



PORTFOLIO OF EVIDENCES

EXTRAORDINARY 2° OPPORTUNITY

SELECTED TOPICS OF PHYSICS

Student name: _____

Group: _____

Student ID: _____ Date: _____

Teacher: _____

The present portfolio is part of 50% of your grade. This value will be obtained as long as it meets the following requirements:

1. Write your complete identification data.
2. The portfolio must be delivered person as a requirement the day of the exam.

FOLLOW THE INSTRUCTIONS PROVIDED BY YOUR TEACHER FOR THE COMPLETION OF THIS PORTFOLIO

!!!WARNING!!!

Plagiarisms and trade of academic material contained in this portfolio will be punished under the terms of the University Legislation.



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UNIVERSIDAD AUTÓNOMA DE NUEVO LEÓN



SELECTED TOPICS OF PHYSICS

EXTRAORDINARY OPPORTUNITY PORTFOLIO



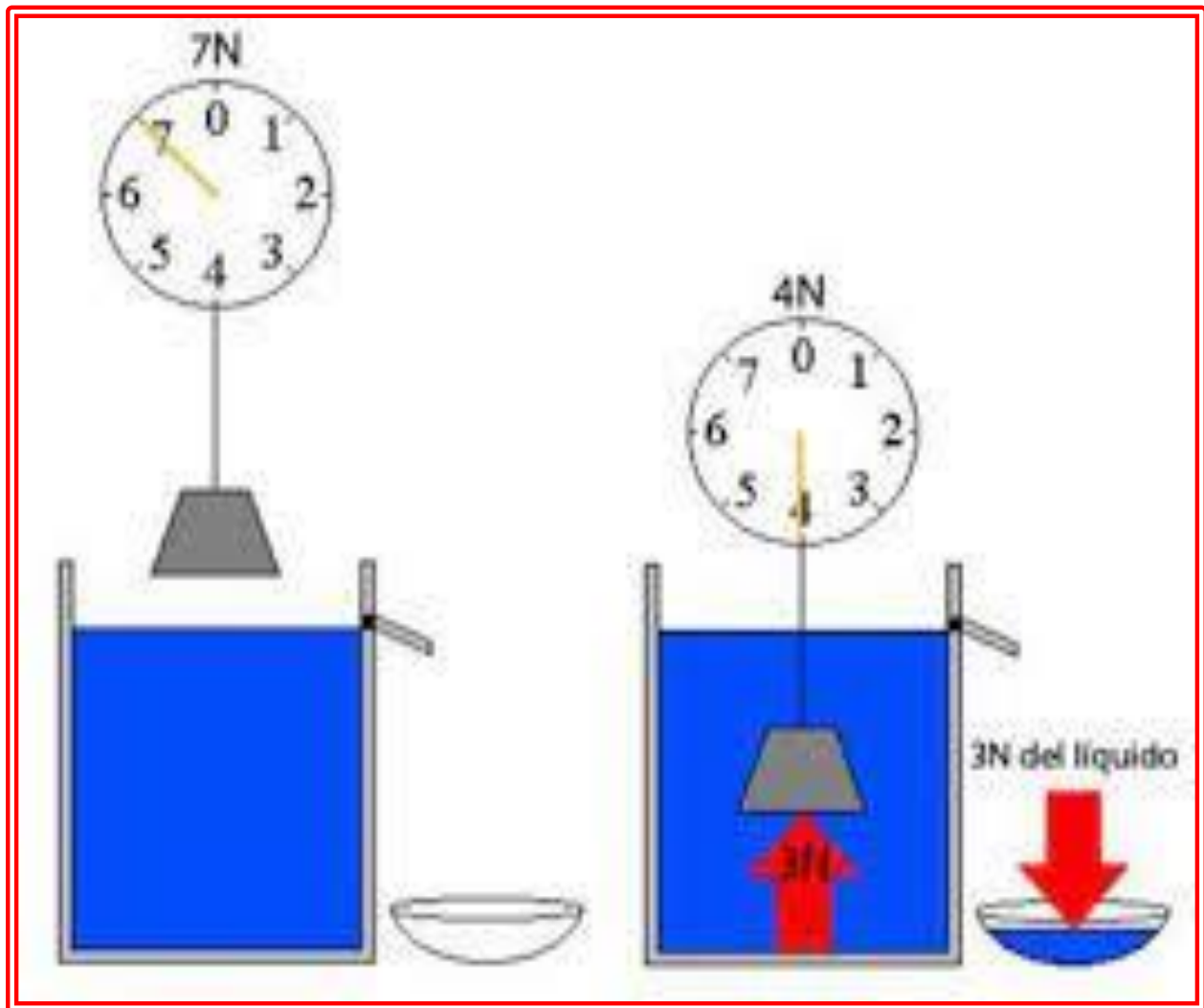
This portfolio is part of 50% of your rating. This value will be obtained as long as the following requirements are met:

