

AL HUDA SCIENCE ACADEMY

Prepared By: Sir Muhammad Usman Ali

Guess Paper of Physics Class 9th

اللہ سب کو سچ کہنے کی ہمت عطا فرمائیں۔ آمین

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Short Questions & Answers

1. Can a non-physical quantity be measured? If yes, then how?
2. Differentiate between physical and non-physical quantities.
3. Does a non-physical quantity have dimensions?
4. What is measurement? Name its two parts.
5. Write the names of 3 base quantities and 3 derived quantities.
6. Differentiate between base and derived quantities.
7. Why do we need a standard unit for measurements?
8. Write the names and symbols of all SI base units.
9. Why are prefixes used? Name three sub-multiple and three multiple prefixes with their symbols.
10. Express the unit of pressure "pascal" in some other units.
11. What are the key rules for writing SI unit symbols and prefixes correctly?
12. Define base units. Give two examples.
13. Define prefixes. Give two examples.
14. Convert 3,500,000,000 Hz into MHz and 0.00003 g into μg by using prefixes.
15. Why is a standard unit needed to measure a quantity correctly?
16. Express the following in scientific notation: (a) 0.45 m (b) 0.004 kg (c) 186000 s
17. Define scientific notation with an example.
18. Write in standard form: (i) 384,000,000 m (ii) 0.00045 s
19. What is meant by zero error?
20. Define measuring tape and write its least count.
21. What are the essential laboratory safety rules to follow during experiments?
22. Define least count and measuring instrument. Give an example.
23. Differentiate between base and derived units.
24. Define least count. Write the least count of a metre rule.
25. Why does parallax error occur?
26. How many divisions are there on a Vernier scale?
27. Write four rules of laboratory safety.
28. Define the pitch of a micrometer screw gauge.

29. For what purpose is a micrometer screw gauge used?
30. Why does a micrometer screw gauge measure more accurately than Vernier Callipers?
31. Why is it better to place the object close to the metre scale?
32. Differentiate between systematic and random errors.
33. Round off to 2 significant figures: (i) 4.45×10^2 m (ii) 4.55×10^2 m
34. Define scalar and vector quantities.
35. State the head-to-tail rule for addition of vectors.
36. Differentiate between circular motion and rotatory motion.
37. Define uniform and non-uniform velocities.
38. What is a resultant vector?
39. Who discovered relativity?
40. Is it possible for a body to have acceleration when moving with (i) constant velocity (ii) constant speed?
41. Define Mechanics. Name its branches.
42. Define kinematics.
43. Write the symbolic representation methods of vectors.
44. Define resultant vector.
45. How are vector quantities important in our daily life?
46. Explain briefly that the state of rest and motion is relative.
47. Differentiate between speed and velocity.
48. Describe the SI unit of distance and displacement.
49. A body moving with uniform speed — will its velocity be uniform? Give reason.
50. A car moving on a circular road may have constant speed, but its velocity is changing at every instant. Why?
51. Define instantaneous speed.
52. A player covers 80 m in 10 seconds. Find the average speed.
53. An eagle dives to the ground along a 300 m path with an average speed of 60 m/s. How long does it take?
54. Is it possible that the velocity of an object is zero at an instant, but its acceleration is not zero? Give an example.

55. Define acceleration. Give its formula.
56. Define positive and negative acceleration.
57. What is retardation?
58. What are distance–time and speed–time graphs?
59. Define graph.
60. Speed of a car is 72 km/h. Convert this to m/s.
61. Convert m/s to km/h.
62. Write the three equations of motion.
63. Falling objects near Earth have the same constant acceleration. Does this mean a heavier object falls faster than a lighter one?
64. What is meant by the universal speed limit?
65. Write three equations of motion under gravity.
66. What kind of change in motion may be produced by a force?
67. Give 5 examples of contact forces.
68. Define the common concept of force with an example.
69. Differentiate between electrostatic and magnetic field.
70. What are strong and weak nuclear forces?
71. Define contact forces with an example.
72. Differentiate between friction and drag force.
73. Differentiate between normal force and tension.
74. Define air resistance.
75. What is elastic force? Give examples.
76. Define gravitational force with an example.
77. Differentiate between electrostatic force and magnetic force.
78. An object moves with constant velocity in free space. How long will it continue to move with this velocity?
79. Why has Newton's first law not been proved on Earth?
80. When sitting in a car that suddenly accelerates, you are pushed back into the seat. Why?
81. State Newton's first law of motion.

