Step Academy official

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STUDENT NAME	
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CLASS	9th
SUBJECT	PHYSICS
TOTAL MARKS	
Paper Type	

Q1. Choose the correct answer.

1. How many millimeters are there in 10 cm?

(A) 100 mm **(B)** 200 mm **(C)** 50 mm **(D)** 10 mm

2. Which of the following quantity can be measured using a micrometer?

(A) current **(B)** force **(C)** length **(D)** mass

3. The instrument best measures the internal diameter of a pipe is.

(A) screw gauge **(B)** vernier caliper **(C)** meter rule **(D)** measuring tape

4. Which prefix represents a largest value?

(A) mega **(B)** giga **(C)** peta **(D)** exa

5. Which of the following is the smallest prefix?

(A) atto **(B)** pico **(C)** nano **(D)** femto

6. Which of the following numbers shows one significant digit?

(A) 1.1 **(B)** 6.0 **(C)** 7.1 **(D)** $6 * 10^3$

7. Which of the following numbers shows 4 significant digits?

(A) 900.8 **(B)** 4 **(C)** 5174.00 **(D)** 0.0002

8.
A light year is distance traveled by light in one year. It travels about 9.460 x 10"m. How many significant figures are in this number.

(A) 6 **(B)** 2 **(C)** 3 **(D)** 4

9. 0.2 mm in uruts of meter is

(A) 0.0002m **(B)** 2×10^{-4} m **(C)** none **(D)** both A and B

10. KITAB UL MANAZIR is the name of book written by

(A) yadub kindi **(B)** Ibnal haitham **(C)** Al benuni **(D)** none

11. The average speed of a bus is $20ms^{-1}$how far can it travel in 10s?

(A) 100 m **(B)** 200 m **(C)** 150 m **(D)** 250 m

12. A truck accelerates uniformly from $15ms^{-1}$ to $20m^{-1}$ in 5 s.What is the acceleration of the truck?

(A) $2ms^{-2}$ **(B)** $1.5\ ms^{3}$ **(C)** $1\ ms^{-2}$ **(D)** $2.5\ ms^{-2}$

Q2. Write short answers of the following questions.

1 . Define "Physics".

2 . Who is called the Father of Physics?

3 . What is the Language of Physics?

4 . Why is Mathematics called the language of Physics?

5 . Write down any four properties of Physics in our daily life.

6 . Why do we study Physics?

7 . Show the relationship between Physics and Biology or How is Physics Helpful in Medical Sciences?

8 . Write down any four branches of Physics?

9 . How to define Physical quantities?

10 . What is meant by measurement?

11 . Make the difference between Base and drived Physical quantities?

12 . Write down the name of 7 base physical quantities along with their units and symbols.

13 . Write the name of any 10 derived physical quantities along with their units and symbols.

14 . Why is speed a derived quantity?

15 . Is volume a base quantity or a derived physical quantity?

16 . What is meant by SI units?

17 .

How to express the term "Standard form" or "Scientific notation"?

18 . Converting a large number 1,250,000 to scientific notation.

19 . Write down the basic steps to convert a number into scientific notation.

20 . Converting a small number to scientific notation.

21 . How many seconds are in 1 year?

22 . Write down the prefixes which we usually use.

23 . How many centimeters (cm) are in 1 meter (m)?

24 . How many grams (g) are in 1 kilogram (kg)?

25 . How many meters (m) are in 1 kilometer (km)?

26 . If the distance from your home to school is 10 kilometers (km), convert it into meters (m).

27 . What are measuring instruments?

28 . How to define the least count?

29 . What is a meter rule? What is its least count?

30 . What is a "Vernier caliper"?

31 . Why do we use Vernier calipers?

32 . How to measure the least count of Vernier calipers?

33 . What is meant by "Vernier constant"?

34 . Write the steps to measure the diameter of a solid cylinder using Vernier calipers.

35 . What is meant by "zero error"

36 . How to recognize positive zero error or negative zero error in Veraier calipers?

37 . What to do if there is a positive zero error in Vernier calipers?

