Al Amal Learning Centre

Physics Test — Chapters 1–4 (Class 9)

Units 1–4: Physical Quantities & Measurement · Kinematics · Dynamics-I · Dynamics-II

Total Marks: 60 **Time:** 2 hr 40 min **Name:** _____ **Roll No.:** _____

SECTION – A (Marks 30) | Each question carries 0.5 mark. Fill the correct bubble / write the correct option.

S#	Question	(A)	(B)	(C)	(D)
1.	Which pair contains only base SI units?	metre, newton	kilogram, second	joule, kelvin	pascal, ampere
2.	Which of the following is NOT a physical quantity?	Mass	Temperature	Time	Taste
3.	In standard form, 0.000052 m is written as:	5.2×10^{5} m	5.2×10^{-4} m	5.2×10^{-5} m	5.2×10^{-6} m
4.	A time of 4.5×10^{-6} s can be written using a prefix as:	4.5 ms	4.5 ns	4.5 ks	4.5 µs
5.	Which pair consists of vector quantities only?	speed, force	distance, velocity	momentum, weight	mass, acceleration
6.	Two perpendicular displacements of 6 m and 8 m act on a body. The magnitude of the resultant is:	10 m	14 m	2 m	48 m
7.	A screw gauge has a pitch of 1 mm and 100 divisions on its circular scale. Its least count is:	0.1 mm	0.01 mm	0.001 mm	1 mm
8.	A vernier caliper has a negative zero error of 0.2 mm and gives a reading of 3.5 mm. The correct reading is:	3.3 mm	3.7 mm	3.5 mm	3.9 mm
9.	To read the volume of water in a measuring cylinder accurately, the eye should be:	above the liquid surface	below the liquid surface	level with the bottom of the meniscus	at any angle
10.	A cyclist travels 3 km east and then 4 km north. Her distance and displacement are:	7 km and 5 km	5 km and 7 km	7 km and 7 km	1 km and 5 km
11.	Which of the following has constant speed but changing velocity?	A car moving on a straight road at 60 km/h	A satellite moving uniformly in a circular orbit	A ball at rest on a table	A stone in free fall
12.	The velocity of a car decreases from 30 m/s to 10 m/s in 5 s. Its acceleration is:	4 m/s²	8 m/s²	−8 m/s²	−4 m/s²
13.	The distance–time graph of a body is a curve that becomes flatter with time. The body is:	speeding up	moving at constant speed	slowing down	at rest
14.	A speed–time graph is a straight line rising from 0 to 12 m/s in 6 s. The distance covered is:	36 m	72 m	18 m	12 m
15.	A stone is dropped from rest and falls for 3 s (g = 9.8 m/s²). Its speed after 3 s is:	9.8 m/s	29.4 m/s	3.27 m/s	88.2 m/s
16.	At the highest point of a ball thrown vertically upward:	velocity ≠ 0 and acceleration = 0	velocity = 0 and acceleration = 0	velocity = 0 and acceleration = 9.8 m/s² downward	velocity = 0 and acceleration = 9.8 m/s² upward
17.	The universal speed limit for any object in the universe is approximately:	3×10^{6} m/s	3×10^{10} m/s	343 m/s	3×10^{8} m/s
18.	The motion of a vibrating guitar string is:	vibratory	rotatory	translatory	random
19.	A speed of 72 km/h is equal to:	7.2 m/s	20 m/s	72 m/s	259.2 m/s
20.	An astronaut travels from Earth to the Moon. Her mass:	decreases to one-sixth	increases	remains the same	becomes zero
21.	A net force of 24 N gives a body an acceleration of 3 m/s². The mass of the body is:	72 kg	8 kg	0.125 kg	21 kg
22.	Which fundamental force is responsible for radioactive decay?	Gravitational force	Strong nuclear force	Electromagnetic force	Weak nuclear force
23.	Which fundamental force has the weakest relative strength yet an infinite range?	Gravitational force	Strong nuclear force	Weak nuclear force	Electromagnetic force

