Federal Board SSC-I Examination
Physics Model Question Paper

National Curriculum 2022-2023 (Inclusive Scheme of Studies 2024)
(50% MCQs & 50% Descriptive)

ROLL NUMBER					
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Section - A (Marks 30)

Time Allowed: 1.20 hours

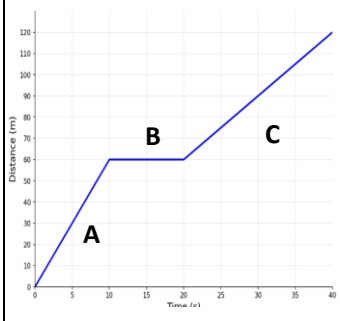
Section – A is compulsory. All parts of this section are to be answered on this page and handed over to the Centre Superintendent. Deleting/ overwriting is not allowed. Use black or blue ball point to fill the bubbles. *Do not use lead pencil.*

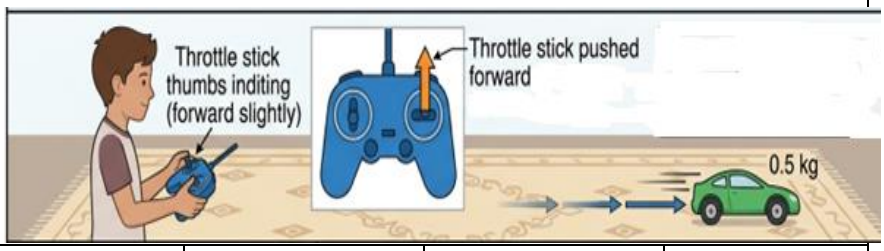
Candidate Sign. _____ **Invigilator Sign**. _____

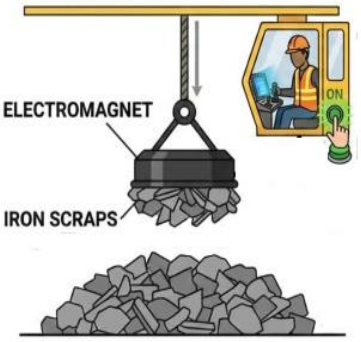
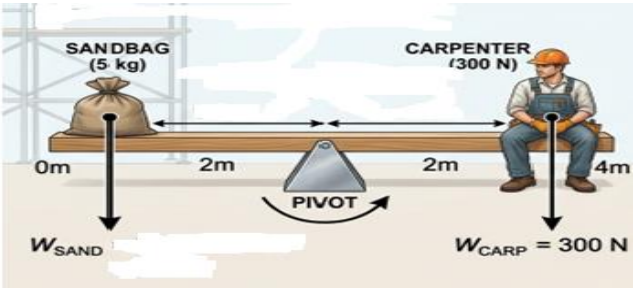
Note: Fill the correct bubble for each question. Each question carries 0.5 mark.

S #	Question	(A)	(B)	(C)	(D)
1.	Which of the following is a base quantity?	Velocity	Mass	Force	Momentum
2.	The rate of change of displacement is called:	Speed	Velocity	Acceleration	Distance
3.	Which of the following forces is a non-contact force?	Friction	Tension	Magnetic force	Air resistance
4.	The tendency of an object to resist a change in its state of rest or motion is called:	Force	Weight	Inertia	Momentum
5.	Pascal's Law is applicable to:	Gases only	Solids only	Fluids	Vacuum
6.	Which of the following is a scalar quantity?	Force	Displacement	Energy	Velocity
7.	The SI unit of momentum is:	N m	kg m/s	kg m/s^2	J
8.	Which statement best describes translational motion of a body?	all its parts move in one direction	rotates about a fixed axis	moves about a fixed point	Changes its shape
9.	The value of 'g' at the surface of the moon is approximately:	9.8 m/s^2	1.6 m/s^2	Infinite	0 m/s^2
10.	Two identical beakers have same amount of water. Beaker A is at 30°C while beaker B is at 60°C temperature. This is because,	Particles of beaker B has more internal energy	Particles of beaker A has more density	Particles of beaker A has more internal energy	Particles of beaker B has less density

