

PHYSICS

For Class IX

1. PHYSICAL QUANTITIES AND MEASUREMENT

- 1.1 Introduction to Physics
- 1.2 Physical quantities
- 1.3 International system of units
- 1.4 Prefixes (multiples and sub multiples)
- 1.5 Standard form / scientific notation
- 1.6 Measuring instruments
 - i. metre rule
 - ii. vernier callipers
 - iii. screw gauge
 - iv. physical balance
 - v. stopwatch
 - vi. measuring cylinder
- 1.7 An introduction to significant figures

2. KINEMATICS

- 2.1 Rest and motion
- 2.2 Type of motion (Translatory, rotatory, vibratory)
- 2.3 Terms associated with motion;
 - i. Position
 - ii. Distance and displacement
 - iii. Speed and velocity
 - iv. Acceleration
- 2.4 Scalars and Vectors
- 2.5 Graphical analysis of Motion;
 - i. Distance-time graph
 - ii. Speed-time graph
- 2.6 Equations of Motion;
 - i. $S = vt$
 - ii. $v_f = v_i + at$
 - iii. $S = v_i t + \frac{1}{2} at^2$
 - iv. $v_f^2 - v_i^2 = 2 a S$
- 2.7 Motion due to gravity

3. DYNAMICS

- 3.1 Momentum
- 3.2 Newton's laws of motion
- 3.3 Friction
- 3.4 Uniform circular motion

4. Turning Effect of Forces

- 4.1 Forces on bodies
- 4.2 Addition of forces
- 4.3 Resolution of forces
- 4.4 Moment of a force
- 4.5 Principle of moments
- 4.6 Centre of mass
- 4.7 Couple
- 4.8 Equilibrium

- 4.9 Stability
- 5. **GRAVITATION**
 - 5.1 Law of gravitation
 - 5.2 Measurement of mass of earth
 - 5.3 Variation of 'g' with altitude
 - 5.4 Motion of artificial satellites (simple treatment)
- 6. **WORK AND ENERGY**
 - 6.1 Work
 - 6.2 Energy forms
 - 6.3 Kinetic energy and Potential energy
 - 6.4 Major sources of energy
 - 6.5 Efficiency
 - 6.6 Power
- 7. **PROPERTIES OF MATTER**
 - 7.1 Kinetic molecular model of matter
 - 7.2 Density
 - 7.3 Pressure
 - 7.4 Atmosphere pressure
 - 7.5 Pressure in liquids
 - 7.6 Up thrust
 - 7.7 Principle of floatation
 - 7.8 Elasticity
 - 7.9 Stress, strain and Young's modulus
- 8. **THERMAL PROPERTIES OF MATTER**
 - 8.1 Temperature and heat
 - 8.2 Thermometer
 - 8.3 Specific heat capacity
 - 8.4 Latent heat of fusion
 - 8.5 Latent heat of vaporization
 - 8.6 Evaporation
 - 8.7 Thermal Expansion
- 9. **TRANSFER OF HEAT**
 - 9.1 The three process of heat transfer
 - 9.2 Conduction
 - 9.3 Convection
 - 9.4 Radiation
 - 9.5 Consequences and everyday application of heat transfer

LIST OF PRACTICALS

1. To measure the area of cross section by measuring diameter of a solid cylinder with vernier callipers.
2. To measure the volume of a solid cylinder by measuring length and diameter of a solid cylinder with vernier callipers.
3. To measure the thickness of a metal strip or a wire by using a screw gauge.
4. To find the acceleration of a ball rolling down an angle iron by drawing a graph between $2S$ and T^2 .

5. Investigate the relationship between force of limiting friction and normal reaction to find the co-efficient of sliding friction between a wooden block and horizontal surface.
6. Measure the force of limiting friction by rolling a roller on a horizontal plane.
7. To determine the resultant of two forces graphically using a Horizontal force table.
8. To verify the principle of moments by using a metre rod balanced on a wedge.
9. To find the tension in the strings by balancing a metre rod on the stands.
10. To find the weight of an unknown object by using vector addition of forces.
11. To find the weight of an unknown object by using principle of moments.
12. To study the relationship between load and extension (Helical spring) by drawing a graph.
13. To find the density of a body heavier than water by Archimedes principle.
14. To find the density of a liquid using 5 ml syringe (instead of density bottle).
15. To find the specific heat by the method of mixture using polystyrene cups (used as container of negligible heat capacity).
16. To draw a graph between temperature and time when ice is converted into water and then to steam by slow heating.
17. To measure the specific heat of fusion of ice.

