LIONS SCHOOL, MIRZAPUR
HALF YEARLY EXAM- 2020 -21

CLASS – XI M.M -70
SUB. PHYSICS TIME- 3 hr

General instruction--- 1-All questions are compulsory

2-This paper is divided into four section. A, B , C and D.Section A have 20 question of one mark each, section B have 7 of 2marks each, section C has 7 question of 3 marks each and section D has 3 question of 5 marks each.

3-Marks for each question are given next to it.

4-There is no choice only internal choice is given.

SECTION- A

1- The dimension of magnetic field is (C is coulomb)
(a) $(MLTC^{-1})$ (b) $(MLTC^{1})$ (c) $(MT^{-1}C^{-1})$ (d) $(MTkC^{-1})$ 1

2- The least count of stop watch is 0.01 sec.The time period of 100 oscillation of the pendulum is 100 sec.The percentage error in the time period will be.
(a) 0.01% (b) 0.1% (c) 1 % (d) 10% 1

OR

When a copper sphere is heated maximum percentage error will be observed in
(b) radius(b) area (c) volume (d) none of these

3- The displacement of a particle is given by $x= (t-2)^2$, where x is in meter and t is in sec. The distance covered by particle in first 4 sec is
(a) 4 m (b) 8m (c) 12 m (d) 16 m 1

OR

CGS unit of relative speed is
(a) m/s (b) cm/s (c) km/hr (d) m/cm

4- A body starts from rest. What is the ratio of the distance traversed by it during 4th and 3rd sec.?
(a) 7/5 (b) 5/7 (c) 7/3 (d) 16/9 1

5- Trippling the speed of a car multiplies the distance covered for stopping it by
(a)3 (b) 6 (c) 9 (d) 24 1

6- If the magnitudes of vectors A, B and C are 12, 5 and 13 and vector sum of A,B and C is A+B= C then angle between A and B is
(a) 0 (b) 180 (c) 90 (d) 45 1

7- A body of mass 500 gm collides against a wall with a velocity of 10m/s and rebound with the same speed. Its change in momentum is

(a)10 kgm/sec (b) 100 kgm/sec (c) 0.5kgm/sec (d) 1000kgm/sec 1

8- On a stationary sail boat , air is blown at the sails from a fan attached to the boat. The boat will.

(a)move forward (b) move backward

(c) spin around (d) remain stationary 1

9- A 3 hp motor requires 2.4 kW to drive it. The efficiency of the motor is about

(a) 90% (b) 75%

(c) 60% (d) 50%

10- When the KE of a body is increased by 300% the momentum of the body is increased by

(a)20% (b) 50% (c) 100% (d) 200% 1

Fill in the blanks and one word answer-------

11- Formula for coefficient of restitution is…….. 1

12- The dimension of Planck's constant is……. 1

13- If a body is moving with uniform speed its acceleration is……. 1

14- The resultant sum of magnitude of A= 3i+4j and its negative is……. 1

15- What is the formula for centripetal force ……. 1

16- Define one ampere. 1

OR

Define one second.

17- Two bodies are thrown at complimentary angles, what is the ratio of their maximum heights. 1

18- Define accuracy and precision. 1

19- A man rowing a boat upstream is at rest with respect to shore. Is he doing some work ? 1

20- What type of energy is stored in the spring of a watch. 1

OR

Mountain roads rarely go straight up but wind up gradually. Why ? 1

SECTION- B

21- Define kinetic energy and derive an expression for it. 2

22- State and prove work energy theorem. 2

OR

Define angle of repose and derive an expression for it.

23- The driver of a three wheeler moving with a speed of 36km/h sees a child standing in the middle of road and brings his vehicle to rest in 4 sec just in time to save the child. What is the average retarding force on the vehicle?The mass of the three wheeler is 400 kg and the mass of driver is 65 kg. 2

24- State and prove polygon law of vectores. 2

25- A force F=3i+4j newton displaces a particle by s= 3j+4k in 3 sec, find the power. 2

OR

A person is moving eastward with a velocity of 4.8 km/h, rain appears to fall vertically downward with a speed 6.4 km/h. Find the actual speed and direction of rain.

26- Find an expression for relative velocity. 2

27- Define each instantaneous velocity and instantaneous speed. 2

SECTION- C

28- A bullet of mass 20 gm strikes a target with a velocity of 150 m/s and is brought to rest after piercing 10 cm into it. Calculate the average force of resistance offered by the target. 3

OR

A mass of 100 gm falls freely under the action of gravity. Find the force acting on it, its momentum and kinetic energy after 10 sec.

29- Explain why it is easier to pull than push a lawn roller. 3

30- Derive three equation of motion by using calculas method. 3

31- A ball is dropped from a height of 90 m on a floor. At each collision with the floor, the ball loses one tenth of its speed. Calculate its speed and height reached after three complete collision with the floor. 3

OR

A bullet loses 1/20 th of its velocity in passing through a plank. What is the least number of planks to stop the bullet.

32- The resistance R=V/I where V= 100± 5 volt and I= 12±0.2 amp. Find percentage error in R. 3

33- Show that the mass m of the largest stone which depends upon velocity v, density d and acceleration due to gravity g. Show that m varies with sixth power of velocity of flow. 3

34- Write the dimension of a/b in $P = a\text{-}t^2/bx$ where P is power. 3

SECTION- D

35- Derive an expression for elastic collision in one dimension. 5

OR

Prove that energy is always lost in inelastic collision.

36- State and prove law of conservation of momentum. Also explain recoiling of a gun. 5

OR

Derive an expression for acceleration on an inclined plane and work done against friction.

37- What are rectangular components of a vector, derive an expression for it. 5

OR

Derive an expression for velocity of projectile. Also discuss the case of range.