11.	A book is lifted from the floor to a shelf. It gains gravitational potential energy (P.E). Which factor is responsible for the gain in P.E of book?	Energy lost by the book as heat	Work done against gravity to raise the book	The increase in the speed of book	The increase in the weight of book
12.	Which one of the following is a renewable energy source?	Coal	Natural gas	Solar energy	Nuclear energy
13.	A group of students carries a liquid barometer while climbing a mountain. They observe that the mercury level decreases as they go higher. What is the reason for this decrease?	Lower air pressure	Stronger gravity	Lower temperature	Higher air pressure
14.	The center of gravity of a uniform rod lies at:	it's one end	its center	One-quarter from an end	outside the rod
15.	What is the purpose of using ball bearings in a machine?	they increase friction	they reduce friction	they increase mass	they reduce air resistance
16.	A file size is 2 gigabytes (GB). If expressed in megabytes (MB), what is the correct value?	2 MB	20 MB	200 MB	2000 MB
17.	Which factor determines validity of a theory?	Length of time	Experimental evidence	Popularity	Number of equations
18.	In a hydraulic press, the pressure applied on the small piston is:	decreased	transmitted equally	increased	vanished
19.	The energy stored in a compressed spring is:	Kinetic energy	Elastic potential energy	Chemical energy	Thermal energy
20.	The slope of a distance-time graph gives:	Acceleration	Force	Speed	Work
21.	A shopping cart is pushed with a force of 2 N for 5 s. What impulse is given to the cart?	2 Ns	5 Ns	10 Ns	20 Ns
22.	A factory machine has an efficiency of 30%. It means that:	30% of the input energy is lost as heat	30% of the input energy is converted into useful output	70% of the input energy is converted into useful output	40% of the input energy is converted into useful output
23.	When a pressure is applied on a surface, the force acts:	Parallel to the surface	Perpendicular to the surface	At 45^{o} angle to the surface	In the same direction as gravity
24.	When a bus starts suddenly, passengers fall backward due to:	Friction	Weight	Inertia	Gravitation
25.	An astronaut takes an object that weighs 200 N on Earth to an unknown planet, where it weighs 50N. If the mass of the object is	0.4N/kg	9.8 N/kg	2.5 N/kg	25 N/kg

	20kg, what is the gravitational field strength on that planet?				
26.	Like parallel forces act in:	opposite directions	same direction	at an angle of 90^o to each other	at an angle of 45^o to each other
27.	The state of matter found in stars is called:	Solid	Plasma	Gas	Liquid
28.	How much work is needed to lift a bag of groceries that weighs 150 N to a height of 4 m?	300 J	450 J	600 J	750 J
29.	Vector X points towards east and vector Y points towards north. In which direction does the resultant vector lie?	North -East	South-East	North	East
30.	The branch of physics which deals with study of light is:	Mechanics	Optics	Thermodynamics	Magnetism
31.	In which of the following situations are the distance traveled and the magnitude of the displacement equal?	A child moving on a swing	An object is moving along a circular path.	A car moving on a curved road	Linear motion in one direction.
32.	When an external magnetic field is removed, a paramagnetic material usually:	Remains permanently magnetized	Loses most of its induced magnetism	Becomes strongly magnetic	Repels magnetic fields strongly
33.	The distance–time graph for a cyclist moving along a straight road is shown. Which motion is displayed by the cyclist in portion A of the graph? 	At rest	Uniform speed	Non-uniform speed	Variable speed
34.	In scientific notation, 0.005 is written as:	5×10^{-3}	5×10^{3}	5×10^{-2}	5×10^{-4}
35.	A raindrop falling from a cloud reaches a constant speed before hitting the ground. At this stage, the raindrop has reached terminal velocity because:	Its acceleration becomes zero.	Its weight becomes zero.	Air resistance disappears	Gravity no longer acts on it.
36.	A spanner of length 30cm uses a force of 150N to open at tight nut. The torque is:	10 N m	25 N m	35 N m	45 N m