S#	Question	(A)	(B)	(C)	(D)
24.	A book of mass 2 kg rests on a table (g = 10 m/s²). The normal force on it is:	2 N	0 N	20 N	0.2 N
25.	A rifle recoils with a much smaller speed than the bullet because:	the rifle exerts a smaller force on the bullet	the rifle has a greater mass, so equal momentum gives a smaller velocity	the rifle is held tightly and cannot move	the bullet gains extra momentum from air
26.	A force of 20 N acts on a trolley for 0.5 s. The impulse is:	40 Ns	0.025 Ns	20 Ns	10 Ns
27.	The momentum of a 1500 kg car moving at 20 m/s is:	30 000 kg m/s	75 kg m/s	1520 kg m/s	300 kg m/s
28.	A 5 kg mass hangs at rest from a string (g = 10 m/s²). The tension in the string is:	5 N	50 N	0 N	100 N
29.	Newton's laws of motion fail to describe accurately:	a rolling ball	an electron inside an atom	a moving train	a swinging pendulum
30.	Forces of 5 N and 3 N act along the same line in opposite directions. The net force is:	8 N	15 N	2 N	0 N
31.	A perpendicular force of 40 N is applied at 0.25 m from a pivot. The torque is:	160 N m	65 N m	0.00625 N m	10 N m
32.	A force applied to a door along a line passing through its hinges produces no rotation because:	the force is too small	the door is heavy	friction is large	the moment arm is zero
33.	Which object has its centre of gravity outside its own material?	A solid sphere	A uniform rod	A cube	A circular ring
34.	A body whose centre of mass rises when it is slightly displaced is in:	stable equilibrium	unstable equilibrium	neutral equilibrium	dynamic equilibrium
35.	A planet orbits a star at radius r with period T. Its average orbital speed is:	$2\pi r/T$	r/T	$T/2\pi r$	$2\pi r^2/T$
36.	Of two same-shaped skydivers, the heavier has a higher terminal velocity because:	gravity acts less on him	drag does not depend on speed	a greater speed is needed before drag equals his larger weight	air resistance disappears
37.	For the same load, rolling friction compared with sliding friction is:	much larger	much smaller	equal	zero
38.	A stone whirled in a horizontal circle is released when the string breaks. It then moves:	radially outward	towards the centre	along the tangent	in a smaller circle
39.	If the speed in circular motion is doubled (same radius), the centripetal force becomes:	double	half	unchanged	four times
40.	A 10 kg object on Neptune (g = 11.0 N/kg, from Table 4.1) weighs:	98 N	110 N	37 N	247 N

Scenario for Q41–44: Hina uses a screw gauge (pitch 0.5 mm, 50 divisions on the circular scale) to measure the diameter of a wire. Main scale reading = 3 mm, circular scale reading = 28 divisions. The screw gauge has a positive zero error of +2 divisions.

S#	Question	(A)	(B)	(C)	(D)
41.	The least count of this screw gauge is:	0.5 mm	0.01 mm	0.1 mm	0.02 mm
42.	The observed reading is:	3.50 mm	3.03 mm	3.30 mm	3.28 mm
43.	The correct diameter of the wire is:	3.26 mm	3.28 mm	3.30 mm	3.24 mm
44.	The correct diameter in metres (scientific notation) is:	3.26×10^{3} m	3.26×10^{-6} m	3.26×10^{-3} m	3.26×10^{-2} m

Scenario for Q45–48: A cyclist starts from rest and speeds up uniformly to 10 m/s in 10 s. She then rides at constant speed for 20 s. Finally she brakes uniformly and stops in 5 s.

S#	Question	(A)	(B)	(C)	(D)
45.	The acceleration during the first 10 s is:	0.1 m/s²	1 m/s²	10 m/s²	100 m/s²
46.	During the middle 20 s, the cyclist has:	zero acceleration	uniform acceleration	non-uniform acceleration	zero speed
47.	The total distance covered is:	250 m	275 m	300 m	200 m