1. Full identification details.
2. The portfolio solution will be in blue ink and by hand, remember that the complete procedures are requested.
3. The portfolio is complete and correct.
4. Take photo of each sheet, to make a WORD document, to convert it later to PDF.
5. This portfolio must be uploaded to TEAMS in PDF format, on the day and time indicated by the teacher in the TASKS section of the equipment corresponding to the subject.
6. PLEASE VERIFY CORRECT PORTFOLIO SUBMISSION AND ADD YOUR NAME ON EACH SHEET.

Student Name:	
Group:	
Teacher name:	

STAGE 1

FLUIDS



STAGE 1: FLUIDS

Dimensions: Recovery, Understanding, Analysis and Application

INSTRUCTIONS: Briefly answer each of the following reagents.

1. What are the aggregation states of matter?	
2. They have a defined shape and volume, they are able to withstand and transmit stresses (tension, compression, shear, etc.	
3. They are able to flow (because they vary their shape easily), are relatively incompressible, have a defined volume and adopt the shape of the container that contains them	
4. It is the ratio of mass to volume, has no directional properties and is therefore a scalar quantity	
5. They are the units in which density is measured, write the ones from SI	
6. These are the units in which density is measured, in the cgs system	
7. It is the force divided by unit area	
8. Is the algebraic representation of pressure	
9. Writes units to measure pressure on SI	
10. Write the units to which a Pascal (Pa) is equivalent	
11. Pressure due to fluid weight above a given depth level.	
12. It is the algebraic representation of hydrostatic pressure	
13. It is the principle that a liquid enclosed in several containers connected at the bottom and open to the atmosphere will always have the same height regardless of the shape of the containers.	
14. It is the pressure due to the weight of the air layer that "weighs" on us	
15. Is the value of atmospheric pressure measured at sea level (Pa)	
16. It is the value of the atmospheric pressure measured at sea level (mm Hg)	
17. It is the sum of atmospheric pressure and hydrostatic pressure within a fluid.	
18. It is the algebraic representation of absolute pressure	
19. Instrument invented by Evangelista Torricelli to measure atmospheric pressure	
20. Statement that says: "The change in pressure, at any point of an enclosed fluid and at rest, is transmitted integrally to all points of the fluid and acts in all directions."	
21. It is an algebraic representation of Pascal's Principle	
22. Statement that says: "A body immersed in a liquid receives a thrust force equal to the weight of the fluid it displaces"	
23. It is an algebraic representation of the Archimedes Principle	

STAGE 1: FLUIDS (PROBLEMS)

**INSTRUCTIONS: Solve the following problems:
(REMEMBER TO INCLUDE THE STEPS: DATA, FORMULA, SUBSTITUTION AND RESULT WITH
UNITS)**

1. Calculate the density of a substance whose mass is 400kg and occupies a volume of 0.25m^3 .
2. What volume does a 450g mass occupy if its density is 6500kg/m^3 ?
3. Calculate the pressure that a tile of 825 cm^2 supports if there is a load of a mass body of 90Kg on it.
4. A force of 1400N is applied over a pressure bearing area of 18000 Pa. Find the area being talked about.
5. Determine the hydrostatic pressure at the bottom of a pool 2 m deep ($\rho=1000\text{kg/m}^3$)
6. Determine hydrostatic pressure on the bottom of a tank containing oil if column height of the liquid is 6 meters and its density is 800 kg/m^3 .
7. Find the depth in container with mercury, if the absolute pressure is 135500 Pa ($\rho_{\text{Hg}} =13600\text{kg/m}^3$)

8. A hydraulic machine is used to lift crane arms and the piston that does so has a diameter of 20 cm. The force that will be applied on the small piston that is a pneumatic hose, is 15N, if it has a diameter of 2 cm. What force is applied to the arms?