38 . What to do if there is a negative zero error in Vernier calipers?

39 . What is "Screw Gauge"?

40 . Write down the names of different parts of Screw Gauge.

41 . What is meant by "Pitch of Screw Gauge"?

42 . Write the steps to measure the thickness of a solid cylinder using Screw Gauge.

43 . How to recognize positive zero error or negative zero error in Screw Gauge?

44 . What to do if there is a positive error in Screw Gauge?

45 . What to do if there is a negative error in Screw Gauge?

46 . What is a Physical balance?

47 . How can we measure the mass of a substance using a physical balance?

48 . What is the difference between a mechanical stopwatch/analog stopwatch and a digital stopwatch?

49 . How can we measure the volume of a key using a measuring cylinder?

50 . What is parallax error in measurements?

51 . How to define "significant figures"?

52 . What are the general rules to write significant figures?

53 . Write the basic rules to round off significant figures.

54 . What is standard form or scientific notation?

55 . What are prefixes? Explain with examples.

56 . What is system of units?

57 . What are measuring instruments?

58 . How technology is shaped by physics?

59 . Why are measurements important?

60 . Why area is a derived quantity?

61 . Why in physics we need to write in scientific notation?

62 . Define Kinematics.

63 . Define Rest.

64 . Does a speedometer measure a car's speed or velocity?

65 . Can an object have zero acceleration and non-zero velocity at the same time? Give example.

66 .
A person standing on a roof of a building throws a rubber ball down with a velocity of 8.0 m/s. What is the acceleration (magnitude and direction) of the ball?

67 . Describe a situation in which speed of an object is constant while velocity is not.

68 . Can an object have a northward velocity and a southward acceleration? Explain.

69 .
As a freely falling object speeds up, what is happening to its acceleration does it increase, decrease, or stay the same?

70 .

A ball is thrown upward with an initial speed of 5m/s. What will be its speed when it returns to starting point?

71 . What is weight? Differentiate between mass and weight.

72 . Write a note on cream separator.

73 . Write a note on washing machine dryer.

74 . Why does dust fly off, when a hanging carpet is beaten with a stick?

75 .
If your hands are wet and no towel is handy, you can remove some of the excess water by shaking them, why does this work?

76 .
Why does a hosepipe tend to move backward when the fire man directs a powerful stream of water towards fire?

77 . How does friction help you walk? Is it kinetic friction or static friction?

78 .
The parking brake on a car causes the air wheels to lockup. What would be the likely consequence of applying the parking brake in a car that is in rapid motion?

79 . Why is the surface of a conveyor belt made rough?

80 . Why does a boatman tie his boat to a pillar before allowing the passengers to step on the river bank?

81 . In uniform circular motion, is the velocity constant? Is the acceleration constant? Explain.

82 .
You tie a brick to the end of the rope and whirl the brick around you in a horizontal circle. Describe the path of the brick after you suddenly let go of the rope.

83 . Why the posted speed for a turn is lower than the speed limit on most highways?

84 . Can the rectangular component of the vector be greater than vector itself? Explain

85 . Explain why door handles are not put near hinges?

86 . Can a small force ever exert a greater torque than a larger force? Explain.

87 .
The gravitational force acting on a satellite is always directed towards the center of the earth. Does this force exert torque on satellite?

88 .
Can we have situations in which an object is not in equilibrium, even though the net force on it is Zero? Give two examples.

89 . Why does wearing high – heeled shoes sometimes cause lower back pain?

90 . Can a single force applied to a body change both its translational and rotational motion Explain?

91 .
Two forces produce the same torque Does it follow that they have the same magnitude? Explain Describe the path of the brick after you suddenly let go of the rope.

92 .
If there is an attractive force between all objects, why don't we feel ourselves gravitating toward nearby massive buildings?

93 . Does the sun exert a larger force on the Earth than that exerted on the sun by the earth? Explain

94 . What is the importance of gravitational constant 'G'? Why is it difficult to calculate?

95 .
If Earth somehow expanded to a larger radius, with no charge in mass, how would your weight be affected? How would it be affected if earth instead shrunk?

