

9th CLASS (SLOs) STUDENTS LEARNING OUTCOMES EXAMINATION.
FEDERAL BOARD SSC-I EXAMINATION.-2023

-PHYSICS

KNOWLEDGE BASE. 30%, UNDERSTANDING BASED. 50%, APPLICATION BASED. 20%

CHAPTER NO.1 **PHYSICAL QUANTITIES AND MEASUREMENT.**

KNOWLEDGE BASED QUESTIONS. 30%

1. Write down any three rules to determine the significant figures in any measurement?
2. Express the following quantities using prefixes. A. 5000 g b. 20000000 W c. 52×10^{-10} kg
3. What is least count of a screw gauge? Write the method to find the least count screw gauge
4. How measuring cylinder can be used to measure volume of an irregular object?
5. What is zero error? Differentiate between positive and negative zero error in case of Vernier caliper.
6. Enlist any three base and derived quantities with their respective units.
7. Calculate the number of seconds in 'one week' express the number in standard form.

UNDERSTANDING BASED QUESTIONS. 50%

1. Name the convenient unit you will use to measure?
2. Explain the statement "A micrometer screw gauge measure more accurately than vernier calliper?"
3. How can we find the volume of a small pebble by the help of measuring cylinder?
4. Give the points to advocate that physics is linked with biology, chemistry, geography and astronomy.
5. Digital stopwatch are most commonly used in physics measurement why?
6. What are the rules for rounding all of non-significant figures?

LONG QUESTIONS.

1. Write detailed note on significant figures.
2. What is the difference between base quantities and derived quantities? Give three examples in each case.

NUMERICLA PROBLEM: **1.3, 1.5(a), (c), (d), 1.10**

CHAPTER NO. 2 **KINEMATICS**

UNDERSTANDING BASED QUESTIONS. 50%

1. Can a body at rest be regarded in motion? Give example
2. Is the distance covered by a body may be greater than the magnitude of displacement?
3. Under what condition displacement is equal to distance?
4. Can the speed of a body be -ve?
5. Is the kinematic equation $S = v_i t + \frac{1}{2} a t^2$ if acceleration.
6. Is unit $\text{kmh}^{-1} \text{ s}^{-1}$ same as $\text{kms}^{-1} \text{ h}^{-1}$?
7. Can a body moving with certain velocity in the direction of east have acceleration in the direction west?

LONG QUESTIONS.

1. A car moves with uniform velocity of 20 ms^{-1} for 3 s. It comes to rest in next 5s with uniform deceleration. Find the total distance travelled by car?
2. A motor cyclist is moving on a road with an acceleration of 3 m/sec^2 , how much time will it require to change the velocity from 10 m/sec^2 to 20 m/sec ?
3. Initial velocity = $v_i = 0$, $a = 0.2 \text{ m/sec}$, time = $t = 2 \text{ min} = 2 \times 60 = 120 \text{ sec}$

NUMERICAL PROBLEMS: **2.3, 2.4, 2.7, 2.8, 2.9**

CHAPTER NO. 3 **DYNAMIC**

KNOWLEDGE BASED QUESTIONS. 30%

1. In term of Newton's 3rd law of motion discuss action and reaction forces in the following example .a) Book kept on table. b) Motion of rocket c) Pushing a shopping cart.
2. State and explain law of inertia?

3. Difference between mass and weight?
4. Write three advantages and disadvantages of friction.
5. State and explain Newton's 3rd law with the help of examples?
6. Discuss the motion of bodies connected to a string a) a two machine b) modified machine.
7. Define friction and give its types?
8. Discuss advantages and disadvantages of friction.
9. Define and explain centripetal force?
10. Suggest any three methods to reduce friction.
11. How much centripetal force is needed to make a body of mass 0.5 kg to moving a circle of radius 50 cm with a speed of 5 ms⁻¹?

UNDERSTANDING BASED QUESTIONS 50%

1. Why does one get hurt seriously while jumping on a hard floor?
2. Why is the surface of conveyor belt made rough?
3. Why do cons. Move faster on carom board when dusted with talcum powder?
4. Why are the long jump athletes are made to jump in sand pits?
5. Why does a passenger move outward when a bus takes turn?
6. Why is it dangerous to travel on the roof of a bus?
7. Why the spinner of a washing machine is made to spin at a very high speed?

LONG QUESTIONS.

1. Define friction. How friction opposes motion. Enlist two disadvantages of it?

NUMERICAL PROBLEMS: 3.6, 3.7, 3.8, 3.9, 3.10

CHAPTER NO. 4

TURNING EFFECT OF FORCES.

KNOWLEDGE BASED QUESTIONS. 30%

1. Demonstrate the role of couple in steering wheels and pedals.
2. Explain addition of forces in detail.
3. What is torque? On what factors does it depend?
4. Explain principle of moment in detail?
5. Define and explain center of gravity and center of mass?
6. Where the C.G of regular and irregular bodies is located?
7. What is equilibrium? Also give its conditions?
8. Explain state of equilibrium in detail?
9. What is dynamic translational equilibrium? Give an example.
10. Define equilibrium and classify its type by quoting example from everyday life.