9. A hydraulic press is used to lift iron and aluminum with a force of up to 16000N and the piston that does it has a diameter of 50cm. What diameter will there be in the small piston that is a pneumatic pipe if 40N is applied to it?

10. Calculates the thrust acting on a .0054 m pure gold ingot³ that is submerged in water.

CHECKLIST FOR STAGE 1		
ENDPOINT	YES	NO
1. Stage exercises are complete		
2. Theory responses are clear and leave no doubt (good letter)		
3. Problems present data with units in SI		
4. The formula (mathematical model) to be used is correct		
5. In problems, procedures are clear		
6. Problem results have requested units		

STAGE 2

HEAT



STAGE 2: HEAT

Dimensions: Recovery, Understanding, Analysis and Application

INSTRUCTIONS: Briefly answer each of the following reagents.

1. It is the variable that determines the thermal equilibrium between the systems.	
2. Instrument designed to measure temperature	
3. Phenomenon on which mercury thermometers are based	
4. It is the freezing point of water on the Celsius scale	
5. It is the boiling point of the water on the Fahrenheit scale	
6. What are the most commonly used or most common temperature scales?	
7. Name is known to thermal expansion of a long, thin metal solid as a wire	
8. Name known to thermal expansion of a liquid	
9. It is the transfer of energy between a system and its environment, by virtue of a temperature difference between them (Q)	
10. Defined as the amount of heat needed to raise the temperature from 1 gram of water to 1 atmosphere of pressure in 1 C.	
11. The amount of heat required to change by one degree Celsius the temperature of one kg of a substance is known as:	
12. It is the temperature at which a substance transforms from the liquid phase to the gaseous phase or vice versa.	
13. It is the amount of heat necessary for 1 kg of substance that is at its melting point to pass from the solid phase to the liquid phase or vice versa. During phase change the temperature remains constant.	
14. Heat transfer by molecular contact that occurs mainly in solids.	
15. Heat transfer due to the displacement of the material by virtue of a difference in densities within it.	
16. They are the currents that form inside a fluid when the fluid rises that "raises" its temperature and lowers the coldest fluid to occupy that place.	
17. It is the mechanism of heat transmission by means of free electromagnetic waves that are emitted continuously by a body by virtue of its temperature.	

STAGE 2: HEAT (PROBLEMS)

INSTRUCTIONS: Solve the following problems:

(REMEMBER TO INCLUDE THE STEPS: DATA, FORMULA, SUBSTITUTION AND RESULT WITH UNITS)

1. Converts 10°C to kelvin.

2. Converts 30°C to degrees Fahrenheit

3. An aluminum wire 60 meters long increases its temperature from 30°C to 58°C. Calculates its final length and change in longitude ($\alpha=25 \times 10^{-6} \text{ 1/}^\circ\text{C}$)

4. Calculates the amount of heat that must be applied to a 4kg solid aluminum cylinder to increase its temperature from 10°C to 120°C. (900J/Kg.°C)

5. How much heat should be added to 2 kg of ice, to melt it completely and raise its temperature to 30 °C if said ice is at its melting temperature? Uses the specific, latent heats of the textbook.

CHECKLIST FOR STAGE 2		
ENDPOINT	YES	NO
1. Stage exercises are complete		
2. Theory responses are clear and leave no doubt (good letter)		
3. Problems present data with units in SI		
4. The formula (mathematical model) to be used is correct		
5. In problems, procedures are clear		
6. Problem results have requested units		

STAGE 3: ELECTRICITY AND MAGNETISM

About...

$$V = IR$$

5 V 450 Ω

voltage resistance

1.5V 1.5V 1.5V 0.9V

current = 11.1 mA

sound
PhET

The diagram illustrates a series circuit. At the top, three 1.5V batteries are connected in series. A voltmeter with a 0.9V scale is connected in parallel across the batteries. A resistor is connected in series with the batteries. The current flowing through the circuit is 11.1 mA. The circuit is powered by a 5V source and has a total resistance of 450 Ω . The circuit is controlled by a 'sound' checkbox and is part of the PhET simulation.