LIST OF APPARATUS / EQUIPMENTS REQUIRED ACCORDING TO THE PHYSICS EXPERIMENTS FOR IX-X GRADES

Experiment No.	Apparatus /Equipment
1.	Vernier callipers, solid cylinder.
2.	Vernier callipers, solid cylinder.
3.	Screw gauge, metal strip or small solid sphere or a piece of wire.
4.	Angle iron 2m long, 2 wooden stands having V-shaped top, steel ball, stopwatch, metre rod.
5.	Horizontal plane, weight box, pulley, wooden block, pan, thread, spring balance, metre rod.
6.	Horizontal plane, weight box, pulley, pan, thread, ruler.
7.	Horizontal board fixed with three pulleys, plane mirror strip, 3 sets of slotted masses of 50 g with hangers, thread, metre scale, protractor.
8.	Metre rod, wooden wedge, thread, weight box.
9.	Two stands, two spring balances, metre rod, thread.
10.	Horizontal board fixed with three pulleys, plane mirror strip, 3 sets of slotted masses of 50 g with hangers, thread, metre scale, protractor.
11.	Wedge, metre rod, slotted weights, thread, object of unknown weight.
12.	Metallic bob, vernier callipers, metre scale, stopwatch, splitted cork, stand with clamp.
13.	Metallic bob, vernier callipers, metre scale, stopwatch, splitted cork, stand with clamp.
14.	Helical spring, iron stand, half metre rod, set of masses with hanger.
15.	Physical balance, weight box, solid body (glass stopper), beaker, thread, small wooden bench, water, thermometer.
16.	5 ml disposable syringe, liquid, water, beaker, weight box, physical balance.
17.	Polystyrene cup, two thermometers, heating arrangement, metallic bob, physical balance, weight box.
18.	Gas burner or spirit lamp, thermometer (-10oC to 110oC), iron stand, beaker, stopwatch, tripod stand, stirrer.
19.	Copper calorimeter with lagging, thermometer, ice chips.
20.	Rectangular glass slab, common pins, drawing pins, drawing board, geometry box, white sheet of paper.
21.	Concave mirror, stand with a clamp, cork with a pin.

22. Semi circular glass block, ray box, drawing board, white paper and pins, protractor, half metre rule, pair of compasses or prism.
23. Glass prism, drawing board, white paper and drawing pins, common pins, geometry box.
24. Convex lens, two needles, three uprights, knitting needle and a metre rod.
25. Convex lens of different focal length and metre rod.
26. Voltmeter, ammeter, a piece of resistance wire, rheostat, battery, connecting wires, key.
27. Two standard resistances, voltmeter, ammeter, connecting wires, key, battery, rheostat.
28. Two standard resistances, voltmeter, ammeter, connecting wires, key, battery, rheostat.
29. Galvanometer, dry cell with box, high resistance box, low resistance box, two keys.
30. Bar magnet, drawing board, white paper and pins, magnetic compass, needle, pencil.
31. Circular coil fitted on a wooden board, compass needle, ammeter, battery, key.
32. OR gate, AND gate, NOT gate, NOR gate and NAND gate modules, power supply, LED indicator module.
33. NOT gate module, thermistor or smoke sensor, alarm system, power pack.

**COMPREHENSIVE LIST OF REQUIRED APPARATUS FOR A
STANDARD PHYSICS LABORATORY FOR GRADES IX-X
(FOR A GROUP OF 40 STUDENTS)**

Sr. No.	Apparatus/ Equipment	Quantity
1.	Vernier Callipers	12
2.	Screw gauge	12
3.	Solid cylinder	12
4.	Metallic wire	1 kg
5.	Small metallic sphere	12
6.	Angle iron 2m long with steel ball	10
7.	Wooden stands having V-shaped top	10
8.	Stopwatch	10
9.	Wooden block	10
10.	Weight box with fractional weights	2
11.	Spring balance	20
12.	Horizontal Board fixed with three pulleys	10
13.	Pan	20
14.	Slotted weights with hangers set of 50g weights	20
15.	Slotted weights with hangers set of 20g weights	20
16.	Metre rod	20
17.	Wedge	12
18.	Plane mirror strip	24
19.	Protractor	24
20.	Inclined plane	10
21.	Steel roller with suspended pan	10
22.	Helical spring	24
23.	Iron stands with clamps	20
24.	Physical balance	02
25.	Beaker (Assorted 250 cc, 500 cc, 1000 cc)	24
26.	Small wooden bench	10