82. State Newton's third law of motion.
83. When a bus suddenly starts, passengers fall backward. Explain why.
84. Derive $F = ma$ from Newton's second law.
85. When someone jumps from a small boat onto the river bank, why does the jumper often fall into the water?
86. Write the difference between mass and weight.
87. A 10 kg block moves on a frictionless horizontal surface with an acceleration of 2 m/s^2 . What is the force acting on the block?
88. Define gravitational field strength.
89. Write the value of gravitational field strength.
90. Define terminal velocity of an object.
91. Differentiate between friction and kinetic friction.
92. Define rolling friction.
93. Define streamline flow.
94. Why doesn't water form a wet layer between the tyre surface and the road, and how does this reduce skidding?
95. How does a wheel produce a frictional force when it contacts the surface?
96. How does a hovercraft move over both water and ground?
97. Define sliding friction. Name its categories.
98. Differentiate between static friction and kinetic friction.
99. State the law of conservation of linear momentum.
100. Differentiate between impulse and momentum.
101. A bullet of mass 15 g is fired with a velocity of 150 m/s. What is its momentum?
102. How do crumple zones in automobiles help protect passengers during an accident?
103. What is a seat belt, and how does it help protect passengers in a car?
104. A person falling on a cemented floor gets badly hurt. Explain why.
105. A cricket player draws back his hands while catching a ball. Explain why.
106. State Newton's second law of motion in terms of momentum.
107. What is the advantage of air bags over seat belts in terms of momentum?
108. When a cricket ball hits high, a fielder draws hands backward while catching it. Why?

109. Define system and isolated system.
 110. State the law of conservation of momentum.
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Short Questions

1. Define like and unlike parallel forces.
2. Difference between like and unlike parallel forces.
3. Differentiate between like parallel forces and unlike parallel forces.
4. A ripe mango does not normally fall from the tree, but when the branch is shaken, it falls easily. Why?
5. Define resultant force.
6. Explain the head-to-tail rule.
7. What is the line of action of a force?
8. Define couple and give an example.
9. Define turning effect of a force (torque) with examples.
10. Differentiate between line of action of force and moment arm.
11. Give a real-life example of torque.
12. Why are steering wheels of smaller diameter installed in modern vehicles?
13. What are rectangular components of a vector and their values?
14. What is resolution of force?
15. Define rectangular components of a force.
16. Can a rectangular component of a vector be greater than the resultant vector?
17. How does a tightrope walker balance himself?
18. State the principle of moments.
19. Differentiate between clockwise and anticlockwise moment.
20. Give an example of a body that is moving yet in equilibrium.
21. Differentiate between static and dynamic equilibrium.
22. State the first condition of equilibrium.
23. State the second condition of equilibrium.
24. Define stable equilibrium.

