TABLE OF SPECIFICATIONS PHYSICS CLASS 9

S.No	Unit	Topic	Sub-Topic	weightage in %age	Test items in each chapter						SLOs	Congnative level	Difficulty level
					MCQS	RRQ	ERQS	Marks distribution					
1.	Physical quantities and measurement	Introduction of physics	----	12	1	1	--	1	4	--	Describe the crucial role of Physics in Science, Technology and Society.	understanding	Moderate
2.		Physical Quantities	Base quantities								Explain with examples that Science is based on physical quantities which consist of numerical magnitude and a unit.	understanding	Moderate
3.			Drive /basics quantities								Differentiate between base and derived physical quantities.	understanding	Moderate
4.		International system of units	Basic/Drive units								List the seven units of System International (SI) alongwith their symbols and physical quantities (standard definitions of SI units are not required).	understanding	Moderate
5.		Prefixes power of ten	--------								Interconvert the prefixes and their symbols to indicate multiple and sub-multiple for both base and derived units.	application	Moderate
6.		Scientific notation	------								Write the answer in scientific notation in measurements and calculations.	application	Moderate
7.		Measuring instrument s	Meter rod/tape/ Vernier caliper /measuring clylider/stop watch/physical balance								Identify and explain the limitation of measuring instruments such as metre rule, vernier callipers and screw gauge.	understanding	difficult
8.			Screw gauge										
9.		Significant figures	rules of signifigure								Describe the need using significant figures for recording and stating results in the laboratory.	understanding	Moderate
10.	Kinematics	Rest and motion		12	1	1	1+1	1	4	3+4	describe using examples how objects can be at rest and in motion simultaneously.	understanding	Moderate
11.		Types of motion	Translatory /rotatory/vibratory								Identify different types of motion i.e; translatory, (linear, random, and circular); rotatory and vibratory motions and distinguish among them.	understanding	Moderate
12.		Scalar and vectors	Sealers /vectors/representati								Differentiate with examples between scalar and vector quantities.	application	Moderate
											Represent vector quantities by drawing.	understanding	Moderate
13.		Term associated with motions	Position /distance and displacement /speed and velocity /acceleration								Differentiate with examples between distance and displacement, speed and velocity.	understanding	Moderate
14.		Graphical representation of motion	Distance –time grapg /speed-time graph and related topics								define the term speed, velocity and acceleration.	knowledge	easy
											plot and interpret distance-time graph and speed-time graph.	application	easy
											Determine and interpret the slope of distance-time and speed-time graph.		
											Determine from the shape of the graph, the state of a body. i. at rest ii. moving with constant speed iii. moving with variable speed.	understanding	Moderate
											Calculate the area under speed-time graph to determine the distance traveled by the moving body.		

15.		Equation of motion	First /second/third equations of motion								derive equations of motion for a body moving with a uniform acceleration in a straight line using graph.	application	Moderate
											solve problems related to uniformly accelerated motion using appropriate equations.	application	Moderate
16.		Motion of freely falling body	-----								solve problems related to freely falling bodies using 10 ms-2 as the acceleration due to gravity.	application	Moderate
17.	Dynamics	Force , inertia and Momentum	Force/inertia /momentum	14	2	2		2	8		define momentum, force, inertia, friction, centripetal force.	knowledge	easy
											solve problem using the equation Force = change in momentum / change in time.	application	easy
											explain the concept of force by practical examples of daily life.	understanding	Moderate
18.		Laws of motions	Frist/ second/third laws of motions / Mass and weight								state Newton's laws of motion.	understanding	easy
											distinguish between mass and weight and solve problem using F = ma, and w = mg.	application	easy
													Moderate
19.		Tension and acceleration string	Tension and acceleration string								calculate tension and acceleration in a string during motion of bodies connected by the string and passing over frictionless pulley using second law of motion.	application	Moderate
20.		Force and momentum	Force and momentum								state the law of conversation of momentum.	knowledge	easy
											use the principle of conservation of momentum in the collision of two objects.	application	difficult
21.			Law of conservation of momentum								determine the velocity after collision of two objects using the law of conversation of momentum.	understanding	Moderate
22.		Frictions	Friction and their type/applications of friction /advantages and disadvantage of								Explain the effect of friction on the motion of a vehicle in the context of tyre surface, road conditions including skidding, braking force.	understanding	Moderate
											Demonstrate that rolling friction is much lesser than sliding friction.	application	easy
											List various methods to reduce friction.	understanding	Moderate
23.		Uniform circular motion	Uniform circular motion/centripetal force/centrifugal force and their applications								Explain that motion in a curved path is due to a perpendicular force on a body than changes direction of motion but not speed.	understanding	Moderate
											Calculate centripetal force on a body moving in a circle using mv2 /r.	application	Moderate
											state what will happens to you while you are sitting inside a bus when the bus	understanding	Moderate
											1. starts moving suddenly		
											2. stops moving suddenly		
											3. turns a corner to the left suddenly		
											Write a story about what may happen to you when you dream that all frictions suddenly disappeared. Why did your dream turn into a nightmare?"	understanding	Moderate
24.	Turning	Like and unlike parallel forces	Like and unlike parallel forces								Define like and unlike parallel forces.	knowledge	easy
25.		Addition of Forces	Head to tail rule								State head to tail rule of vector addition of forces/vectors.	knowledge	easy
26.		Resolution of forces	Resolution forces/perpendicular								Describe how a force is resolved into its perpendicular components.	understanding	Moderate
											Determine the magnitude and direction of a force from its perpendicular components.	understanding	Moderate
27.		Torque or moment of force	Torque / line of action of forces								Define moment of force or torque as moment = force x perpendicular distance from pivot to the line of action of force.	knowledge	easy
											Explain the turning effect of force by relating it to everyday life.	understanding	Moderate
28.		Principle of moments	Principle of moment								State the principle of moments.	knowledge	easy

