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78 Warning:- Please write your Roll No. in the space provided and sign. Roll No----------
(Inter Part – I) (Session 2015-17 to 2017-19) Sig. of Student ----------
Physics (Objective) **(Group I)** **Paper (I)**
Time Allowed:- 20 minutes **PAPER CODE 2471** Maximum 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. Write **PAPER CODE**, which is printed on this question paper, on the both sides of the Answer Sheet and fill bubbles accordingly, otherwise the student will be responsible for the situation. Use of Ink Remover or white correcting fluid is not allowed.

Q. 1

1) The percentage error in measuring mass and speed is 2% and 3% respectively. The maximum percentage uncertainity (error) in the measurement of Kinetic Energy is
(A) 11 % (B) 5 % . (C) 7 % (D) 8 %

2) In $5.47 \times 19.89 = 108.7983$; answer should be written as
(A) 108.8 (B) 108.9 (C) 109 (D) 108.79

3) A force for 100 N makes an angle of 60^o with Y-axis, its horizontal component is
(A) 50 N (B) 60 N (C) 70.7 N (D) 86.6 N

4) The direction of torque is
(A) Along the position vector $\vec{r}$ (B) Perpendicular to both $\vec{r}$ and $\vec{F}$ (C) Along the direction of force $\vec{F}$ (D) Opposite to the direction of $\vec{r}$

5) The maximum range of a projectile is 100 km. Take $g = 10\, ms^{-2}$ The initial velocity of the projectile will be
(A) 1000 kms^{-1} (B) 1 kms^{-1} (C) 10 kms^{-1} (D) 100 kms^{-1}

6) Dimensions of power is
(A) $[ML^2T^{-2}]$ (B) $[ML^2T^{-1}]$ (C) $[ML^2T^{-1}]$ (D) $[ML^2T^{-3}]$

7) $\omega = 60\ rev\ \min^{-1}$ is equal to
(A) $\pi\ rad\, s^{-1}$ (B) $2\pi\ rad\, s^{-1}$ (C) $\frac{1}{\pi}\ rad\, s^{-1}$ (D) $\frac{2}{\pi}\ rad\, s^{-1}$

8) Height of geostationary satellite from the earth's surface is
(A) 42300 km (B) 900 km (C) 36000 km (D) 400 km

9) Let A = Area of crossection of pipe v = speed of fluid then 'Av' is called
(A) Volume flow rate (B) Energy flow rate (C) Mass flow rate (D) Pressure flow rate

10) Maximum velocity in SHM is
(A) $x_o \omega^2$ (B) $x_o \omega$ (C) $x\omega$ (D) $x_o^2 \omega$

11) Stars moving away from earth shows
(A) Blue Shift (B) Red Shift (C) Yellow Shift (D) Green Shift

12) Sound waves are
(A) Electromagnetic waves (B) Transverse waves (C) Compressional waves (D) Matter waves

13) Angle between a ray and wavefront is
(A) 180^o (B) 0^o (C) 90^o (D) 45^o

14) When Newton's Rings are seen through the transmitted light, then the central spot is
(A) Dark (B) Blue (C) Bright (D) Red

15) In newer Optical fiber systems, repeaters are placed at
(A) 30 km (B) 100 km (C) 300 km (D) 100 m

16) Average Translational KE of a gas molecule is
(A) $\frac{3}{2}KT$ (B) $\frac{2}{3}KT$ (C) $\frac{1}{2}KT$ (D) KT

17) A heat engine operates between temperatures 400 K and 1000 K, its efficiency is equal to
(A) 50 % (B) 60 % (C) 70 % (D) 70 %

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Physics (Subjective) **Group (I)** (Session 2015-17 to 2017-19) (Inter Part - I) **Paper (I)**

Time Allowed: 2.40 hours **Section ---------- I** Maximum Marks: 68

2. Answer briefly any Eight parts from the followings:- **8 × 2 = 16**

(i) How many years are there in a neno second? (ii) Define radian and stradian and give their units.

