

A-1-Y

Roll No,

Total No. of Questions : 26]

[Total No. of Printed Pages : 4

XIARWZJD21

5701-Y

PHYSICS

Time : 2.30 Hours]

[Maximum Marks : 70

Section-A

(Very-Very Short Answer Type Questions)

1 each

1. If $y = \cos^2 x$, then $\frac{dy}{dx}$ is
2. Write relation between torque and force.
3. Define instantaneous velocity.
4. What is Avogadro's number ?
5. What remains conserved in an inelastic collision ?

Section-B

(Very Short Answer Type Questions)

2 each

6. A physical quantity x is expressed as $x = \frac{a^2 b^3}{c \sqrt{d}}$ If percentage errors in a , b , c and d are 2%, 1%, 3% and 4% What is percentage error in x ?

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Turn Over

7. What is kinetic interpretation of temperature ? Define absolute zero temperature.
8. Define Angle of Repose ?
9. Derive relation between kinetic energy and linear momentum.
10. What are Resonant oscillations ?

Section-C

(Short Answer Type Questions)

3 each

11. Differentiate $y = \sin x$ w.r.t. x from ab initio method.
12. Test the correctness of the following equations :
 - (a) $v^2 - u^2 = 2as$
 - (b) $S = ut + \frac{1}{2}at^2$
13. The ceiling of a long hall is 25 m high. What is the maximum distance that a ball thrown with speed of 40 ms^{-1} can go without hitting the ceiling of hall ?
14. State Parallelogram law of vector addition. Write expression for magnitude and direction of resultant of two vectors.
15. What is a Geostationary Satellite ? Write some of its properties.

16. Differentiate between Inertial and Gravitational masses.
17. Discuss various modes of transfer of heat.
18. State and explain First Law of Thermodynamics.
19. State and explain Zeroth law of Thermodynamics and give the concept of temperature from this law.
20. What do you understand by Degree of Freedom ? Give general relation to find the degree of freedom. <https://www.jkboseonline.com>
21. Derive an expression for potential energy of a spring.
22. Distinguish between a Longitudinal and a Transverse wave.

Section-D

(Value Based Question)

4

23. Savita was surprised to see oil spreading on the surface of water and asked her mother to explain why oil spreads on the surface of water ? Her mother explained the reason behind it. By going through the explanation, she thought of learning more about other scientific phenomenon also :
- (a) What qualities do you find in Savita ?
 - (b) Oil spreads over surface of water whereas water does not spread over the surface of oil. Why ?

Section-E

(Long Answer Type Questions)

5 each

24. State and explain Newton's 2nd law of motion. Prove that 2nd law of motion is real law of motion.

Or

What is meant by Centripetal Force ? Derive expression for centripetal force.

25. Define cross-product of two vectors. Give its geometrical meaning. Discuss some of its important properties.

Or

Define radius of gyration. Derive an expression for it. Give its S.I. Unit and dimensional formula.

26. What is meant by S.H.M. ? Derive formula for velocity acceleration, time period and frequency of a particle executing S.H.M.

Or

What are Beats ? Prove that the no. of beats produced per second is equal to the difference between the frequencies of two superimposing waves.

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