SUBJECT: PHYSICS

CLASS: 11th

TIME: 3 HOURS

MAXIMUM MARKS: 70

S.No	General Instructions	Marks
	There are total of four sections in the question paper. All questions are compulsory	
1	Section-A contains 10 Very Very Short Type Questions of 1 Mark each	1x10 = 10 marks
	Section-B contains 9 Very Short Answer Type Question of 2 Marks each to answered in 20 to 30 words	2x9 = 18 marks
	Section-C contains 9 Short Answer Type Questions of 3 Marks each to be answered in 50 to 70 words.	3x9 = 27 marks
	Section-D contains 3 Long Answer Type Questions of 5 Marks each to be answered in 100 to 150 words.	5x3 = 15 marks
2	Use log table, if necessary. Use of scientific calculator is not allowed	

SECTION A

Q1.

i) The position time graph for a body in uniform motion is

a)

b)

c)

d)

ii) The dimensional formula for Gravitational constant is

a) ML^3T^2

b) $M^{-1}L^2T^2$

c) $M^2L^2T^{-1}$

d) $M^{-1}L^3T^{-2}$

iii) The position vector of a particle in a circular motion about the origin sweeps out equal area in equal time. Its

a) velocity remains constant

b) speed remains constant

c) acceleration remains constant

d) tangential acceleration remains constant

iv) The work done by the external force on a system equals the change in

a) total energy.

b) kinetic energy.

c) potential energy.

d) none of these.

v) The centre of mass of earth – moon system lies

a) close to earth

b) close to moon

c) exactly at the centre of line joining earth & moon

d) on the moon

vi) Value of g is maximum at

   a) equator   b) poles

   c) centre of earth   d) All of above

vii) In the relation $E = \sigma T^4$, 'σ' is called:

   a) Kirchhoff's constant

   b) Stefan's constant

   c) Wien's constant

   d) Boltzmann's constant

viii) For a heat engine to have 100% efficiency, the temperature of

   a) sink should be $0^0 k$

   b) sink should be $0^0 C$

   c) source should be $100^0 C$

   d) source should be $0^0 C$

ix) If the volume of a gas is increased by 4 times,

   a) temperature must be doubled.

   b) at constant temperature, the pressure must be increased four times.

   c) at constant pressure, temperature must be increased four times.

   d) None of the above.

x) The potential energy of a simple pendulum is

   a) maximum at mean position

   b) maximum at extreme position

   c) maximum at all the points

   d) is always zero

SECTION B

Q2. Which of the following reading is the most accurate?

   (a) 7000 m   (b) 70×10^2 m   (c) 7×10^3 m

Q3. With the help of dimensional analysis, convert one Newton into dyne.

Q4. A force of 3000 dyne acts on a mass of 300 g for 10 seconds. Calculate the kinetic energy of the body after 10 seconds.

Q5. Angular momentum is conserved in the rotation of electron around the nucleus and the rotation of planets around the Sun. Why?

Q6. An artificial satellite moving in a circular orbit around the Earth has total energy E_o. What is its potential energy?

Q7. State the second law of thermodynamics.

Q8. Find the root mean square velocity of smoke particles each of mass 5×10^{-17} kg in the Brownian motion in air at N.T.P.

Q9. A steel wire of diameter 2 mm is kept under the tension of 2 kN. Find the speed of the transverse wave in the wire. (Density of steel is 7.9×10^3 kg m^{-3})

Q10. Derive the relationship for time period of simple pendulum

SECTION C

Q11. A car moving along a straight path with the speed of 126 Km/h is brought to rest within a distance of 200 m. Find the retardation of the car (assumed uniform) and how long does it take for the car to stop?

Q12. Calculate the angle of banking of a smooth curved road of radius 100 m, if vehicle can safely travel along it with a speed of 108 km/hr.

Q13. State Newton's three laws of motion.

Q14. A pump on the ground floor of a building can pump up water to fill a tank of volume 30 m³ in 15 minutes. If the tank is 40 m above the ground and the efficiency of pump is 30%, how much electric power is consumed by the pump?

Q15. What is law of conservation of angular momentum?

Q16. State and explain Kepler's three laws of planetary motion.

Q17. Discuss three limitations of Bernoulli's Theorem.

Q18. What is the importance of second law of thermodynamics?

Q19. Write the postulates of kinetic theory of gases.

SECTION D

Q20. What is Projectile motion? Derive the expression for maximum height, time of flight and horizontal range of a projectile fired at an angle with horizontal.

OR

If a body travels half of its total path in the last second of its fall from the rest, find time (t) and height (h) of its fall.

Q21. Define Young's modulus of elasticity? What are its units? How is it experimentally measured?

OR

Explain Wein's displacement Law. What are its applications?

Q22. Derive the expression for average kinetic energy of a particle executing Simple Harmonic Motion.

OR

What is wave motion? Describe the characteristics of wave motion.