(iii) Discuss two frontiers of Science. (iv) Find the dimensions of 'G' using equation $F = G\frac{m_1 m_2}{r^2}$

(v) Explain how a vector can be subracted from the other vector?

(vi) A force of 10N makes an angle of 60^o with x-axis. Find its x and y - components.

(vii) Prove that dot product is commutative.

(viii) Define average and instentaneous velocity. Also give their units.

(ix) Calculate the distance covered by a free falling body during first second of its motion.

(x) Show that range of projectile is maximum when it is thrown at an angle of 45^o with horizontal.

(xi) Explain how the lift is produced in an aeroplane? **(xii)** Why fog droplets appear to be suspended in air?

3. Answer briefly any Eight parts from the followings:- **8 × 2 = 16**

(i) In which case is more work done? When a 50 Kg bag of books is lifted through 50 cm, or when a 50 Kg crate is pushed through 2 m across the floor with force of 50 N.

(ii) What sort of energy is in the following.
(a) Compressed spring (b) Water in high dam (c) A moving car.

(iii) Prove that $\vec{F}.\vec{V} = Power$

(iv) Explain how many minimum number of geo-stationary satellites are required for global coverage of T.V transmission

(v) Find the rotational kinetic energy of disc. (vi) Why the microwaves are used in satellite communication.

(vii) If a mass spring system is hung vertically and set into oscillations, why does the motion eventually stop?

(viii) What happens to the period of simple pendulum if its length is doubled. What happen if the suspended mass is doubled?

(ix) State the Hook's Law, write it in mathematical form. (x) How are beats useful in tuning musical instrument?

(xi) Explain the term node and anti-node. **(xii)** How Doppler's effect is applied to a radar system?

4. Answer briefly any Six parts from the followings:- **6 × 2 = 12**

(i) Explain whether the Young's experiment is an experiment for studying interference or diffraction effects of light.

(ii) State Huygen's principle. (iii) Define wavefronts and ray of light.

(iv) Explain the difference b/w angular magnification and resolving power.

(v) How the Power is lost in optical fibre through dispersion? Explain.

(vi) A thermos flask containing milk as system is shaken rapidly. Does the temperature of the milk rise?

(vii) Does entropy of a system increases or decreases due to friction? Explain.

(viii) Specific heat of gas at constant pressure is greater than specific heat at constant volume. Why?

(ix) Write down the two strokes of a petrol engine.

Note: Attempt any three questions. **Section ---------- II** **(8 × 3 = 24)**

5. (a) Add two vectors by using their rectangular components. Determine the magnitude and direction of the resultant.

(b) A truck weighing 2500 Kg and moving with a 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

6. (a) Define gravitational field and conservative field. Prove that work done is independent of path followed in gravitational field by gravitational force.

(b) Calculate the angular momentum of a star of mass $2\times10^{30}\ Kg$ and radius $7\times10^{5}\ Km$. If it completes one complete rotation about its axis once in 20 days.

7. (a) What is carnot engine? Discuss carnot cycle and calculate its efficiency.

(b) What gauge pressure is required in the city main for a stream from a fire hose connected to mains to reach a vertical height of 15 m.

8. (a) Describe Newton's formula for the speed of sound in air and explain how it was corrected by Laplace?

(b) A 100.0 g body hung on a spring elongates the spring by 4.0 cm. When a certain object is hung on the spring and set vibrating, its period is 0.568 second. What is the mass of the object pulling the spring?

9.(a) Describe diffraction of X-rays by crystals and derive Bragg's equation and what are the uses of X-rays diffraction

(b) Calculate the critical angle and angle of entry for an optical fibre having core of refractive index 1.50 and cladding of refractive index 1.48.

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(Inter Part – I) (Session 2015-17 to 2017-19) Sig. of Student ----------
Physics (Objective) **(Group II)** **Paper (I)**
Time Allowed:- 20 minutes **PAPER CODE 2476** Maximum 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. Write **PAPER CODE**, which is printed on this question paper, on the both sides of the Answer Sheet and fill bubbles accordingly, otherwise the student will be responsible for the situation. Use of Ink Remover or white correcting fluid is not allowed.

