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.
1. At constant temperature, if pressure is halved then its volume is:
   A) constant B) halved C) four times D) doubled

2. The louder the sound, the greater will be its:
   A) wavelength B) amplitude C) speed D) frequency

3. Change in entropy of reversible process is:
   A) positive B) negative C) zero D) maximum

4. 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

5. The magnifying power of convex lens of focal length 10cm is:
   A) 7 B) 9.6 C) 3.5 D) 11

6. One radian is equal to:
   A) 77.3° B) 67.3° C) 57.3° D) 47.3°

7. Pascal is the unit of:
   A) pressure B) force C) tension D) weight

8. 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

9. Distance between two adjacent crests and troughs is:
   A) λ B) $\frac{\lambda}{2}$ C) $\lambda/4$ D) 2λ

10. 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°

11. 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

12. 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°

13. The ratio of moment of inertia of disc and hoop is:
    A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) $\frac{3}{4}$ D) $\frac{3}{2}$

14. _____ has the same dimensions.
    A) work and power B) momentum and energy
    C) work and torque D) power and pressure

15. 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

16. _____ is derived unit.
    A) candela B) ampere C) kelvin D) newton

17. _____ is non-conservative force.
    A) electric force B) magnetic force C) gravitational force D) frictional force

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

(SECTION – I)

2. Write short answers to any EIGHT questions. $(2 \times 8 = 16)$

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. $(2 \times 8 = 16)$

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. $(2 \times 6 = 12)$

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)

Roll No. of Candidate: _____

Physics (New Scheme)   (INTERMEDIATE PART-I) 319-(1)   Group: II   Paper: I
Time: 20 Minutes   OBJECTIVE   Marks: 17
Code: 6472

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.

1. The significant figures in 0.0004813 are:
A) 8   B) 7   C) 4   D) 3

2. The dimension $[M^0LT^0]$ represents the quantity:
A) Length   B) Mass   C) Time   D) Velocity

3. 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

4. The dot product of $\overrightarrow{A}$ with itself is equal to:
A) A   B) A^2 C) zero   D) 2 A

5. If the force acting on a body is doubled, then the acceleration becomes:
A) constant   B) double   C) half   D) one fourth

6. If the velocity of an object is doubled then its K.E becomes:
A) double   B) constant   C) four times   D) sixteen times

7. 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

8. 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

9. When the temperature increases, the viscosity of the gases:
A) decreases   B) remains constant   C) increases   D) none of these

10. On the average for normal healthy person diastolic pressure is:
A) 120 torr   B) 110 torr   C) 100 torr   D) 75 - 80 torr

11. When the bob of simple pendulum is at extreme position then its K.E is:
A) maximum   B) minimum   C) zero   D) small

12. Tuning fork is a source of:
A) energy   B) heat   C) light   D) sound

13. Longitudinal waves do not exhibit:
A) reflection   B) refraction   C) diffraction   D) polarization

14. 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

15. A layer over the central core of the jacket is called:
A) jacket   B) plastic   C) cladding   D) rubber

16. What remains constant in adiabatic process?
A) volume   B) pressure   C) entropy   D) temperature

17. According to first law of thermodynamics the quantity which is conserved is:
A) force   B) momentum   C) power   D) energy

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. $(2 \times 8 = 16)$

   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. $(2 \times 8 = 16)$

   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. $(2 \times 6 = 12)$

   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?

(Turn Over)