27.	5 ml disposable syringes	20
28.	Polystyrene cups	24
29.	Thermometer – 10Co to 110Co with half degree mark	24
30.	Gas burner or spirit lamp	10
31.	Solid lead shots	1 kg
32.	Tripod stand	10
33.	Stirrer	10
34.	Thread	5 spool
35.	Splitted cork	1 pkt
36.	Rubber pad	12
37.	Concave mirror with stand	12
38.	Needles with stands (Uprights)	24
39.	Kitting needle	12
40.	Rectangular glass slab	12
41.	Common pins	2 pkt
42.	Drawing board pins	2 pkt
43.	White paper	1 pkt
44.	Semi circular glass slab	10
45.	Light ray box	10
46.	Drawing board	15
47.	Compass	15
48.	Glass prism	12
49.	Convex lens (f= 10 cm to 20 cm)	20
50.	Voltmeter (0 - 5V)	10
51.	Ammeter (0 – 3A)	10
52.	Resistance wire	1 spool
53.	Rheostat	10
54.	Connecting wires	2 kg
55.	Keys	20
56.	Standard resistances (1 Ω , 2 Ω , 5 Ω , 10 Ω)	10 each
57.	Galvanometer	10
58.	Dry cell with box	24
59.	High resistance box	12
60.	Low resistance box	12
61.	Bar magnet	12 set
62.	Circular coil (fitted on wooden board)	10
63.	Power supply	10
64.	OR gate module	10
65.	AND gate module	10
66.	NOR gate module	10
67.	NAND gate module	10
68.	NOT gate module	10
69.	LED indicator module	10
70.	Alarm system	5
71.	Smoke sensor	5
72.	Thermistor	5



Federal Board SSC-I Examination
Physics Model Question Paper

FBISE
WE WORK FOR EXCELLENCE

Roll No:

Answer Sheet No: _____

Signature of Candidate: _____

Signature of Invigilator: _____

SECTION – A

Time allowed: 20 minutes

Marks: 12

Note: Section-A is compulsory and comprises pages 1-3. All parts of this section are to be answered on the question paper itself. It should be completed in the first 20 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

Q.1 Insert the correct option i.e. A / B / C / D in the empty box opposite each part. Each part carries one mark.

i. $1 \mu m = \underline{\hspace{1cm}} m$

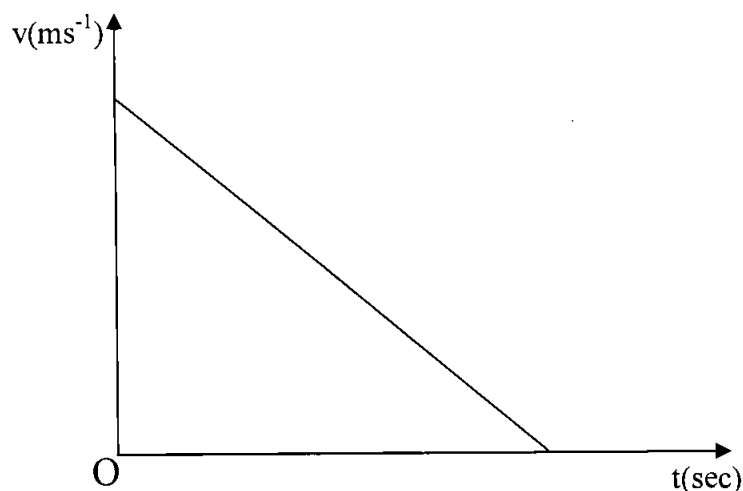
A. 10^{-2}

B. 10^{-3}

C. 10^3

D. 10^{-6}

ii. The graph shows that an object is moving with:



A. uniform speed

B. uniform velocity

C. uniform deceleration

D. uniform acceleration

iii. $72 \text{ km/h} = \underline{\hspace{1cm}} \text{ m.s}^{-1}$

A. 720

B. 72

C. 36

D. 20

DO NOT WRITE ANYTHING HERE

iv. When a bus takes a sharp turn, passengers fall in the outward direction because of:

- A. gravity
B. weight
C. inertia
D. pressure

v. A body of mass 8kg is acted upon by a force of 20N, what would be its acceleration?

- A. 2 mS^{-2}
B. 2.5 mS^{-2}
C. 4 mS^{-2}
D. Zero

vi. Which of the following is the unit of momentum?