25. Define unstable equilibrium.
26. Define neutral equilibrium with an example.
27. Define centripetal force. Write its formula and direction.
28. Define centripetal acceleration and write its equation.
29. What is the work done on an object that remains at rest when a force is applied to it?
30. Define work and its SI unit.
31. Define efficiency of a working system. Why can't a system have 100% efficiency?
32. A person does 200 J of work pushing a carton through 5 m. How much force is applied?
33. Find the work done by a 65 N force pulling a suitcase 20 m (at 30° to horizontal).
34. A 120 N block is dragged up a 20 m slope with a force of 100 N to lift it 10 m. Calculate the efficiency.
35. Discuss the case when work done is maximum.
36. How is work done if a 4 kg brick is pulled up a height of 5 m?
37. Define the SI unit of work. Also discuss its bigger units.
38. A person does 200 J of work pushing a carton through 5 m. How much force is applied?
39. A slow-moving car may have more kinetic energy than a fast-moving motorcycle. How is this possible?
40. A woman gains 4500 J of gravitational PE running up stairs. If she runs up with twice the speed, what will her PE gain be?
41. Find an expression for the kinetic energy of a moving body.
42. What is gravitational potential energy? Give an example.
43. Describe the conservation of energy.
44. Difference between nuclear energy and chemical energy.
45. Difference between gravitational potential energy and nuclear energy.
46. According to Einstein's theory of relativity, how are matter and energy related?
47. A 10 kg body is raised to a height of 5 m. Find its gravitational potential energy.
48. In which form is energy stored in a stretched bow?
49. Differentiate between kinetic energy and potential energy.
50. What is the energy content of the nuclear bomb dropped on Hiroshima?
51. Describe the energy output of a power station in one year.

52. Write the formula and SI unit of potential energy.
 53. Differentiate between gravitational potential energy and elastic potential energy.
 54. Differentiate between chemical potential energy and nuclear potential energy.
 55. Comment on the statement: "An object has one joule of potential energy."
 56. State the law of conservation of energy.
 57. What is meant by waste energy?
 58. Difference between renewable and non-renewable energy.
 59. Describe two advantages of energy production.
 60. Write two disadvantages of energy production.
 61. Name some non-renewable energy sources.
 62. What is power? Define the unit used for it.
 63. What do you know about the watt?
 64. What is the unit of power in the British engineering system?
 65. Calculate the power of a machine that does 4 J of work in 2 seconds.
 66. Difference between output and input energy.
 67. Why is the energy output always less than the energy input?
 68. A cyclist does 12 J of useful work from every 80 J of food energy. Find his % efficiency.
 69. Why doesn't an ideal system exist in daily life?
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Short Questions

Chapter 6: Properties of Matter

1. State what you mean by elasticity of a solid.
2. Describe deformation of solids with an example.
3. Steel is more elastic than rubber. Why?
4. Write four differences between the solid and gas states of matter.
5. Define deforming force.
6. Describe any two applications of Hooke's law.
7. Difference between galvanometer and spring scales.
8. Define elastic limit and Hooke's law.

9. What is spring constant? Write its SI unit.
10. Give names of three applications of Hooke's law.
11. Springs are made of steel instead of iron. Why?
12. Why do heavy animals like elephants have a large foot area?
13. Why is it painful to walk barefoot on pebbles?
14. Distinguish between force and pressure.
15. Describe any two examples of pressure in daily life.
16. Why do sports boots have studs on their soles?
17. A girl walking on a carpet in high heels leaves deep impressions. Why?
18. Why is the cutting edge of a knife made very thin?
19. Why are water tanks constructed at the highest level in houses?
20. Define pressure. Write its formula and unit.
21. What is one pascal?
22. What is the relationship between liquid pressure and depth?
23. Calculate the pressure of a column of mercury 76 cm high (density of mercury = $13.6 \times 10^3 \text{ kg/m}^3$).
24. Describe atmospheric pressure.
25. Which instrument measures atmospheric pressure?
26. How does a change in atmospheric pressure relate to weather?
27. Define atmospheric pressure.
28. Explain the effect of variation of atmospheric pressure with height.
29. State Pascal's law. Give an application.
30. State the basic principle used in the hydraulic brake system of automobiles.
31. Define force multiplier.
32. Define hydraulic brake.
33. Write the advantages of Pascal's law.
34. Write the uses of a hydraulic press.

