☆☆☆☆ RWP.

Roll No._____ to be filled in by the candidate.

Inter. (Part-I)-A- 2019

(For all sessions)

Paper Code	6	4	7	7

Physics (Objective Type)

Marks: 17

Time: 20 Minutes

NOTE: Write answers to the questions on objective answer sheet provided. Four possible answers A,B,C & D to each question are given.Which answer you consider correct, fill the corresponding circle A,B,C or D given in front of each question with Marker or pen ink on the answer sheet provided.

1.1. On loading the prong of tuning fork with wax, the frequency of sound:
(A) increases (B) decreases (C) remains same (D) periodic increase and decrease

2. Fringe spacing increases if we use:
(A) lowest order (B) highest order (C) red light (D) blue light

3. Soap film shows colours due to:
(A) Interference (B) Diffraction (C) Polarization (D) Reflection

4. Magnifying power of the lens is 6 then its focal length will be:
(A) 4 (B) 6 (C) 5 (D) 4.5

5. The SI unit of product of pressure and volume is:
(A) Watt (B) Joule (C) Pascal (D) N.m

6. Carnot engine cycle consists of:
(A) Four steps (B) Three steps (C) Single step (D) Two steps

7. Mass is highly concentrated form of:
(A) Inertia (B) Energy (C) Plasma (D) Charge

8. Dimensions of $\sqrt{v/\ell}$ is same as:
(A) Angular frequency (B) Force (C) Torque (D) Time period

9. Force of 10N makes an angle of 30° with y-axis, its x-component will be:
(A) 5N (B) 8.66 (C) $\frac{10}{\sqrt{2}}N$ (D) $10\sqrt{2}N$

10. In which quadrant vector $-2\hat{i}-3\hat{j}$ lies.
(A) 1st (B) 2nd (C) 4th (D) 3rd

11. Distance travelled by free falling object in first second is:
(A) 4.9m (B) 9.8m (C) 19.6m (D) 10m

12. Choice of zero potential energy level is:
(A) Surface of the Earth (B) at infinity
(C) Just above the surface of the Earth (D) arbitrary

13. 2° is equal to:
(A) 0.035 rad (B) 0.30 rad (C) 0.35 rad (D) 0.0035 rad

14. Centripetal force is directed along:
(A) Tangent to circle (B) radius (C) axis of rotation (D) x-axis

15. Terminal velocity of a particle in the fluid depends on:
(A) Nature of fluid (B) Acceleration of particle (C) Force on particle (D) angular velocity of particle

16. Radar system is an application of:
(A) Electric effect (B) Doppler's effect (C) Magnetic effect (D) Chemical effect

17. $\sqrt{\frac{\ell}{g}}$ and $\sqrt{\frac{m}{k}}$ has same:
(A) numerical value (B) units (C) damping (D) time period

Roll No._____ (To be filled in by the candidate)

(For all sessions)

Physics (Essay Type)

Time: 2:40 Hours **Marks: 68**

Section - I

2- Write short answers of any eight parts from the following. 2 x 8 =16

i. Find unit vectors in the direction of vector $\vec{A}, \vec{A} = 8\hat{i} + 4\hat{j}$.
ii. What do you mean by scientific notations? Give one example.
iii. Time period of a simple pendulum is measured by stop watch. What type of errors are possible in the time period?
iv. Differentiate between base units and derived units with examples.
v. Calculate the number of seconds in one year.
vi. Write briefly about Ballistic Missile.
vii. Define viscosity and give its units.
viii. Explain the circumstance in which $\vec{V}$ and $\vec{a}$ are :(i). in parallel. (ii). are perpendicular.
ix. Vector $\vec{A}$ lies in xy plane. For what orientations will both of its rectangular components be negative and for what orientations, its rectangular components be positive.
x. Describe Newton's second law of motion in terms of momentum.
xi. Explain briefly how the swing is produced in a fast moving cricket ball with figure.
xii. Define positive and negative acceleration along with their directions.

3- Write short answers of any eight parts from the following. 2 x 8 =16

i. Calculate the work done in Killo joules in lifting a mass of 10kg through vertical height of 10m.
ii. A boy uses a catapault to throw a stone which accidently smashes a green house window. Discuss the possible energy changes.
iii. Convert 1.4kw into joule/sec.
iv. Prove that $1\text{rad} = 57.\overset{\circ}{3}$.
v. Show that for a body attached with a spring $\vec{a} = \frac{-k}{m}\vec{x}$.
vi. Can we realize an ideal simple pendulum?
vii. Why does sound travel faster in solids than in gasses?
viii. What are the uses of beats?
ix. What is meant by moment of inertia? Explain its role in angular motion.
x. How artificial gravity is produced in a satellite orbiting around the Earth.
xi. What happens to the period of a simple pendulum if its length is doubled?
xii. Differentiate between mechanical waves and electromagnetic waves.

4- Write short answers of any six parts from the following. 2 x 6 =12

i. Under what conditions two or more sources of light behave as coherent sources?
ii. How would you manage to get more orders of spectra using a diffraction grating?
iii. Can visible light produce interference fringes? Explain.
iv. How the light signal is transmitted through the optical fibre?
v. Why would it be advantageous to use blue light with a compound microscope?
vi. Specific heat of a gas at constant pressure is greater than specific heat at constant volume. Why?
vii. Is it possible to construct a heat engine that will not expel heat into the atmosphere?
viii. Can the mechanical energy be converted completely into heat energy? if so give an example.
ix. Define isothermal process and adiabatic process.

Section - II

8x3=24

NOTE: Answer any three questions from the following.

5. (a) How can a vector be resolved into its rectangular components? How a vector is determined if its rectangular components are given? 05

   (b) A ball is thrown with a speed of 30mS^{-1} in a direction $\overset{\circ}{60}$ with horizontal. Calculate the range of the ball. 03

6. (a) Define absolute potential energy. Derive an expression for the absolute potential energy on the surface of the Earth,considering r=R(Radius of the Earth). 05

   (b) A body of moment of Inertia $I=080\text{Kgm}^2$ about a fixed axis, rotates with a constant angular velocity of $100\ \text{radS}^{-1}$. Calculate its angular momentum L and the torque to sustain this motion. 03

7. (a) What is "Carnot Engine"? Derive formula for its effeciency. 05

   (b) How large must a heating duct be if air moving 3.0mS^{-1} along it can replenish the air in a room of 300m^3 volume every 15min? Assume air's density remains constant. 03

8. (a) Derive Newton's formula for velocity of sound in air and describe the correction made by Laplace. 05

   (b) A simple pendulum is 50cm long. What will be its frequency of vibration at a place where $g=9.8\text{mS}^{-2}$? 03

9. (a) Explain Young's double slits experiment. Derive the relation for position of mth bright and dark fringes from the center of the screen. 05

   (b) A telescope is made of an objective of focal length 20cm and an eye piece of 5.0cm, both convex lenses. Find the angular magnification. 03