29.	effect of force	Center of mass	Center of mass	12	2	2	--	2	8	--	define the centre of mass and centre of gravity of a body.	knowledge	easy
30.		Center of gravity	Center of gravity/center of gravity regular and irregular shape thin lamina										
31.		Couple	Couple								Define couple as a pair of forces tending to produce rotation.	knowledge	easy
											Prove that the couple has the same moments about all points.	knowledge	easy
32.		Equilibrium	Equilibrium /conditions of Equilibrium/ states of								Define equilibrium and classify its types by quoting examples from everyday life. state the two conditions for equilibrium of a body	knowledge	easy
											Solve problems on simple balanced systems when bodies are supported by one pivot only.	application	Moderate
33.		Stability and position of center	Stability and position of center of mass								Describe the states of equilibrium and classify them with common examples. • explain effect of the position of the centre of mass on the stability of simple objects.	understanding	Moderate
34.	Gravitation	Force of gravitation	Law of gravitation /law of gravitation and newton law of motion /gravitation	10	1	1	1+1	1	4	3+4	State Newton's law of gravitation.	knowledge	easy
											Explain that the gravitational forces are consistent with Newton's third law.	understanding	Moderate
											Explain gravitational field as an example of field of force.	understanding	Moderate
											Define weight (as the force on an object due to a gravitational field.)	knowledge	easy
35.		Mass of earth	Mass of earth								Calculate the mass of earth by using law of gravitation.	application	Moderate
											Solve problems using Newton's law of gravitation.	application	Moderate
36.		Variation of g with altitude	Variation of g with altitude								Explain that value of 'g' decreases with altitude from the surface of earth.	understanding	Moderate
37.		Artificial satellite	Artificial satellite/motion of								Discuss the importance of Newton's law of gravitation in understanding the motion of satellites.	understanding	Moderate
38.		Work	Work /unit of work/	10							define work and its SI unit.	knowledge	easy
											calculate work done using equation Work = force x distance moved in the direction of force	application	
39.		Energy	Energy and their types								Define energy, kinetic energy and potential energy. State unit of energy	knowledge	easy
40.		Kinetic energy	Kinetic energy								Prove that Kinetic Energy Ek = ½ mv2 and.	application	Moderate
41.		Potential energy	Potential energy								potential energy Ep = mgh and solve problems using these equations	application	Moderate
42.		Form of energy	Mechanical /heat/electrical/sound/light/								list the different forms of energy with examples	understanding	Moderate
			Chemical/nuclear energies										
43.		Inter-conversion of energy	Inter-conversion of energy								• describe the processes by which energy is converted from one form to another with reference to	understanding	Moderate

44.	Work and Power	Major sources of energy/ hydroelectric generation//Power / power generation	Fossil /nuclear fuels/renewable energy sources/energy from water /energy from sun/solar house heating/solar cells Wind energy, geothermal energy, energy from bio mass, mass energy relation, electricity from fossil fuels , energy and environment , flow diagram of an energy		2	2	--	2	8	--	o.fossil fuel energy o hydroelectric generation o solar energy o nuclear energy o geothermal energy o wind energy o biomass energy		
											State mass energy equation E = mc2 and solve problems using it.	application	Moderate
											Describe the process of electricity generation by drawing a block diagram of the process from fossil fuel input to electricity output.	understanding	difficult
											List the environmental issues associated with power generation.	understanding	Moderate
											Differentiate energy sources as non renewable and renewable energy sources with examples of each.	understanding	Moderate
											Explain by drawing energy flow diagrams through steady state systems such as Filament lamp, a power station, a vehicle traveling at a constant speed on a level road.	understanding	difficult
45.		Efficiency	Efficiency								Define efficiency of a working system and calculate the efficiency of an energy conversion using the formula o efficiency = energy converted into the required form / total energy input	knowledge	easy
											Explain why a system cannot have an efficiency of 100%.	understanding	easy
46.		Power	Power								define power and calculate power from the formula	application	Moderate
											Power = work done / time taken	application	
											Define the unit of power "watt" in SI and its conversion with horse power. Solve problems using mathematical relations learnt in this unit.	application	easy
47.	Properties of matter	Kinetic molecular model of matter	Solid , liquid, gasses, plasma	10	1	1	1+1	1	4	3+4	State kinetic molecular model of matter (solid, liquid and gas forms). Describe briefly the fourth state of matter i.e. "plasma".	understanding	Moderate
48.		Density	Density								define the term 'density'	knowledge	easy
											Compare the densities of a few solids, liquids and gases.	understanding	Moderate
49.		Pressure	Pressure								Define the term pressure (as a force acting normally on unit area).	knowledge	easy
											Explain how pressure varies with force and area in the context of everyday examples.	understanding	Moderate
50.		Atmospheric pressure	Measurement of atmospheric pressure /variation in atmospheric pressure								Explain that the atmosphere exerts a pressure.	understanding	Moderate
											Describe how the height of a liquid column may be used to measure the atmospheric pressure.	understanding	Moderate
											Describe that atmospheric pressure decreases with the increase in height above the earth's surface.	understanding	Moderate
											Explain that changes in atmospheric pressure in a region may indicate a change in the weather.	understanding	difficult
51.		Pressure of liquids	Pressure of liquids, Pascal law and its application								State relation for pressure beneath a liquid surface to depth and to density i.e., (p=ρgh) and solve problems using this equation.	application	difficult
											State pascal's law.	knowledge	easy
											apply and demonstrate the use with examples of pascal's law	application	easy
52.		Archimedes principle	Archimedes principle, density of object								State Archimedes principle.	knowledge	easy
											Determine the density of an object using Archimedes principle.	understanding	Moderate
											State the up thrust exerted by a liquid on a body.	knowledge	easy