Chapter 7: Thermal Properties of Matter

1. What is the effect of raising the temperature of a liquid?

2. What is meant by the temperature of a body?
3. What determines the direction of heat flow?
4. Distinguish between heat and internal energy.
5. Relation between temperature and internal energy.
6. Differentiate between temperature and heat.
7. Why does heat energy transfer from one thing to another?
8. Why does a cup of tea get cold after some time?
9. Discuss whether the Sun is matter.
10. What is meant by thermometric property? List some thermometric properties.
11. Describe the main scales used for measuring temperature.
12. Write down basic thermometric properties.
13. Explain the liquid-in-glass thermometer.
14. Differentiate between upper and lower fixed points.
15. Define the Fahrenheit scale and label its fixed points.
16. Define the absolute (Kelvin) temperature scale.
17. Explain the relationship between Kelvin and Celsius scales.
18. How much would 30°C be on the Fahrenheit and Kelvin scales?
19. Define thermocouple thermometer.
20. Why are the walls of a thermometer bulb thin?
21. What are thermometric properties?
22. Define absolute zero. What is its value?
23. Why does current flow in a thermocouple thermometer?
24. Why is mercury usually preferred to alcohol as a thermometric liquid?
25. Why are there no negative numbers on the Kelvin scale?

Chapter 8: Magnetism

1. Define magnetism with examples.
2. Differentiate between magnetic and non-magnetic materials.
3. Define magnet. How many properties does a magnet have?
4. Difference between north and south magnetic poles.

5. Define magnetic pole and attraction/repulsion of magnetic poles.
6. Define induced magnetism.
7. Define magnetised and unmagnetised.
8. Describe the direction of internal and external magnetic field lines.
9. Define magnetization.
10. What are temporary and permanent magnets?
11. Difference between temporary and permanent magnets.
12. Define the magnetic field of a magnet.
13. What are magnetic lines of force?
14. Define magnetic line of force.
15. How does a magnetic field work?
16. What determines the strength of a magnetic field?
17. Which material is used for temporary magnets?
18. Describe the relation between magnetic field strength and magnetic lines of force.
19. Name some uses of permanent magnets and electromagnets.
20. Define an A.C. generator.
21. Define one application of a permanent magnet.
22. Define moving coil loudspeaker.
23. What is the reverse process of an electric generator?
24. Describe the use of permanent magnets in flour mills.
25. Write the use of permanent magnets in the medical field.
26. Define uses of electromagnets.
27. Define the circuit breaker.
28. Explain the use of electromagnets in maglev trains.
29. State some uses of electromagnets.
30. What is a magnetic relay?
31. Difference between magnetisation and demagnetisation.
32. Describe the single-touch and double-touch methods.
33. Define heating and hammering as demagnetization methods.

34. State the right-hand grip rule.
35. Write the stroking method of magnetisation.
36. Name the methods of demagnetisation of magnets.

Chapter 9: Nature of Science

1. State what science is, in your own words. Write its two main groups.
2. What is physics all about? Name some of its branches.
3. Write the scope of physics.
4. Explain the concept of the theory of relativity.
5. What is the difference between geophysics and climate physics?
6. State some uses of physics in daily life.
7. Differentiate between mechanics and quantum mechanics.
8. Define heat and thermodynamics.
9. Differentiate between acoustics and optics.
10. Define relativistic mechanics.
11. Differentiate between biophysics and biomedical physics.
12. Differentiate between astrophysics and geophysics.
13. List the main steps of the scientific method.
14. What is a hypothesis? Give an example.
15. Distinguish between a theory and a law of physics.
16. Differentiate between theory and law.
17. Is the theory of science an ultimate truth?
18. When is a theory rejected or in need of modification?
19. If a hypothesis is not testable, is it wrong?

Long Questions

Question No. 5

1. Differentiate between physical and non-physical quantities.
2. Define SI prefixes. Explain with suitable examples.
3. Define base units. Describe the name and symbol of base units.