Q. 1

1) When an object is placed within the focal point of a convex lens then its image will be
(A) Real (B) Inverted (C) Virtual (D) Of same size

2) If the temperature of a gas is constant then $<\frac{1}{2}mv^2>$ of the molecules of gas will be
(A) Constant (B) Zero (C) Increased (D) Decreased

3) For diatomic gas r = 1.4 and $C_v = \frac{5R}{2}$ (R is gas constant) then C_p will be
(A) $\frac{2}{5}R$ (B) $\frac{9}{2}R$ (C) $\frac{7}{2}R$ (D) $\frac{11}{2}R$

4) How many seconds are there in one year
(A) $3.156\times10^{6}s$ (B) $3.1536\times10^{8}s$ (C) $3.1536\times10^{10}s$ (D) $3.1536\times10^{7}s$

5) Zero Error belongs to
(A) Personal Error (B) Random Error (C) Systematic Error (D) Collective Error

6) $\hat{i}\cdot(\hat{j}\times\hat{k})$ is equal to
(A) 1 (B) Zero (C) -1 (D) $\hat{i}$

7) Which is correct formula
(A) $\vec{\tau}=rF$ (B) $\vec{\tau}=rF\sin\theta$ (C) $\vec{\tau}=\vec{r}\times\vec{F}$ (D) $\vec{\tau}=rF\cos\theta\,\hat{n}$

8) A mass of 5000 gm moves with an acceleration of $10\ ms^{-2}$, force acting on it is
(A) 5 N (B) 500 N (C) 50 N (D) 5000 N

9) A body has P.E = mgh when it is at height "h" from the ground. At the point at a distance "x" below from the top its P.E. will be
(A) mgx (B) mgh (C) mg(x+h) (D) mg(h-x)

10) One degree is equal to
(A) $\frac{2\pi}{260}rad.$ (B) $\frac{2\pi}{180}rad.$ (C) $\frac{\pi}{180}rad.$ (D) $\frac{\pi}{360}rad.$

11) The Apparent weight of object of mass ''m'' when the lift is moving upward with acceleration equal to "g" (acceleration due to gravity) is given as
(A) mg (B) 2 mg (C) Zero (D) $\frac{1}{2}mg$

12) The dimensions of potential energy per unit volume are same as that of
(A) Work (B) Pressure (C) Speed (D) Density

13) The potential energy of a spring mass vibrating system at its mean position is
(A) Maximum (B) Minimum (C) Equal to K.E. (D) Zero

14) The speed of sound in air at $0\,^{o}C$ is $332\,ms^{-1}$. Then speed of sound at $40\,^{o}C$ will be
(A) $372\ ms^{-1}$ (B) $356.4\ ms^{-1}$ (C) $346.4\ ms^{-1}$ (D) $332\ ms^{-1}$

15) If a stretched string vibrate in three loops. Then relation between its length and wave length of stationary wave is
(A) $l=\frac{3\lambda}{2}$ (B) $l=3\lambda$ (C) $l=\frac{2\lambda}{3}$ (D) $\lambda=3l$

16) X-ray diffraction has been very useful in determining the structure of
(A) Haemoglobin (B) Stars (C) Galaxies (D) Stones

17) The angle between ray of light and wave front is
(A) 90^{o} (B) 0^{o} (C) 180^{o} (D) 120^{o}

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(Inter Part - I) (Session 2014-2016)

Physics (Subjective) (Group II) Paper (I)

Time Allowed: 3.10 hours **Section ---------- I** Maximum Marks: 83

2. Answer briefly any Eight parts from the followings:- **8 × 2 = 16**

(i) Distinguish between Biological Sciences and Physical Sciences. (ii) Define the radian and steradian

(iii) Give the drawbacks to use the time period of a simple pendulum as a time standard.