STAGE 3: ELECTRICITY AND MAGNETISM

Dimensions: Recovery, Understanding, Analysis and Application

INSTRUCTIONS: Briefly answer each of the following reagents.

1. Electric charge assigned to an electron	
2. An atom can gain electrons and be charged...	
3. Electrical charges of the same sign are repelled; and electrical charges of opposite signs are attracted.	
4. In an isolated system the amount of electrical energy is conserved, that is, if one body loses electrons, the other gains them.	
5. So we call the material that when an electric charge is placed on it, it is distributed on the surface of the material	
6. Is a material that can act as a conductor or insulator under certain conditions	
7. Method that, when rubbing two bodies, one with the other, both are electrified one positively and the other negatively.	
8. SI unit for measuring the electrical load of a body	
9. Principle that establishes: "The magnitude of the electric force between two point charges is directly proportional to the product of the charges and inversely proportional to the square of the distance that separates them."	
10. Mathematical expression of Coulomb's Law	
11. Units in which the force between two point loads is measured in the SI	
12. It is the space that surrounds an electrical charge and interacts with any other charge that is present	
13. It is the work done to carry a test load from one point A of an electric field to another point B	
14. It is the work per unit of electric load when a load moves from one point A of an electric field to another point B of the same	
15. It is synonymous with electric potential difference	
16. SI unit used to measure electrical potential difference	
17. Is the flow of electrons through a conductor	
18. Mathematical expression for calculating the electrical current through a conductor	
19. SI unit for measuring the electrical load of a body	
20. It is the current that always flows in only one direction	
21. It is the current that periodically reverses the direction in which it flows	
22. It is the opposition presented by conductors to the passage of electrical current	
23. SI unit for measuring electrical resistance (include its symbol)	

24. It is a circuit consisting of a PEF, a resistive element and connection wire	
25. It is a circuit that has a PEF, two or more resistive elements connected one followed by the other	
26. It is a circuit that has two or more resistive elements connected directly to the PEF	
27. It is the resistance we use to reduce any circuit to a single circuit	
28. Mathematical expression that allows us to calculate the equivalent resistance of a series circuit	
29. Mathematical expression that allows us to calculate the equivalent resistance of a parallel circuit	
30. Law that establishes that: "in metallic conductors, the current (I) circulating in a circuit is directly proportional to the potential or voltage difference (V) and inversely proportional to the electrical resistance (R)".	
31. Properties exhibited by certain substances to attract other substances such as pieces of iron	
32. These properties are intensified at the ends of the magnet called...	
33. A device that is a needle-shaped magnet that swings on a pivot and faces toward the earth poles	

STAGE 3: ELECTRICITY AND MAGNETISM (PROBLEMS)

**INSTRUCTIONS: Solve the following problems:
(REMEMBER TO INCLUDE THE STEPS: DATA, FORMULA, SUBSTITUTION AND RESULT WITH UNITS)**

1. Calculate the force that exists between two charges of -6mC and the other of -8nC , if they are separated by a distance of $.5\text{ m}$.

2. An electric field at a distance of 20cm from a point charge is 5000N/C . Find the magnitude that this charge must have to produce that electric field.