37.	What is a reasonable estimate for the mass of an apple?	2kg	200g	2mg	20kg
38.	A relationship between physical quantities remains unchanged under the same conditions after many experiments. Scientists accept it as a:	Theory	Assumption	Hypothesis	Law
39.	Which of the following is a physical property that can be used to measure temperature?	mass of a liquid	volume of a liquid	mass of a substance	weight of a substance
40.	A perpetual motion machine is impossible because of:	Friction	Conservation of energy	Gravity	Air resistance
	STIMULUS/SITUATION/SCENARIO BASED MCQs				
	Scenario for MCQs # 41 to 44	**Atif is playing with his remote-controlled car on a flat carpet. When he gently pushes the throttle forward, the car starts moving and gradually speeds up on straight line. Curious, he increases the force applied by the motor to observe how the motion changes.** 			
41.	What type of motion does the toy car exhibit?	constant velocity	constant acceleration	decreasing velocity	decreasing momentum
42.	How would the toy car's speed-time graph look like?	Straight line with negative slope	Straight line with positive slope	curved graph	Horizontal line
43.	The toy car has a mass of 0.5 kg. If it accelerates at 0.4 m/s^2, what is the magnitude of the force applied to it?	0.2 N	0.4 N	0.8 N	2 N
44.	He then places a small weight on the car, increasing its mass while applying the same force. What will happen to acceleration?	increases	decreases	remains same	becomes zero
	Scenario for MCQs # 45 to 48	**A worker in a scrapyard is operating a large crane fitted with an electromagnet. His job is to load and unload heavy iron scrap from trucks.**			

					
45.	What key idea should the worker keep in mind while operating the crane with an electromagnet?	Electro-magnet works without electricity	Magnet can be controlled (ON/OFF)	Electro-magnet only attracts plastic materials	Magnet becomes weaker as iron is attached to it
46.	Why does the crane attract only iron scraps and not plastic or wood?	Plastic and wood are lighter than iron	Plastic and wood are electrically charged	Iron is a magnetic material	Both plastic and wood block magnetic field
47.	What will happen to the crane's ability to lift and drop scrap if he replaces the electromagnet with a permanent bar magnet?	It will only attract iron pieces	It works as normal	It will attract only plastic materials	It will repel all types of materials
48.	Why is an electromagnet preferred over a permanent magnet in a scrapyard crane?	It is cheaper than a permanent magnet	It allows control over lifting and releasing scrap	It attracts all metals permanently	It does not use any electricity
Scenario for MCQs # 49 to 52		**A carpenter is working on a construction site. He places a 5 kg sandbag on one end (left side) of a 4 m long uniform wooden beam. The beam is supported at a pivot. He then sits on the opposite side (right side) to balance the beam so that it remains horizontal.** 			
49.	The situation described is an example of:	Circular motion	Principle of moments	Principle of inertia	Principle of pulley
50.	Which factor does not affect the moment of a force?	Shape of the object	Magnitude of force	Distance from pivot	Direction of force
51.	If the 5 kg sandbag is now placed 1.2 m on the left side of the pivot, how far must he sit on the right side to balance the beam [$g=10ms^{-2}$]?	0.8 m	1.2 m	2 m	0.2 m