4. Define and explain least count with the example of a metre rule. Also write its error.
5. What are Vernier Callipers? Describe their structure and importance.
6. Define micrometer screw gauge. Describe its structure and importance.
7. Write the rules of rounding off digits.
8. How many ways are there to represent vectors? Explain the symbolic representation of vectors.
9. Define resultant vector. Explain the head-to-tail rule.
10. Explain the concept of force with practical examples.
11. State Newton's first law of motion. Explain with examples.
12. Describe Newton's laws of motion.
13. Describe methods to reduce friction.
14. Define sliding friction. Explain its categories.
15. Define and explain momentum and impulse. Also derive the mathematical form of impulse.
16. Define momentum and express Newton's second law of motion in terms of change in momentum.
17. State and explain the principle of conservation of momentum.

Question No. 6

1. What is the resolution of vectors? How is a force resolved into horizontal and vertical components?
2. Calculate the magnitude and direction of a force determined from its perpendicular components.
3. Explain the principle of moments with an example.
4. State and explain the conditions of equilibrium.
5. Explain stable equilibrium with a suitable example.
6. Explain unstable equilibrium with a suitable example.
7. Explain neutral equilibrium with a suitable example.
8. Define centripetal force. Write its formula and direction.
9. Discuss the washing machine as an example of a source of centripetal force.
10. Write a brief note on the cream separator.
11. What is meant by kinetic energy? State its unit. Describe how it is determined.
12. Explain potential energy with an example and derive its relation.

13. State the law of conservation of energy. Explain it using an example of a body falling from a certain height in terms of its potential energy and kinetic energy.
14. Explain the effect of variation of atmospheric pressure with height.
15. Describe Pascal's law. State its applications with examples.
16. Discuss the working of a hydraulic press.
17. Write the working of hydraulic brakes.

Question No. 7

1. What are temperature scales? Explain different scales of temperature.
2. Define thermometers. Explain the basic properties of thermometric material.
3. Explain the conversion of temperature from one scale to another.
4. What are the important properties of magnets? Explain.
5. Define magnetization. Explain the phenomenon of induced magnetism.
6. Distinguish between temporary and permanent magnets.
7. Define strength of magnetic field. Explain with suitable examples.
8. Write the uses of electromagnets.
9. What is a circuit breaker? Why is it used?
10. Write the methods to demagnetize a magnet.
11. Discuss the basic concept of quantum mechanics.
12. What are the main branches of physics? State briefly.
13. What is the scope of physics in everyday life? Give some examples.
14. Define scientific method. Write its basic steps.
15. A force of 200 N is acting on a cart at an angle of 30° with the horizontal direction. Find the x- and y-components of the force.
16. A force of 160 N is acting on a wooden box at an angle of 60° with the horizontal direction. Determine the values of its x- and y-components.
17. A 150 g stone attached to a string is whirled in a horizontal circle at a constant speed of 8 m/s. The length of the string is 1.2 m. Calculate the centripetal force acting on the stone. Neglect the effects of gravity.