96 .
What would happen to your weight on earth if the mass of the earth doubled but its radius stayed the same?

97 . Why lighter and heavier objects fall at the same rate toward the earth?

98 .
The value of 'g' changes with location on earth, however we take the same value of 'g' as $9.8ms^{-2}$ for ordinary calculations why?

99 . Moon is attracted by the earth, why it does not fall on earth?

100 . Why for some height larger and smaller satellites must have same orbital speeds?

Q3. Write detailed answers of the following questions.

1 . What is SI? Name SI base quantities and their units?

2 . Describe the construction and use for measurement of the following instruments:
a. Vernier Calliper
b. Screw Gauge

3 .
What is meant by the significant figures of measurement? What are the main points to be kept in mind while determining the significant figures of measurement?

4 . Discuss the contribution of Muslim scientists in the development of physics?

5 . Discuss the work of famous Pakistani physicists?

6 . What is Physics? Describe main branches of physics.

7 . What are physical quantities? Discuss its types.

8 . Describe the purpose, construction and use for measurement of vernier caliper?

9 .

Describe the purpose, construction and use for measurement of screw gauge?

10 . What is stop watch? Discuss its types and their working?

11 . What is least count? How least count for vernier caliper and screw gauge are defined?

12 . How can we find the volume of a small pebble with the help of measuring cylinder?

13 .
The mass of earth is 5,980,000,000,000,000,000,000,000 kg. Write this number in standard form/ scientific notation.

14 . Calculate the number of seconds in a week. Express the number in power of 10 notation.

15 .
Adult housefly (Musca domestica) is having a mass of only about 0.0000214kg. Express this number in standard form/ scientific notation.

16 .
The smallest bird is the bee hummingbird. Males measure only 0.057m, convert this number to standard form and write this number in millimeters.

17 . Which of the following is the accurate device for measuring length;
a. A vernier calipers with main scale of 1mm marking and 50 divisions on sliding scale.
b. A screw gauge of pitch 1mm and 25 divisions on the circular scale.

18 . A breaker contains 200ml of water, what is the volume of water in cm^3 and m^3.

19 .
An angstrom (symbol A*) is a unit of length (commonly used in atomic physics), defined as 10^{-10}m which is of the order of the diameter of an atom. a. How many nanometers are in 1.0 angstrom?

20 . How many femtometers or fermis (the common unit of length in nuclear physics) are in 1.0 angstrom?

21 . Write the following numbers in standard form;
a. Mass of Bacterial cell;0.000,000,000,005kg

22 . Diameter of sun; 1,390,000,000 m

23 .
What is motion? Describe that motion is relative. How two observers in relative motion can have conflicting views about same object?

24 . Explain different types of motion and give an example of each.

25 .
Define scalar and vector quantities. Explain with example the graphical representation of vector quantities.

26 .
What is position. Explain the difference between distance traveled, displacement, and displacement magnitude.

27 . State and explain the terms:
a) Speed
b) Velocity
c) Acceleration

28 .
Use velocity time graph to prove the following equations of motion.

(a) $v_f = v_i + at$ **(b)** $s = v_i t + \frac{1}{2}at^2$ **(c)** $2as = v_f^2 - v_i^2$

(a) Derive 1st equation of motion
OR
Prove that $v_f = v_i + at$

29 .
What is free fall? what is its value near the surface of earth. Explain with example that rock and sheet of paper will fall at the same rate without air resistance.

30 . What is meant by graph and discuss how the slope of a graph can be calculated?

31 . Discuss the distance time graph with different cases.

32 . Define speed-time graph? Show that how
(a) Slope or gradient of speed-time graph gives magnitude of acceleration?
(b) Area under the gives distance travelled?

33 . Discuss the slopes of speed-time graph in following cases.
(a). When Acceleration is uniform
(b). When Acceleration is variable (non-uniform)
(c). When there is no Acceleration.

34 .
Is it possible that displacement is zero but not the distance? Under what condition displacement will be equal to distance.

