

INTERMEDIATE PUBLIC EXAMINATION

Jr. PHYSICS MODEL PAPER (ENGLISH VERSION)

TIME: 3 HOURS

MAX. MARKS: 60

SECTION - A

Note: 1) All are very short answer type questions.

2) Answer ALL questions.

3) Each question carries TWO marks.

10 × 2 = 20

1. What are significant figures? What do they represent when reporting the result of a measurement?
2. How is average velocity different from instantaneous velocity?
3. The vertical component of a vector is equal to its horizontal component. What is the angle made by the vector with X-axis?
4. Write the relation between rotational kinetic energy and angular momentum.
5. Will pendulum clock gain (or) lose time, when taken to the top of a mountain?
6. If an iron wire is stretched by 1%, what is the strain on the wire?
7. Mention any two examples that obey Bernoulli's theorem and justify them.
8. A thermos flask containing liquid is shaken vigorously, what happens to the temperature?
9. Does a body radiate heat at 0° K? Does it radiate at 0°C?
10. If a gas has 'f' degrees of freedom, find the ratio of C_p and C_v .

SECTION - B

Note: 1) All are Short answer type questions.

2) Answer any SIX questions.

3) Each question carries FOUR marks.

6 × 4 = 24

11. Show that maximum height reached by a projectile launched at an angle of 45° is one quarter of its range.
12. A force $2\hat{i} + \hat{j} - \hat{k}$ N acts on a body which is initially at rest. At the end of 20 sec the velocity of the body is $4\hat{i} + 2\hat{j} - 2\hat{k}$ m/s. What is the mass of the body?
13. Define Torque & angular momentum. Derive the relation between them.
14. Derive an expression for height attained by a freely falling body after 'n' number

of rebounds from the floor.

15. Obtain an expression for frequency of oscillation of a spring of force constant K to which mass ' m ' is attached.
16. While constructing bridges & buildings a pillar with distributed ends preferred than a pillar with rounded ends. Why?
17. What is Toricelli's Law? Explain how speed of efflux is determined with an experiment?
18. Obtain an expression for work done by an ideal gas during isothermal change.

SECTION - C

Note: 1) All are Long answer type questions.

2) Answer any TWO questions.

3) Each question carries EIGHT marks.

$2 \times 8 = 16$

19. (a) Define angle of friction and angle of repose. Show that angle of friction is equal to angle of repose for a rough inclined plane.
(b) A block of mass 4 Kg is resting on a rough horizontal plane and is about to move when a horizontal force of 30 N is applied on it. If $g = 10 \text{ m/s}^2$, find the total contact force exerted by the plane on the block.
20. State Newton's Law of Gravitation. Explain how the value of gravitational constant (G) can be determined by Cavendish method.
21. (a) State and explain Newton's Law of cooling. State the conditions under which Newton's Law of cooling is applicable.
(b) A body cools down from 60°C to 50°C in 5 minutes and to 40°C in another 8 min. Find the temperature of the surroundings.