**Pratice Paper 2**

**Class – XI**

**Subject – Physics**

**Time: 3 Hrs MM: 70**

**General Instructions:**

All questions are compulsory.

There are 26 questions in total. Questions 1 to 5 carry 1 mark each, questions 6 to 10 carry 2 marks each, question11to 22 carry 3 marks each and question 23 carry 4 marks, questions 24 to 26 carry 5 marks each.

There is no overall choice.

Use of calculators is not permitted.

You may use the following physical constants wherever necessary.

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c = 3 x 108 ms–1

h = 6.626 x 10–34 Js

e = 1.602 x 10–19 C

μ0 = 4 π x 10–7 T m A–1

Mass of neutron mn ≅ 1.675 x 10–27 kg

Boltzmann’s constant k = 1.381 x 10–23 J K–1

Avogadro’s number NA = 6.022 x 1023 / mol –1

Q1. Give dimensions of (i) rotational Kinetic energy (ii) strain.

Q2. If the force shown on the block is action, what is its reaction?

Q3. Mention two advantages of ‘I’ shape of iron beams used in building

construction.

Q4. Give one example each of natural and forced convection.

Q5. Why is ‘invar’ used for making the pendulum of a clock?

Q6. What are different types of error?

Q7.Derive 2 equations of motion using v t graph.

Q8. What is the maximum height reached by an oblique projectile if its

time of flight is T?

Q9. Explain very briefly, why

(i) A horse cannot pull a cart and run in empty space?

(ii) Passengers are thrown outward when a moving bus takes a sudden turn.

Q10. What are concurrent forces? Under what conditions will a body remain in equilibrium?

Q11Find out the expression for total energy of satellite.

Q12. A gas mixture consists of molecules of type A, B and C with molecular masses mA > mB > mC. Rank the three types according to (a) average kinetic energy (b) rms speed, greatest first. Give justification for each answer.

OR

What would be the ratio of initial and final pressures if the masses of all the molecules of a gas are halved and their speeds doubled? What is the kinetic energy per unit volume of a gas if its pressure is 2 × 105 N/m2.

Q13. A Carnot’s engine takes 2095 J of heat per cycle from source at 400 K and rejects 1676 J to the sink. Calculate the temperature of the sink and efficiency of the engine.

Q14. Define SHM. Under what conditions is the motion of a pendulum simple harmonic?

Q15. A particle is executing SHM. What fraction of its energy is kinetic

when the displacement is half the amplitude?

Q16. The motion of a car along y-axis is given by v(t)= -12t + 12 where velocity v is in m/s and time t in seconds. Find the instantaneous position of the car as a function of time if at t = 0 it was at 5 m. Also find its acceleration at t = 2 second.

Q17. (i) Classify the following into conservative and non-conservative spring force, human push, gravitational force, viscous drag (ii) Potential energy of a system due to a conservative for F is U. What is the relation between then?

Q18. Define coefficient of restitution. In an elastic collision of two bodies are the momentum and energy of each body conserved? Why is heavy water chosen in a nuclear reactor to slow down fast moving neutrons?

Q19. (a) Find the torque of a force 7ˆi 3ˆj 5kˆ about the origin. The force

acts on a particle whose position vector is ˆi ˆj kˆ .

(b) How do we find the direction of angular velocity?

 Q20. State perpendicular axis theorem. What is the moment of inertia of a ring of mass 2 kg and radius 0.5m about an axis passing through its centre and erpendicular to its plane? Also find moment of inertia about a parallel axis through its edge.

Q21.What do you mean by satellite.Discuss its principle.

Q21 State the main features of kinetic theory of an ideal gas.

Q22. State the first law of thermodynamics. Establish the relation between CP and CV.

Q23.Bani went to marketand she saw a person hypnotising a lady with a pendulum,she threw his pendulum and called the police

i)What moral do you get from story.

ii)Name the type of motion and its time period.

Q24. What do you understand by ‘laminar flow’ and ‘streamlined flow’? Water is flowing with a speed of 2 m/s in a horizontal pipe with cross sectional area 2 × 10-2 m2 at pressure 4 × 104 Pa. What will be the pressure at a smaller cross section where the area decreases to 0.01 m2?

OR

Define angle of contact. For what nature of angle of contact will a liquid wet the solid? A liquid drop of diameter 4 mm breaks into 1000 droplets of equal size. Calculate the resultant change in surface energy if the surface tension of the liquid is 0.07 N/m.

Q25. A displacement wave is represented by y = 0.50× 10-3 Sin (500t +

0.025 Hz). where y, t and z are in cm, sec and m respectively. Deduce (i) the direction of travel of the wave.

(ii) wave frequency

(iii) wavelength

(iv) the wave speed

(v) maximum particle velocity

Or

Discuss a heat engine.Mention its types.Also its working with labelled diagram.

Q26.Derive an expression for pressure exerted by gas and deduce gas laws. 5