35 .
A squash ball makes contact with a squash racquet and changes velocity 15m/s west to 25m/s east in 0.10s. Determine the vector acceleration of the squash ball.

36 .
A golf ball that is initially traveling at 25m/s hits a sand trap and slows down with an acceleration of -20m/s2. Find its displacement after 2.0s.

37 .
A driver is travelling at 18m/s when she sees a red light ahead. Her car is capable of decelerating at a rate of 3.65 m/s2. If she applies brakes when she is only 20.0m from the intersection when she sees the light, will she be able to stop in time.

38 .
An antelope moving with constant acceleration $2m/S^2$ covers crosses a point where its velocity is 5m/s. After 6.00s how much distance it has covered and what is its velocity.

39 . With what speed must a ball be thrown vertically from ground level to rise a maximum height of 50m?

40 .
In 2009, a Jamaican sprinter Usain Bolt created a world record in Berlin by running 100m in just 9.58s. What is his average speed?

41 .
If in the same experiment you take the readings of the speedometer of the car as 20km/h in the 4th second and 32 km/h in the 9th second. What is the acceleration of your car in this interval?

42 .
A cyclist is moving with uniform acceleration of $1.2m/s^2$. How much time will it require to change his velocity form 6m/s to 12 m/s.

43 . In a cricket ball go straight up with a velocity of 40m/s. Calculate
(a) Maximum height ball will reach.
(b) Time to reach that height.

44 . State and explain Newton's three laws of motion. Give one example of each.

45 . Define momentum. Relate force to change in momentum.

46 . Define collision and explosion. Explain change in momentum in terms of collision and explosion.

47 . What is friction? What are microscopic basis of friction? What is normal force, how it affects friction.

48 .
Differentiate between static and kinetic friction by giving an example. Find the expression for the coefficient of kinetic and static friction.

49 .
What are the advantages and disadvantages of friction? Also give methods to reduce and improve friction.

50 .
What is tension? If two connected bodies of masses m1 and m2 are hanging from the ends of a string which is passing over a pulley, find the values of tension and acceleration in it.

51 .
What is centripetal force? Explain how centripetal force is used in banking of roads and centrifugation.

52 . Discuss the graphical interpretation of friction.

53 .
1580kg car is travelling with a speed of 15.0 m/s. what is the magnitude of the horizontal net force that is required to bring the car to a halt in a distance of 50.0m.

54 .
A bullet of mass 10g is fixed with a rifle. The bullet takes 0.003s to move through barrel and leaves with a velocity of 300m/s. What is the force exerted by the rifle?

55 .
Two bodies of masses 3kg and 5kg are tied to string which is passed over a pulley. If the pulley has no friction, find the acceleration of the bodies and tension in the string.

56 .

Determine the magnitude of the centripetal force exerted by the rim of a car's wheel on a 45.0 kg tire. The tire has 0.408 meter radius and is rotating at a speed of 30.0 m/s.

57 .
A motorcyclist is moving along a circular wooden track of a circus (death well) of radius 5m at a speed of 10m/s. If the total mass of motorcycle and the rider is 150 kg, find the magnitude of centripetal force acting on him?

58 .
A car of mass 1000kg is running on a circular motorway interchange near swabi with a velocity of 80m/s, the radius of circular motorway interchange is 800m. How much centripetal force is required?

59 .
Find the acceleration produce in engine force of 3500N in car of mass 600 Kg and truck of mass 2400 kg.

60 .
The weight of an astronaut and his space suit on the moon is only 250N. How much do they weigh on earth? What is the mass on the moon? On earth? (Take acceleration due to gravity for earth as g_E = 9.8m/s^2 and moon as g_M = 1.6m/s^2)

61 .
The fastest recorded speed for a golf ball hit by a golfer is 75.8 m/s (273km/hr). If mass of golf ball is 46g, what is the magnitude of its momentum?

62 .
In carrom board game the stricker of mass having mass 0.015kg sliding to the right atvelocity of 0.40m/s makes head on collision with a disk having mass 0.005kg that is initially at rest. After the collision, stricker moves to the right along the direction of disk at 0.20m/s. Find the final velocity of the disk.