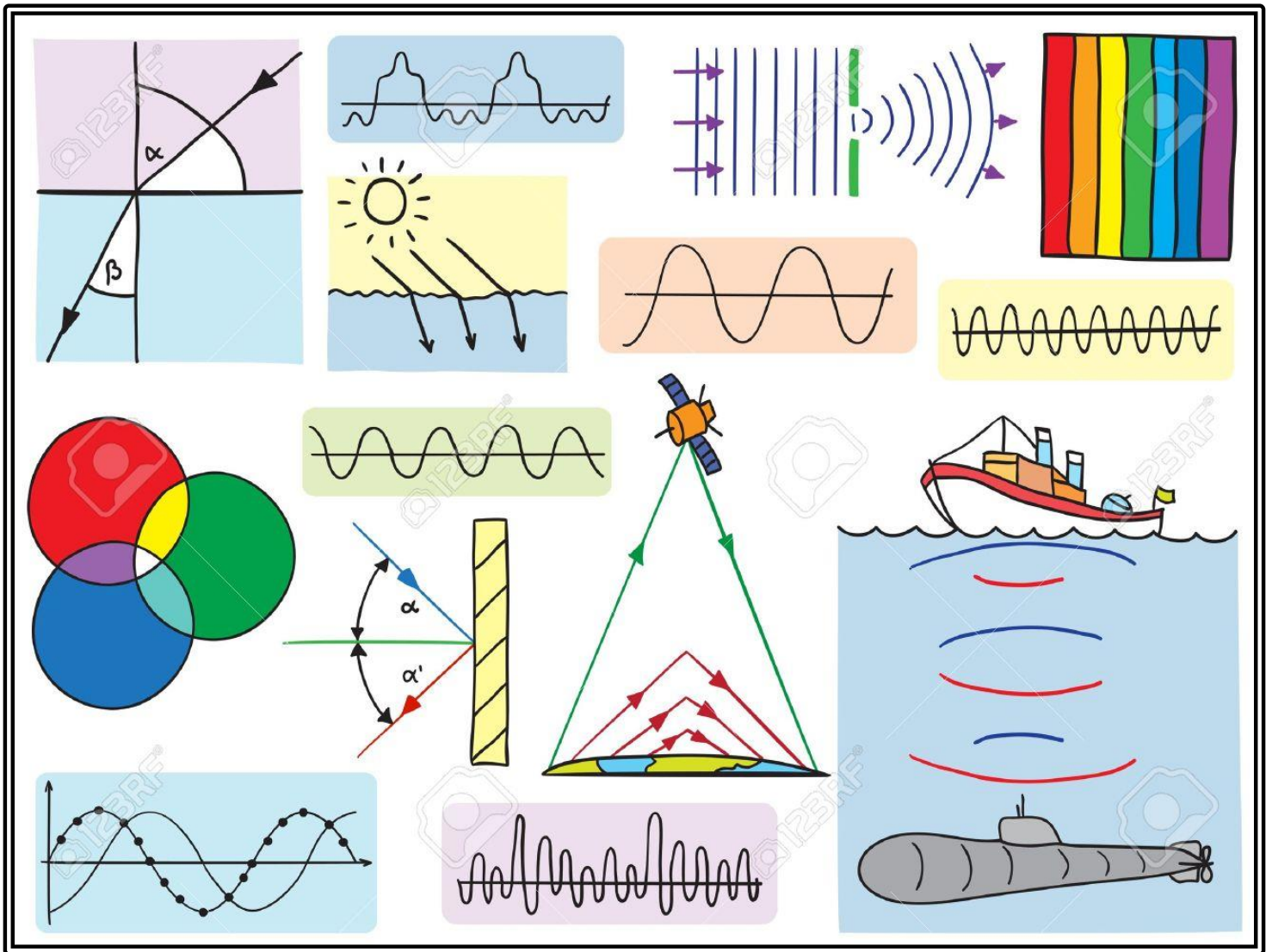
3. Calculate the electrical resistance of a copper wire of 10000cm in length, if its thickness is 1.2cm (ρ copper = $1.72 \times 10^{-8}\ \Omega\text{-m}$)

4. Find the equivalent resistance of the internal resistances of control cells with 1 mΩ, 3 mΩ, 6 mΩ and 5 mΩ; if these are connected in series.

5. Find the equivalent resistance of the resistances of a pyrometer with 2 Ω, 4 Ω and 6 Ω; if these are connected in parallel.

CHECKLIST FOR STAGE 3		
ENDPOINT	YES	NO
1. Stage exercises are complete		
2. Theory responses are clear and leave no doubt (good letter)		
3. Problems present data with units in SI		
4. The formula (mathematical model) to be used is correct		
5. In problems, procedures are clear		
6. Problem results have requested units		

STAGE 4: OSCILLATIONS AND WAVES, SOUND AND OPTICS.