52.	The carpenter shifts the pivot so it is now 1 m from the sandbag (left side). What is the moment arm of carpenter?	1 m	2m	3 m	4 m
	Scenario for MCQs #53 to 56	**A space research organization is launching a new satellite into space from earth.**			
53.	Which expression will be used to determine the orbital velocity of satellite around the earth?	$\frac{2\pi r}{t}$	$\frac{2\pi r}{T}$	$\frac{2\pi T}{R}$	$\frac{2\pi t}{r}$
54.	The period of satellite to orbit the earth is 96.5 minutes, at a height 6.97×10^6m from center of earth. What will be its speed in the orbit?	7.56 km/s	7.56 m/s	756 km/s	7.56 cm/s
55.	The satellite is launched through a rocket. The engine is started, hot gases are pushed downwards and the rocket lifts off the ground. **W**hich force is directly responsible for pushing the rocket upwards?	The friction between rocket and air.	The force of engine downwards.	The force exerted by the exhaust gases pushing against the ground.	The reaction force exerted by the exhaust gases on the rocket.
56.	Which of the following explains the working of a rocket in space?	Pascal's law	Buoyant force	Newton's third law of motion	Thermal expansion of gases
	Scenario for MCQs #57 to 60	**Amir is helping his father in the garden. After digging, they need to walk across a snowy lawn to reach the tool shed. Amir is wearing his sports shoes while his father is wearing flat snowshoes.**			
57.	Amir steps onto the snow and his feet immediately sink deep while his father walks easily on the surface. What is the physical reason behind this?	The snowshoes increase the weight on snow.	The snowshoes decrease the weight on snow	The snowshoes increase the area of contact, decreasing pressure	The snowshoes decrease the area of contact, decreasing pressure
58.	For a constant force, what is the relation between the pressure exerted and area of contact?	direct	exponential	proportional	inverse
59.	Amir's weight is 600 N, and area of contact of his sport shoes with snow is 0.02 m^2. What is the pressure exerted by Amir on the snow?	12 kPa	30 kPa	600 Pa	30 Pa
60.	Amir's father has the same weight (600 N) and his snowshoes contact area is 0.20 m^2. How many times smaller is the pressure, he exerts as compared to Amir?	20 times	2 times	5 times	10 times

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(50% MCQs & 50% Descriptive)

Time allowed: 1 hour 40 minutes **Total Marks: 30**

Note: Answer all parts from Section 'B' and all questions from Section 'C' on the **E-sheet**. Write your answers on the allotted/given spaces.

SECTION – B (6x3 = 18 Marks)

Note: Give brief answers of the following questions. All questions carry equal marks. (6x3 = 18)

Q#	Question	Marks		Question	Marks
1.	Differentiate between base quantities and derived quantities with one example of each.	03	**OR**	Differentiate between mass and weight (any three points).	03
2.	A car starts from rest and reaches a velocity of **20m/s** in **5 seconds.** Calculate its average velocity and total distance covered by it.	03	**OR**	Prove that pressure of a liquid of density ρ at a depth h is: **P = ρ g h**.	03
3.	A bullet is fired from a gun. It penetrates into sand and then stops. Where does its kinetic energy is used?	03	**OR**	Why spring constant of steel spring is greater than rubber spring of same number of turns and same cross-sectional area?	03
4.	Can a body have zero velocity but non-zero acceleration? Explain with a physical example.	1+2	**OR**	A solenoid is having **50 cm** length and **100** turns. Calculate the magnetic field strength of solenoid if **1.2 A** current pass through it?	03
5.	Explain motion of rocket using law of conservation of momentum.	03	**OR**	How can we increase sensitivity and range of liquid-in glass thermometer?	03
6.	State what will happen to the rotational motion of a disc rotating freely in space, with no external moment acting on it? Provide a reason for your answer.	1+2	**OR**	Two identical balls are rolling on a smooth floor. Ball A has twice the momentum of ball B. Both balls are stopped by applying the same force. Which ball will take more time to come to rest? Give mathematical explanation of your reason.	03

SECTION–C (Marks 2 x 6 = 12)

7.	Suggest any three ways to magnetize and demagnetize any material.	2+2 +2	**OR**	Describe three states of equilibrium. For each give one clear daily life example.	2+2+ 2
8.	Define acceleration. What does it tell us about the motion of an object? If the slope of a speed-time graph for a moving object is steeper, what can you explain about the motion of the object?	2+2 +2	**OR**	State two real life situations in which energy can be converted from one form to another. Describe the mechanism by which this conversion takes place in each system. Why sometimes energy is transferred to surroundings as heat?	2+2+ 2