UNDERSTANDING BASED QUESTIONS. 50%

1. Why is it more difficult to lean back word?
2. Why does helicopter has a second rotor on its tail?
3. Why is it better to use a long spanner rather than a short one to tighten a nut on a bolt?
4. A girl is seated safely and steady canoe but when she tries to stand up the canoe capsizes explain this is term of c.m and stable?
5. The gravitational force acting on a satellite is always direction toward center of earth, does this force exert torque on satellite?

APPLICATION BASED QUESTIONS. 20%

1. Name some more objects that work by the turning effects of forces.
2. What should be the length of the spanner to loosen the same nut with a 60 N force?
3. How much force would be sufficient to loosen it with a 6 cm long spanner?
4. Can a small child play with a fat child on the seesaw? Explain how?
5. Briefly describe working principle of see-saw.
6. Does the speed of a ceiling fan go on increasing all the time?

LONG QUESTION.

1. WHAT IS TORQUE? On what factors does it depend?
2. Explain principle of moment in detail?
3. Where the C.G. of regular and irregular bodies is located?

NUMERICAL PROBLEM: 4.1, 4.3, 4.4

CHAPTER NO. 5

GRAVITATION.

KNOWLEDGE BASED QUESTIONS 30%

1. What will be acceleration due to gravity on the surface of planet whose mass and radius are twice that of corresponding earth's values?
2. Describe how artificial satellite keep on moving around the earth due to gravitational force.
3. Explain gravitational field as an example of field of force.
4. State and explain Newton's law of gravitation?
5. What is satellite
6. What is a field force?
7. What is meant by the force of gravitation?

UNDERSTANDING BASED QUESTIONS. 50 %

1. What will be the weight of a body if it raised above the earth equal to its radius?
2. Moon is attracted by earth why it does not fall on ground?
3. What is the value of "G" on moving?
4. If mass of earth is taken as doubled but remain in same size, what will happen to the value of "g" and "G".
5. If mass in earth field is doubled what will happen to the force exerted?
6. What provide the force that produces centripetal acceleration in an orbit?
7. A satellite is moving around the earth on which of the following does it depend a. Mass of satellite
b. Distance of satellite. c.. Mass of earth?
8. Describe how artificial satellite keep on moving around the earth due to gravitational force.

LONG QUESTIONS.

1. What is artificial satellite? Derive formula for orbital speed of an artificial satellite.
2. A satellite is revolving around the earth at an attitude 35000 km. Calculate its orbital speed.
3. Explain the value of 'g' decreases with altitude from the surface of earth.
4. Solve problems using Newton's law of gravitation.
5. Calculate mass of earth by using law of gravitation.

NUMERICAL PROBLEMS: 5.2, 5.4, 5.6

CHAPTER NO. 6.

WORK POWER AND ENERGY.

KNOWLEDGE BASED QUESTIONS. 30%

1. What kind of energy transformation takes place when a body is dropped from a certain height?
2. Define unit of power in SI unit and conversion in hp.
3. Calculate work done using equation Work = force x distance moved in the direction of force.
4. Define energy? Also give its different types?
5. Define and explain kinetic energy? Also derive $K.E. = \frac{1}{2}mv^2$
6. Define and explain potential energy? And prove $P/E = mgh$.
7. Discuss the relation b/w mass and energy.
8. Describe the processes by which energy is converted from one form to another with reference to. Fossil fuel energy, hydroelectric generation, solar energy, Nuclear energy, geothermal energy, wind energy, biomass energy
9. Define efficiency of a working system and calculate the efficiency of an energy conversion using the formula $\text{efficiency} = \frac{\text{energy converted into the required form}}{\text{total energy input}}$.
10. What is biomass? How it can be used as a energy source? What is its harmful effect?
11. Differentiate energy sources as non-renewable and renewable energy sources with examples of each.

UNDERSTANDING BASED QUESTIONS. 50 %

1. What type of energy conservation can be observed in water dams?
2. What happens to K.E. of a bullet when it penetrates into a sand bag?
3. What do you understand by term energy transformation support your answer by two examples.
4. Why do we need energy?
5. Why fossil fuels are called non-renewable form energy.
6. Which form of energy is most preferred and why?
7. What is meant by efficiency of a system?

8. How can you find the efficiency of a system?
9. How is energy converted from one form to another? Explain.

LONG QUESTIONS.

1. Explain Mass-Energy Equation.
2. How is energy converted from one form to another? Give two examples to support your answer.
3. Define energy, kinetic energy and potential energy. State unit of energy, prove that Kinetic Energy = $\frac{1}{2}mv^2$.

NUMERICAL PROBLEM: 6.1, 6.2, 6.5, 6.6, 6.8, 6.9

CHAPTER NO. 7

PROPERTIES OF MATTER.

