

**SECOND TERM EVALUATION 2024-25**

**PHYSICS**

**Standard: IX**

**Time: 1 ½ Hour**

**Total Score: 40**

**Instructions:**

- **First 15 minutes is given as cool-off time. Use this time for reading and understanding the questions.**
- **Answer the questions based on instructions.**
- **Allocate time according to marks.**

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**Answer any three questions from 1 to 4. (1 mark each)**

1. Write the formula for acceleration due to gravity  $g$  in terms of  $G$ ,  $M$ , and  $R$ .
2. Define buoyant force.
3. What is the SI unit of power?
4. When is work said to be done on an object?

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**Answer any seven questions from 5 to 13. (2 marks each)**

5. A stone and a feather are dropped from the same height on Earth.
  - a) Which one will hit the ground first?
  - b) Why does this difference occur in the presence of air?
6. The weight of an object on Earth is 49 N. What will be its weight on the Moon, where  $g_{\text{Moon}} = \frac{1}{6}g_{\text{Earth}}$
7. Define relative density. If the relative density of a liquid is 0.8, will an object with a density of  $0.9 \text{ g/cm}^3$  float in it? Justify.
8. Write two differences between mass and weight.
9. A vehicle of mass 1000 kg accelerates uniformly from rest to 20 m/s in 10 s.
  - a) What is the acceleration?
  - b) Calculate the net force acting on the vehicle.
10. What is the principle of floatation?
11. Explain why the weight of an object is zero during free fall.
12. A stone is tied to a string and rotated in a horizontal circle. What is the force acting on the stone, and in which direction does it act?
13. State Newton's third law of motion and give a real-life example.

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**Answer any five questions from 14 to 19. (3 marks each)**

14.

- a) State the Universal Law of Gravitation.
- b) Write the formula for gravitational force and define each term.
- c) If the distance between two masses is doubled, how does the force between them change?

15. A body of mass 5 kg is traveling at a velocity of 10 m/s. Calculate:

- a) Its initial momentum.
- b) The force required to stop it in 2 seconds.
- c) The rate of change of momentum.

16. A block of iron and a block of wood, both weighing 50 N, are fully immersed in water.

- a) Which will experience a greater buoyant force?
- b) Why?

17. A planet has twice the mass of Earth and the same radius.

- a) How will the acceleration due to gravity on this planet compare to that on Earth?
- b) Derive the formula for  $g$  on a planet in terms of  $G$ ,  $M$ , and  $R$ .

18.

- a) Why does a ship made of iron float, but an iron nail sinks in water?
- b) State the factors affecting buoyant force.

19. A body of mass 10 kg falls freely from rest under gravity.

- a) What will be its velocity after 5 seconds?
- b) Calculate the distance it travels during this time.

**Answer any two questions from 20 to 22. (4 marks each)**

20. The data for the motion of an object is given below. Draw the velocity-time graph and answer the following questions:

Time (s)	0	1	2	3	4	5	6
Velocity (m/s)	0	5	10	15	20	20	20

- a) Calculate the acceleration during the first 3 seconds.
- b) Find the total distance travelled by the object.

21. A stone is thrown vertically upward with an initial velocity of 30 m/s.

- a) Calculate the maximum height reached.
- b) How long will it take to reach the ground? (Take  $g=10 \text{ m/s}^2$ )

22. A block weighing 300 N is placed on an inclined plane.

- a) What is the normal reaction force?
- b) If the angle of inclination is  $30^\circ$ , calculate the component of the weight acting along the plane.