S#	Question	(A)	(B)	(C)	(D)
48.	The average speed for the whole journey is approximately:	10 m/s	5.5 m/s	7.86 m/s	8.75 m/s
Scenario for Q49–52: A 1200 kg car travelling at 15 m/s on a straight road is brought to rest by its brakes in 6 s. A passenger who is not wearing a seat belt is thrown forward.					
S#	**Question**	**(A)**	**(B)**	**(C)**	**(D)**
49.	The passenger is thrown forward because of:	friction	gravity	centripetal force	inertia
50.	The initial momentum of the car is:	18 000 kg m/s	80 kg m/s	1215 kg m/s	180 kg m/s
51.	The average braking force on the car is:	2000 N	3000 N	90 N	108 000 N
52.	An airbag reduces injury because it:	reduces the passenger's mass	increases the passenger's momentum	increases the contact time, so the average force is smaller	removes the passenger's inertia
Scenario for Q53–56: Sana opens a door 1.0 m wide by pushing perpendicular to it with a force of 50 N at the handle, which is 0.9 m from the hinge.					
S#	**Question**	**(A)**	**(B)**	**(C)**	**(D)**
53.	The torque produced about the hinge is:	55.6 N m	5.0 N m	45 N m	0.018 N m
54.	To produce the same torque by pushing at 0.3 m from the hinge, the force needed is:	150 N	15 N	45 N	50 N
55.	If Sana pushes along the door's surface towards the hinge, the door does not turn because:	the force is too small	the door is heavy	friction is large	the line of action passes through the axis, so the moment arm is zero
56.	By convention, the moment that turns the door anticlockwise is taken as:	negative	positive	zero	a scalar
Scenario for Q57–60: A 2 kg stone is tied to a 0.5 m string and whirled in a horizontal circle at a constant speed of 5 m/s.					
S#	**Question**	**(A)**	**(B)**	**(C)**	**(D)**
57.	The force providing the centripetal force is:	weight of the stone	friction	normal reaction	tension in the string
58.	The magnitude of the centripetal force is:	100 N	25 N	50 N	10 N
59.	If the speed is doubled with the same radius, the tension becomes:	200 N	100 N	400 N	800 N
60.	The time taken for one revolution at 5 m/s is approximately:	1.57 s	0.63 s	6.28 s	0.10 s

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Physics Test — Chapters 1–4 (Class 9)

SECTION – B (6 × 3 = 18 Marks) | Give brief answers. Attempt all questions; each has an OR choice.

Q#	Question	Marks	Question (OR)	Marks
1.	Differentiate between scalar and vector quantities, giving two examples of each.	3	**OR** Differentiate between accuracy and precision with a suitable example.	3
2.	A train slows down uniformly from 30 m/s to 10 m/s in 8 s. Calculate its acceleration and the distance covered in this time.	3	**OR** Sketch the distance–time graphs for a body (i) at rest, (ii) moving with uniform speed, (iii) with increasing speed. State what the slope of such a graph represents.	3
3.	Why does a standing passenger lurch forward when a bus stops suddenly? Explain using Newton's first law.	3	**OR** A 0.15 kg ball moving at 20 m/s is caught and brought to rest in 0.1 s. Calculate the average force on the hands.	3
4.	Define centre of gravity. Describe how to find the centre of gravity of an irregular plane lamina using a plumb line.	1+2	**OR** How can the stability of an object be improved? Give two real-life examples.	3
5.	Why does a skydiver stop accelerating and fall with a constant speed? Explain with the forces involved.	3	**OR** State two advantages and two disadvantages of friction, and name two methods of reducing it.	3
6.	State the principle of moments. A 120 N weight hangs 0.5 m to the left of a pivot. At what distance on the right must an 80 N weight be hung to balance it?	1+2	**OR** A satellite orbits Earth at a radius of 7.0×10^6 m with a period of 5400 s. Calculate its orbital speed.	3

SECTION – C (2 × 6 = 12 Marks) | Attempt both questions; each has an OR choice.

Q#	Question	Marks
7.	(a) Define moment of force. Write its formula and SI unit. (2) (b) State the first and second conditions of equilibrium. (2) (c) A uniform plank is pivoted at its centre. A 200 N weight is placed 1.2 m to the left of the pivot. Where must a 300 N weight be placed on the right to balance it? (2)	6
	OR (a) What is friction? Differentiate between rolling friction and sliding friction. (2) (b) Explain, with the help of a diagram, how ball bearings and lubricants reduce friction. (2) (c) Why does friction not depend on the area of contact? Explain with the example of wide and narrow tyres. (2)	6
8.	(a) Define centripetal force. Name three real-life sources of centripetal force. (2) (b) A 0.4 kg ball is whirled in a circle of radius 0.8 m at 4 m/s. Calculate the centripetal force. (2) (c) What happens to the ball if the string breaks? Explain with a law of motion. (2)	6
	OR (a) Define momentum and impulse. State the law of conservation of momentum. (2) (b) A 2 kg trolley moving at 3 m/s collides with a 4 kg trolley at rest and they stick together. Find their common velocity. (2) (c) Explain the working of a rocket in space using conservation of momentum. (2)	6