- A. Nm
B. kgmS^{-2}
C. NS
D. NS^{-1}

vii. A couple is formed by:

- A. Two forces perpendicular to each other.
B. Two like parallel forces.
C. Two equal and opposite forces in the same line.
D. Two equal and opposite forces not in the same line.

viii. A force of 10N makes an angle of 30° with the horizontal. What would be its vertical component?

- A. 4N
B. 5N
C. 7N
D. 8.7N

ix. The orbital speed of a low orbit satellite is:

- A. zero
B. 8 ms^{-1}
C. 800 ms^{-1}
D. 8 km s^{-1}

x. 1 horse power = _____ watts

- A. 1000
- C. 746

- B. 7460
- D. 10^6

xi. The S.I. units of latent heat of fusion is:

- A. Joule
- C. $J \cdot kg^{-1} \cdot K^{-1}$

- B. $Joule \cdot kg^{-1}$
- D. $J^{-1} \cdot kg^{-1} \cdot K^{-1}$

xii. Normal human body temperature is:

- A. $15^{\circ}C$
- C. $37^{\circ}F$

- B. $37^{\circ}C$
- D. $98.6^{\circ}C$

For Examiner's use only

Q No.1: Total Marks:

Marks Obtained:



Federal Board SSC-I Examination
Physics Model Question Paper

Time allowed: 2.40 hours

Total Marks: 53

Note: Sections 'B' and 'C' comprise pages 1-2 and questions therein are to be answered on the separately provided answer book. Answer only eleven parts from section 'B' and attempt any two questions from section 'C'. Use supplementary answer sheet i.e. sheet B if required. Write your answers neatly and legibly.

SECTION – B

(Marks: 33)

Q.2 Attempt any eleven parts from the following. The answer of each part should not exceed 3 to 4 lines.

- (i) Find the base quantities involved in each of the following derived quantities:
 - (a) Force
 - (b) Work
- (ii) Describe the direction of acceleration of a moving body when its velocity is:
 - (a) increasing
 - (b) decreasing
- (iii) Differentiate between scalars and vectors.
- (iv) A bullet of mass 20g is fired from a gun with a muzzle velocity 100 ms^{-1} . Find the recoil of the gun if its mass is 5 kg.
- (v) Why the outer edge of the curved road is elevated?
- (vi) Why is it easy to tight a nut using a spanner of long arm than a spanner of short arm?
- (vii) Why is the height of vehicles kept as low as possible?
- (viii) Describe briefly what do you know about GPS?
- (ix) Why does the value of "g" vary from place to place?
- (x) A force of 200 N acts on a body of mass 20 kg. The force accelerates the body from rest until it attains a velocity of 50 mS^{-1} . Through what distance the force acts?
- (xi) How can geothermal energy be used for meeting energy requirements of a mankind?

- (xii) Describe briefly the operation of a vacuum cleaner.
- (xiii) Why does a heavy ship float over water but a small needle sinks?
- (xiv) Why do wet clothes dry up more quickly in summer than in winter?
- (xv) Why are gaps left in railway tracks?

SECTION – C

(Marks: 20)

Note: Attempt any two questions.

(2×10=20)

- Q.3** a. State Newton's law of gravitation. Also give its mathematical details.
Calculate the mass of the Earth. (06)
- b. Prove that $S = v_i t + \frac{1}{2} a t^2$ (04)
- Q.4** (a) State and explain Archimedes Principle. (06)
- (b) Find the magnitude and direction of a force, if its x-component is 12 N and y-component is 5 N. (04)
- Q.5** (a) What is meant by conduction of heat? Discuss the factors upon which rate of flow of heat depends. Define thermal conductivity. (06)
- (b) Find the volume of a brass cube at 100°C whose side is 10cm at 0°C, (Coefficient of linear thermal expansion of brass = $1.9 \times 10^{-5} \text{ K}^{-1}$) (04)
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Federal Board SSC-I Examination
Physics Practical Model Question Paper

Time allowed: 2 hours

Total Marks: 10

Note: Perform any ONE of the following practicals:

- Q.1 Find the area of cross section of a solid cylinder by measuring its diameter with vernier callipers. (05)
- Q.2 Verify the principle of moments by using a meter rod balanced on wedge (05)
- Q.3 Find the density of a body heavier than water by Archimedes principle. (05)
- Note Book (2)
- Viva Voce (3)
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