KNOWLEDGE BASED QUESTIONS. 30%

1. Describe how the height of a liquid column may be used to measure the atmospheric pressure.
2. What do you know about density?
3. Define Pressure and write down its unit.
4. State Pascal's law.
5. State Archimedes Principle.
6. Difference between Stress and Strain.
7. Explain Hook's law.
8. Define Young's Modulus.
9. Prove that the SI unit of Young's modulus is Pascal or Nm^{-2}
10. State that Hydraulic Press, Hydraulic car lift and hydraulic brakes operates on the principle that the fluid pressure is transmitted equally in all direction.

UNDERSTANDING BASED QUESTIONS. 50%

1. Explain the braking system of the vehicles.
2. What is principle of floatation?
3. What is barometer?
4. Why weather changes can be expected due to decrease of atmospheric pressure?
5. How property of elasticity is used in our body?
6. Under what condition the object floats in water?
7. When an inflated balloon is heated it bursts. Why?
8. Under what condition the object sinks in water?

APPLICATION BASED QUESTIONS. 20%

1. How effectiveness of a small force is increased when area of force is reduced?
2. What is up thrust? Explain the principle of floatation.
3. Explain how a submarine move up the water surface does and down in to water?

LONG QUESTIONS.

1. State "Pascal's Law" Explain working of hydraulic press and braking system in vehicle as an application of Pascal's Law.
2. State Archimedes principle. Determine the density of an object using Archimedes principle.
3. Define the term stress, Strain and Young's Modulus. b. State Hooke's law and explain elastic limit.

NUMERICAL PROBLEMS: 7.1, 7.3, 7.4, 7.7, 7.8, 7.10, 7.11, 7.12

CHAPTER NO. 8

THERMAL PROPERTIES OF MATTER.

KNOWLEDGE BASED QUESTIONS. 30%

1. At what temperature the reading on Fahrenheit and Celsius scales are equal?
2. Write down the conversions of thermometer scales.
3. Describe heat of fusion and heat of vaporization. (as energy transfer without a change of temperature for change of state).
4. What is latent heat of fusion? Write its expression.
5. Explain the thermal expansion of liquids (real and apparent expansion).
6. Describe the use of cooling caused by evaporation in refrigeration process without using harmful CFCs.

UNDERSTANDING BASED QUESTIONS. 50%

1. What do you know about bimetallic strip?
2. Why are gaps left in railway tracks?
3. Why is water used in cooling system of automobiles?
4. The temperature of soil increases more than the same mass of water. Why?
5. Why the climates of the coastal areas remain moderate throughout the year?
6. Why the overhead transmission lines are given a certain amount of sag?
7. In bridges the steel girders rest on rollers at one end, explain why?

APPLICATION BASED QUESTIONS. 20%

1. Why clinical thermometer is used.
2. How specific heat differs from heat capacity?
3. Give two uses of cooling effect by evaporation.
4. How evaporation differs from vaporization.

LONG QUESTIONS.

1. What is meant evaporation? On what factors the evaporation of a liquid depends? Discuss at least five factors briefly.
2. Describe qualitatively the thermal expansion of solids (Linear and volumetric expansion).

NUMERICAL PROBLEMS: 8.1, 8.2, 8.7, 8.8, 8.9, 8.10

CHAPTER NO. 9

TRANSFER OF HEAT.

UNDERSTANDING BASED QUESTIONS. 30%

1. Pieces of Iron and glass are heated to the same temperature, why does Iron feel hotter on touching?
2. Convection is difficult in solids. Why?
3. In desert regions that are hot in day time and cold at night time the walls of houses are often made of mud. Why is it important that mud walls be thick?
4. Cooking pans made of steel are provided with extra copper base. Why?
5. Why white clothes are preferred wearing in summer? Explain briefly.
6. Why is the freezer compartment kept at the top of refrigerator? Explain briefly.
7. In certain places, birds can fly for hours without flapping their wings, Explain.
8. Double walled glass vessel is used in thermos flask? Why?
9. What measures do you suggest to conserve energy in houses?

APPLICATION BASED QUESTIONS. 20%

1. In solids, atoms and molecules are packed close together. They continue to vibrate about their mean position. What happens when one of its ends is heated?
2. Why Styrofoam boxes are used.
3. What causes a glider to remain in air?
4. How do thermals help birds to fly for hours without flapping their wings?
5. Why does a cup of hot tea become cold after sometime?
6. Why does a glass of chilled water become hot after sometime?

LONG QUESTIONS.

1. Investigate the absorption of radiation by a black surface and silvery surfaces using Leslie cube.
2. On what factors conduction of heat depend? And define thermal conductivity.
3. Write down the uses of conductors and non-conductors.
4. What do you know about convection currents in Air? How land and sea breeze blow?

NUMERICAL PROBLEMS: 9.1, 9.2