63 .
A 200kg cannon at rest contains a 10kg cannon ball. When fired, the cannon ball leaves the cannon with a speed of 90m/s. what is the recoil speed of cannon?

64 .
A pilot is flying a small plane at 56.6m/s in a circular path with a radius of 188.5m. The centripetal force needed to maintain the plane's circular motion is 1.89×10^{4}N. What is the plane's mass?

65 . What are force diagrams? Define like and unlike parallel force with examples.

66 .
Define moment of a force. Give its mathematical description and elaborate the factors on which it depends?

67 .
What is resolution of forces? Explain with an example how force can be resolved into rectangular components.

68 . Define equilibrium. Explain its types and state the two conditions of equilibrium.

69 .
What is centre of mass Or centre of gravity Explain how CM/CG can be determined? Is there any difference between CM and CG?

70 . Explain the stability of the objects with reference to position of centre of mass.

71 . Explain the process of force for like and unlike parallel forces.

72 . Define the types of torque or Define the senses of rotation.

73 .
A bolt on a car engine needs to be tightened with a torque of 40Nm. you use a 25 cm longwrench and pull on the end of the wrench perpendicularly. How much force do you have to exert?

74 .
Sana whose mass is 43 kg, sits 1.8m from the centre of a see saw. Faiz whose mass is 52 kg, wants to balance Sana. How far from the centre of see saw should Faiz sit?

75 .
Two kids of weighing 300N and 350N are sitting at the ends of 6m long seesaw. The seesaw is pivoted at its centre. Where would a third kid sit so that the seesaw is in equilibrium in the horizontal position? The weight of 3rd kid is 250N (Ignore the weight of seesaw).

76 .
Two children push on opposite sides of a door during play. Both push horizontally and perpendicular to the door. One child pushes with a force of 20N at a distance of 0.60m from the hinges, and the second child pushes at a distance of 0.50m. What force must the second child exert to keep the door from moving? Assume friction is negligible.

77 .
A construction crane lifts building material of mass 1500 kg by moving its crane arm, calculate moment of force when moment arm is 20m. After lifting the crane arm, which reduces moment arm to 12 m, calculate moment.

78 .
Two force are applied one force is 25 N (20^0 with x – axis) and the other force is 10N (60^0 with x-axis). Find the net resultant force.

79 .
20Nm torque is required to open a soda bottle. A boy with a bottle opener apply a force perpendicularly at 0.1m, what is the magnitude of force required.

80 .
State and explain the law of universal Gravitation. Also show that the law obeys Newton's third law of motion.

81 . Determine the mass of earth by applying the law of gravitation.

82 . How is the Value of 'g' changing by going to higher altitude? Write the relevant formula.

83 . Derive the formula for the orbital speed of an artificial satellite.

84 .
The mass of earth is 6×10^{24} kg and that of the moon is 7.4×10^{22} kg. If the distance between the earth and the moon is 3.84×10^5 km, calculate the force exerted by the earth on the moon.

85 .

If the radius of the moon is 1.74 ×1$\mathbf{0}^6$ m and have acceleration due to gravity on its surface as 1.6$\boldsymbol{m}^{-2}$ Calculate the mass of moon.

86 .
If the radius of the moon is 1.74 ×1$\mathbf{0}^6$ m and have acceleration due to gravity on its surface as 1.6$\boldsymbol{m}^{-2}$ Calculate the mass of moon.

87 . Calculate the value of 'g' at 1000 km and 35900 km above the earth surface
i. Calculate value of 'g' at 1000 km.

88 . At which altitude above Earth's surface would the gravitational acceleration be 4.9m/s^2

89 .
The distance from centre of earth to centre of moon is 3.8×1$\mathbf{0}^8$ m. Mass of earth is 6×1$\mathbf{0}^{24}$ kg. What is the orbital speed of moon?

90 .
The Hubble space telescope orbits Earth (m_E=6×10^{24} kg) with an orbital speed of 7.6× 10^{3}m/s. Calculate its altitude above Earth's Surface.