53.		Principle of floatation	Principle of floatation/ship and submarines								State principle of floatation.	knowledge	easy
											Explain that a force may produce a change in size and shape of a body.	knowledge	easy
												understanding	Moderate
54.		Elasticity	Elasticity/stress/strain								Define the terms stress, strain and young's modulus.	knowledge	easy
55.		Hook law	Hook law/ young modulus								State Hooke's law and explain elastic limit.	understanding	Moderate
56.	Thermal properties of matter	Temperature and Heat	Temperature and Heat	14	1		1+1	1		3+4	Define temperature (as quantity which determine the direction of flow of thermal energy).	knowledge	easy
											Define heat (as the energy transferred resulting from the temperature difference between two objects).	knowledge	easy
57.		Thermometer	Liquid in glass thermometer								List basic thermometric properties for a material to construct a thermometer.		
												understanding	Moderate
58.			Scale of thermometer / Conversion of temperature from one scale into other temperature scale								Convert the temperature from one scale to another (Fahrenheit, Celsius and Kelvin scales).	application	Moderate
59.		Specific heat capacity	Specific heat capacity/importance of large specific heat										
											Describe rise in temperature of a body in term of an increase in its internal energy.	understanding	difficult
											Define the terms heat capacity and specific heat capacity.	knowledge	easy
60.		Change of state	Change of state								Describe heat of fusion and heat of vaporization (as energy transfer without a change of temperature for change of state).	understanding	Moderate
61.		Latent heat of fusion	Latent heat of fusion								Describe experiments to determine heat of fusion and heat of vaporization of ice and water respectively by sketching temperature-time graph on heating ice.	understanding	Moderate
62.		Latent heat of vaporization	Latent heat of vaporization								Explain the process of evaporation and the difference between boiling and evaporation.	understanding	Moderate
63.		The evaporation	**Temperature/ surface area/wind/**								**Explain that evaporation causes cooling.**	understanding	Moderate
											List the factors which influence surface evaporation.	understanding	Moderate
64.		Thermal expansion	Linear thermal expansion in solid / volume thermal expansion /consequences of thermal expansion/applicatio								Describe qualitatively the thermal expansion of solids (linear and volumetric expansion).	understanding	Moderate
											Explain the thermal expansion of liquids (real and apparent expansion).	understanding	Moderate
											Solve numerical problems based on the mathematical relations learnt in this unit.	application	Moderate
65.	Transfer of heat	Transfer of heat	Transfer of heat	6	1	1	--	1	`	--	Recall that thermal energy is transferred from a region of higher temperature to a region of lower temperature.	knowledge	easy
66.		Conduction	Conduction /thermal conductivity /uses of conductor and non-conductor								Describe in terms of molecules and electrons , how heat transfer occurs in solids.	understanding	Moderate
											State the factors affecting the transfer of heat through solid conductors and hence, define the term "Thermal Conductivity".	understanding	Moderate
											Solve problems based on thermal conductivity of solid conductors.	application	Moderate
											Write examples of good and bad conductors of heat and describe their uses.	understanding	Moderate
67.		Convection	Convection/convection in air/ uses of								Explain the convection currents in fluids due to difference in density.	understanding	Moderate
											State some examples of heat transfer by convection in everyday life.	application	Moderate
68.		Radiation	Radiation /emission and absorption of radiation /greenhouse effect								Explain insulation reduces energy transfer by conduction.	understanding	Moderate
											Describe the process of radiation from all objects.	understanding	Moderate
											explain that energy transfer of a body by radiation does not require a material medium and rate of energy transfer is affected by:	understanding	difficult
											· Colour and texture of the surface		
											· Surface temperature o Surface area		
69.		Application of consequences of radiation	Application of consequences of radiation								----------		