STAGE 4: WAVE MOVEMENT, SOUND AND OPTICS.

Dimensions: Recovery, Understanding, Analysis and Application

INSTRUCTIONS: Briefly answer each of the following reagents.

1. It is a movement where after a fixed time the conditions of position, speed, energy, etc. are repeated	
2. Minimum time after which the conditions of the movement are repeated	
3. It is the number of times the process repeats its conditions for each unit of time (second)	
4. Units for frequency	
5. It is a periodic movement but the mobile repeats its trajectory	
6. It is the distance between the equilibrium position and the extreme position occupied by the moving body.	
7. Is the name of the force that tends to return the body to its equilibrium position	
8. In an oscillatory movement where the restoring force tends to direct the oscillating body to its equilibrium position and is also not considered friction, that movement takes the name of...	
9. Law that establishes that the force exerted on an object is directly proportional to its deformation	
10. Equation describing Hooke's Law:	
11. Mathematical expression that allows us to calculate the period for a body-spring system	
12. Consists of a mass weight m those suspended by a light rope of length L , the restorative force is the component of the weight tangent to the trajectory	
13. Mathematical expression that allows us to calculate the period for a single pendulum	
14. It is the classification of the waves according to the medium where they propagate	
15. It is the classification of waves according to the type of movement when propagated	
16. This is the name given to the top of a wave	
17. This is the name given to the bottom of a wave	
18. Branch of Physics studying sound	
19. It is a mechanical wave that propagates through an elastic medium	
20. It is the audible interval for a human being	
21. Airborne sound speed considered	
22. It is the characteristic of the sound that is related to the frequency of the wave	
23. It is the characteristic of sound that is related to amplitude	
24. Is the ratio of the power of one sound per unit area	
25. They are the two ends of the audible intensity range	
26. It is the mathematical expression that allows us to calculate the Intensity level of a sound in decibels	
27. It is a phenomenon that occurs when the receiver or "observer" perceives a frequency different from that emitted by a sound source, due to the movement of either of the two.	
28. Branch of physics that studies light and its wave phenomena:	

29. Branch of optics that studies light as a wave or as a ray	
30. Light with a nature is currently considered...	
31. It consists of the different classes of electromagnetic radiation	
32. It is the region of the Electromagnetic Spectrum that we can perceive with our eyes	
33. This law says that the angle of incidence is equal to the angle of reflection.	
34. Mirror for which the distance to the object is the same as the distance to the image	
35. Spherical mirrors can be...	
36. For each pair of transparent media, the ratio between the sine of the angle of incidence and the sine of the angle of refraction has a constant value...	
37. Name given to the angle of incidence when the angle of refraction is equal to 90°.	
38. When the incidence angle is greater than the critical angle, the wave phenomenon is called:	
39. These are the two types of lenses	

STAGE 4: WAVE MOVEMENT, SOUND AND OPTICS (PROBLEMS)

INSTRUCTIONS: Solve the following problems:
(REMEMBER TO INCLUDE THE STEPS: DATA, FORMULA, SUBSTITUTION AND RESULT WITH UNITS)

1. What is the period of an ancient phonograph playing acetate records and performing 45 revolutions per minute?

2. Calculate the frequency of an AM radio wave, 150m long, assuming the velocity is 3×10^8 m/s.

3. Determines the oscillation period and frequency of a single pendulum 80 cm long.

4. A metal ball attaches to one end of a cable, if the other end hangs to the roof. How often will the sphere move, if it oscillates 50 times in 1 min and what is its oscillation period?

5. The whistle of a train emits a 400 Hz frequency sound. What is the pitch of the sound heard when the train moves towards a stationary observer with a speed of 20 m/s

CHECKLIST FOR STAGE 4		
ENDPOINT	YES	NO
1. Stage exercises are complete		
2. Theory responses are clear and leave no doubt (good letter)		
3. Problems present data with units in SI		
4. The formula (mathematical model) to be used is correct		
5. In problems, procedures are clear		
6. Problem results have requested units		

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