Numerical Problems

1. Write using correct prefixes: (a) 5.0×10^4 cm (b) 580×10^2 g (c) 45×10^{-4} s
2. State the number of seconds in (a) a day (b) a week (c) a month, and state your answers in scientific notation.
3. Solve the following addition/subtraction. State your answers in scientific notation: (a) 4×10^{-4} kg + 3×10^{-5} kg (b) 5.4×10^{-6} m – 3.2×10^{-5} m
4. Solve the following multiplication/division. State your answers in scientific notation: (a) $(5 \times 10^4 \text{ m}) \times (3 \times 10^{-2} \text{ m})$ (b) $(6 \times 10^8 \text{ kg}) / (3 \times 10^4 \text{ m}^3)$
5. Express the density of mercury given as 13.6 g/cm^3 in kg/m^3 .
6. State the number of significant digits in each measurement: (a) 0.0045 m (b) 2.047 m (c) 3.40 m (d) 3.420×10^4 m
7. Draw the representative lines of the following vectors: (a) a velocity of 400 m/s making an angle of 60° with the x-axis. (b) a force of 50 N making an angle of 120° with the x-axis.
8. A car is moving with an average speed of 72 km/h. How much time will it take to cover a distance of 360 km?
9. A truck starts from rest. It reaches a velocity of 90 km/h in 50 seconds. Find its average acceleration.
10. A car passes a green traffic signal while moving with a velocity of 5 m/s. It then accelerates at 1.5 m/s^2 . What is the velocity of the car after 5 seconds?
11. A wagon is moving on the road with a velocity of 54 km/h. Brakes are applied suddenly and it covers 25 m before stopping. Determine the acceleration.
12. A stone is dropped from a height of 45 m. How long will it take to reach the ground? What will be its velocity just before hitting the ground?
13. A 10 kg block is on a smooth surface. A force of 5 N is applied. Find: (a) acceleration (b) velocity after 5 s.
14. A cyclist (55 kg) on a 5 kg bicycle starts from rest, applying 90 N for 8 s, then continues at constant speed for 8 s. Find the total distance.
15. A force of 7500 N moves a 3000 kg truck. Find the acceleration and time to increase speed from 36 km/h to 72 km/h.
16. The mass of a person is 80 kg. What is his weight on Earth and on the Moon? ($g_{\text{moon}} = 1.6 \text{ m/s}^2$)
17. A 160 g cricket ball hits a bat at -28 m/s and leaves at 52 m/s . The contact time is $4 \times 10^{-3} \text{ s}$. Find the average force.
18. What force is required to increase the velocity of an 800 kg car from 10 m/s to 30 m/s in 10 s?

19. A 3 kg ball at 5 m/s collides with a stationary 2 kg ball. They move together. Find their final velocity.
20. A spanner 25 cm long is used to open a nut. If a force of 400 N is applied at the end of the spanner, what is the torque acting on the nut?
21. A signboard is suspended by means of two steel wires. If the weight of the board is 200 N, what is the tension in the strings?
22. Find the work done by a 65 N force in pulling a suitcase for a distance of 20 metres.
23. A force of 20 N acting at an angle of 60° to the horizontal is used to pull a box through a distance of 3 m across a floor. How much work is done?
24. A truck of mass 3000 kg is moving on a road with uniform velocity of 54 km/h. Determine its kinetic energy.
25. A 0.14 kg ball is thrown vertically upward with an initial velocity of 35 m/s. Find the maximum height reached by the ball.
26. A 1000 kg car moving with an acceleration of 4 m/s^2 covers a distance of 50 m in 5 seconds. What is the power generated by its engine?
27. An engine raises 100 kg of water through a height of 80 m in 25 s. What is the power of the engine?
28. A force of 600 N acts on a box to push it 5 m in 15 s. Calculate the power.
29. A box of mass 10 kg is pushed up along a ramp 15 m long with a force of 80 N. If the box rises to a height of 5 m, what is the efficiency of the system?
30. A spring is stretched 20 mm by a load of 40 N. Calculate the spring constant. If an object causes an extension of 16 mm, what will be its weight?
31. A block of wood of density $8 \times 10^3 \text{ kg/m}^3$ has a volume of 60 cm^3 . Find its mass.
32. A brick measures $5 \text{ cm} \times 10 \text{ cm} \times 20 \text{ cm}$. If its mass is 5 kg, calculate the maximum and minimum pressure it can exert on a horizontal surface.
33. Calculate the pressure of a column of mercury 76 cm high. Density of mercury is $13.6 \times 10^3 \text{ kg/m}^3$.
34. In a hydraulic brake, a force of 500 N is exerted on a piston of area 5 cm^2 . Find the pressure transferred and the force on the second piston of area 20 cm^2 .
35. The areas of the small and large pistons are 10 cm^2 and 100 cm^2 . What force is needed on the small piston to lift a car of 4000 N?
36. How much would 30°C be on the Fahrenheit and Kelvin scales?
37. The normal human body temperature is 98.6°F . Convert it into Celsius and Kelvin scales.

38. At what temperature would the Celsius and Fahrenheit thermometer readings be the same? Prove it.
39. Convert 5°F to Celsius and Kelvin scale.
40. What is the equivalent temperature of 25°C on the Fahrenheit and Kelvin scales?

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