(iv) What is meant by dimension? (v) Write down the names of two examples of scalar product.

(vi) Define unit vector. (vii) Can the magnitude of a vector have a negative value? Explain.

(viii) Can you add zero to a null vector? Explain. (ix) Differentiate between elastic and inelastic collision.

(x) What is a ballistic flight? (xi) What is meant by projectile motion.

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

3. Answer briefly any Eight parts from the followings:- **8 × 2 = 16**

(i) An object has 1 J of potential energy. Explain what does it mean?

(ii) A boy uses a catapult to throw a stone which accidentally smashes a green house window. List the possible energy changes. (iii) Define work energy principle.

(iv) Explain how many minimum number of geo-stationary satellites are required for global coverage of T.V transmission. (v) What is meant by rotational kinetic energy.

(vi) Why does a diver change his body positions before and after diving in the pool?

(vii) What is the total distance travelled by an object moving with S.H.M in a time equal to its period, if its amplitude is A?

(viii) If a mass spring system is hung vertically and set into oscillations, why does the motion eventually stop?

(ix) Define vibration. (x) How are beats useful in tuning musical instruments?

(xi) Explain why sound travels faster in warm air than in cold air.

(xii) What is effect of density on speed of sound.

4. Answer briefly any Six parts from the followings:- **6 × 2 = 12**

(i) Define grating element of a diffraction grating. (ii) Define diffraction of light.

(iii) Why is the centre of Newton's ring dark? (iv) What is working principle of optical fiber?

(v) Give two conditions of total internal reflection.

(vi) How a convex lens may be used as a simple microscope? (vii) State carnot theorm.

(viii) A thermos flask containing milk is shaken rapidly. Does the temperature of milk rise?

(ix) What happens to the temperature of room, when an air conditioner is left running at a table in the middle of the room?

Note: Attempt any three questions. **Section ---------- II** **(8 × 3 = 24)**

5. (a) Define and Explain Rectangular Components of a Vector.

(b) A 1500 Kg car has its velocity reduced from $20\,ms^{-1}$ to $15\,ms^{-1}$ in 3.0 s. How large was the average retarding foul?

6. (a) State and explain work energy principle.

(b) What should be the orbiting speed to launch a satellite in circular orbit 900 km above the surface of the earth (Take mass of earth as $6.0\times10^{24}\,Kg$ and its radius as 6400 Km)

7. (a) Define molar specific heat of a gas. Prove that $C_P - C_V = R$

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

8. (a) What is Doppler effect? Discuss the cases when Its source moves towards and away from a stationary observer.

(b) A simple pendulum is 50.0 cm long. What will be Its frequency of vibration at a place where value of $g = 9.8\ m/s^2$

9. (a) What is compound microscope. Explain its working and derive formula for its magnifying power.

(b) A second order spectrum is formed at an angle of 38.0^{o} when light falls Normally on a diffraction grating having 5400 lins per centimeter. Determine wave length of the light used.

Section ---------- III (PRACTICAL) **(4 × 2 = 08)**

10. (a) **Write answer of any Four Parts**

(i) What is zero error? Give its formula. (ii) What is resolution of a vector?

(iii) Give difference between Vernier Calliper and Screw Gauge.

(iv) State Hook's law. Give its formula. (v) What is momentum? Give its S.I units

(vi) What is law of length in Sonometer experiment? Give its formula.

(vii) What is focal length? Give its unit. (viii) Define refractive Index. Give formula.

(b) Write a brief procedure to find value of 'g' by oscillating spring mass system. **(03)**

.....OR.....

Write a brief procedure to find the focal length of Convex lens by displacement method. **(2+2)**

(c) **Write the answers on the basis of graph.**

(i) Find the slope of the graph A. (ii) Find the value of $T^2\,(\sec^2)$ at $x = 18cm$. **(Graph A)**

.....OR.....

(i) What does the graph infer us? (ii) Find the slope of the graph B. **(Graph B)**

See Graphs over leaf