D) one fourth
15. The dot product of \vec{A} with itself is equal to:
A) A B) A^2 C) zero D) 2 A
16. On the average for normal healthy person diastolic pressure is:
A) 120 torr B) 110 torr C) 100 torr D) 75 - 80 torr
17. Longitudinal waves do not exhibit:
A) reflection B) refraction C) diffraction D) polarization

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Physics (New Scheme)

(INTERMEDIATE PART-I) 319

Group: II

Paper: I

Time: 2:40 Hours

SUBJECTIVE

Marks: 68

Note: Section I is compulsory. Attempt any THREE (3) questions from Section II.

(SECTION - I)

2. Write short answers to any EIGHT questions.

(2 × 8 = 16)

- i. Name several repetitive phenomenon occurring in nature which could serve as reasonable time standards.
- ii. Define random error and systematic error.
- iii. Define null vector. Give example.
- iv. Is it possible to add a vector quantity to a scalar quantity?
- v. Can a body rotate about its centre of gravity under the action of its weight?
- vi. What do you mean by geothermal energy?
- vii. An object has 1 J of potential energy. Explain what does it mean?
- viii. A person is standing near a fast moving train. Is there any danger that he will fall towards it?
- ix. Define terminal velocity.
- x. In relation to SHM, explain the equation; $a = -\omega^2 x$
- xi. What are free and forced oscillations?
- xii. Does frequency depends on amplitude for harmonic oscillator?

3. Write short answers to any EIGHT questions.

(2 × 8 = 16)

- i. State superposition principle.
- ii. Is it possible for two identical waves travelling in the same direction along a string to give rise to a stationary wave?
- iii. Explain why sound travels faster in warm air than in cold air?
- iv. What is the effect on the phase of a wave if it is reflected from the boundary of a:
a) rare medium b) denser medium
- v. Derive relation between linear and angular acceleration.
- vi. Explain how many minimum number of geostationary satellites are required for global coverage of T.V transmission?
- vii. Define angular momentum and also state law of conservation of angular momentum.
- viii. Define angular velocity, how its direction is determined?
- ix. An object is thrown vertically upwards. Discuss the sign of acceleration due to gravity, while the object is in air.
- x. Define inertial frame of reference.
- xi. How the acceleration and distance are determined from velocity time graph?
- xii. Define centripetal force and centripetal acceleration. Also write their relations. (do not derive)

4. Write short answers to any SIX questions.

(2 × 6 = 12)

- i. An oil film spreading over a wet footpath shows colours. Explain how does it happen?
- ii. How would you distinguish between un-polarized and plane polarized lights?
- iii. Why adiabat is steeper than isotherm? Explain.
- iv. What do you understand by linear magnification and angular magnification?
- v. Define the critical angle.
- vi. What is negative entropy? Give example and its unit.
- vii. What is degradation of energy?
- viii. Why is the average velocity of molecules in a gas zero but the average of square of the velocities is not zero?
- ix. Why does the pressure of gas in car tyre increase when it is driven through some distance?

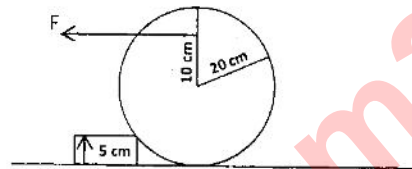
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Guj - 11 - Gr 2 - 19

(SECTION - II)

5. (a) Completely describe the Carnot Engine. Derive formula for its efficiency. 5
(b) i) How many seconds are there in 1 year? 3
ii) How many nano seconds in 1 year?
iii) How many years in 1 second?

6. (a) Define elastic Collision. Considering the elastic collision in one-dimension of two bodies, show that speed of approach is equal to speed of separation. 5
(b) A spherical ball of weight 50 N is to be lifted over a step as shown in figure. Calculate the minimum force needed just to lift it above the floor. 3



7. (a) Derive the relation for absolute potential energy. 5
(b) Find the temperature at which the velocity of sound in air is two times of its velocity at 10°C . 3
8. (a) What is a difference between centripetal force and centrifugal force? Derive the relation for it $F_c = mr\omega^2$? 1+4
(b) A block of mass 4.0 kg is dropped from a height of 0.80m on to a spring of spring constant $k = 1960\text{Nm}^{-1}$. Find the maximum distance through which the spring will be compressed? 3
9. (a) Define interference. Derive conditions for minima and maxima in Young's Double-slit interference experiment. 5
(b) An astronomical telescope having magnifying power of 5 consists of two thin lenses 24cm apart. Find the focal lengths of the lenses. 3