UANL
UNIVERSIDAD AUTÓNOMA DE NUEVO LEÓN

2nd Opportunity

Physics 2

Student name:	
ID:	**Group:**
Teacher:	

This paper is part of the 50% of your score. The score will be obtained in relation with the following statements:

1. It must be handwritten (writing clarity and spelling).
2. It must be completely and correctly answered.
3. Identification data.
4. It must be turned at the beginning of the exam to the established teacher .
5. THE TASKS MUST BE COMPLETED WITH BLUE PEN.

NOTE:
Plagiarism and Trade related to the academic contents of this portfolio will be sanctioned in accordance to the Academic Legislature.

P H Y S I C S 2

CHAPTER 1

Vectors

a) Introduction

b) Vector Quantities

c) Analytical Methods

CHAPTER 2

Dynamic

a) Force

b) Newton's Laws of Movement

c) Applications of Newton's Second Law

d) Friction Force

e) Static

CHAPTER 3

Gravitation

a) Kepler's Laws

b) Law of Universal Gravitation

c) The Gravitational Constant

d) The Force of Gravitational Attraction of Bodies Near the Surface of Earth.

e) The Effect of the Gravitational Attraction Force to Maintain an Artificial Satellite in Orbit

CHAPTER 4

Work, Power and Energy

a) Work

b) Power

c) Energy

d) Mechanical Energy

e) Conservation of Mechanical Energy

CHAPTER 5

Impulse and Momentum

a) Impulse

b) Momentum

c) Relationship Between Impulse and Momentum

d) Conservation of Linear Momentum

e) Elastic and Inelastic Collisions

I.- ANSWER THE FOLLOWING QUESTIONS.

1. Name the physical quantity has only magnitude and is represented in particular by a number and a unit:

_____

2. Mention the physical quantity has magnitude and direction:

_____

3. Name of the result obtained from the addition or subtraction of vectors:

_____

4. Methods are used in the addition or subtraction of vectors:

_____

5. Graphical method to add two or more vectors:

_____

6. Characteristic of the polygon method for adding vectors:

_____

7. It is defined as any agent capable of producing changes or distortions in the movement of a body.

_____

8. It studies not only the movement of bodies but also the causes that produce or modify it:

_____

9. Type of forces are caused by the attraction that exists between two bodies due to their masses and the distance that separates them:

_____

10. Type of forces are exerted between electric charge particles.

_____

11. Type of forces are produced within the nucleus of the atom between the particles that form and hold it together.

_____

12. Type of forces that occur when a body is in contact with another on which a force is exerted.

_____

13. A body will remain resting or in uniform line movement unless a force acts on it.

_____

14. Property that bodies show opposing the change in movement, is known as:

_____

15. It is a quantitative measure of inertia. This property is a characteristic of all matter.

_____

16. Any resulting force applied to a body causes an acceleration in the same direction it acts. The magnitude of such acceleration is directly proportional to the magnitude of the applied force and inversely proportional to a body mass.

_____

17. Every action force has a reaction force, equal in magnitude and in the same direction, but in the opposite direction.

_____

18. It is defined as the force of gravitational attraction exerted on it by a massive body like Earth or Moon.

_____

19. Force exerted on a surface object.

_____

20. Define the Free-body Diagram.

_____

21. Force unit that applied to a mass of 1 kg can produce an acceleration of 1 m / s^2.

_____

22. Opposing force to the sliding movement between the **contacting surfaces** and follows a parallel direction to **them**.

_____

23. Explain how friction is in relation to the direction of momentum.

_____

24. It is comprised within the dynamic and is in charge of analyzing the balance of bodies.

_____

25. Statement that proposes: *A translational body is in equilibrium if the resultant of all forces acting on it is equal to 0*.

_____

26. In a ΣFx = 0 and ΣFY = 0 plane, the FR is equal to:

_____

27. It is the force which is equal in magnitude and direction, but opposite direction to the resultant force.

_____

28. When two or more forces act at the same point are called:

_____

29. It is a system of forces that are in the same plane.

_____

30. Theory which assumes that Earth is the center of the Universe, it remains static and, stars are on a crystal sphere and rotating around Earth.

_____

31. Theory that proposes the Sun is the center of the Universe and the Planets rotate around it in circular orbits.

_____

32. Developer of the Universal Gravitation Law.

_____

33. Law that states the following: *The orbit of a planet is an ellipse with the Sun at one of the two foci.*

_____

34. Law that states the following: *A line segment joining a planet and the Sun sweeps out equal areas during equal intervals of time.*

_____

35. Law states the following: *The square of the orbital period of a planet is proportional to the cube of the semi-major axis of its orbit.*

_____

36. The gravitational force exerted by Earth on all bodies is called:

_____

37. Statement that establishes: *A particle attracts every other power particle in the Universe using a force that is directly proportional to the product of their masses and inversely proportional to the square of the distance between their centers.*

_____

38. Value of the gravitational constant in the International System of Measures.

_____

39. Product of force by the displacement, in force is applied.

_____

40. Is the work unit in the International System of Units.

_____

41. It is defined as the amount of work done in unit time or as fast a work is done.

_____

42. It is the power unit in the International System.

_____

43. It is the ability of a body or system to perform work.

_____

44. Unit for measuring power in the International System.

_____

45. Energy that a body has due to its position relative to other objects is called:

_____

46. It is defined as the product of mass and velocity of the object.

_____

47. What are the units of momentum in the International System?

_____

48. What are the measuring units of momentum in the International System?

_____

49. Is defined as the product of force acting on a body and the time during which it does.

_____

50. Points out if the momentum is a vector quantity or a vector scale.

_____

51. Type of collision in which the kinetic energy before impact, is equal to the amount of kinetic energy after impact

_____

52. Type of collision where kinetic energy is always conserved (being an ideal case).

_____

53. Type of collision where no kinetic energy is conserved

_____

II.-SOLVE THE FOLLOWING PROBLEMS.

55. Determine the vertical vector component 300 N at an angle of 35˚.

56. Find the horizontal vector component 2140 at an angle of 25˚.

57. Calculate the resultant force of F_1 = 60 N to θ = 30˚ and F_2 = 85 N to θ = 140˚.

58. Calculate the resultant force of F_1 = 40 N to θ = 15˚ and F_2 = 25 N = 80Y F_3 to θ = θ = 220˚ to 42N.

59. Which horizontal force is required to accelerate a bicycle 800 N at a rate of 2.3 m / s^2?

60. Which mass has an object that accelerates 3m / s^2 under the influence of a net force of 5 N?

61. A worker pushes a box with a net force of 75 N. If the box has an acceleration of 0.50 m / s^2 How heavy is the box?

62. A cart 490 N is pulled by a force that is inclined at an angle of 35° accelerates horizontally at a rate of 2m / s^2. Calculate the applied force.

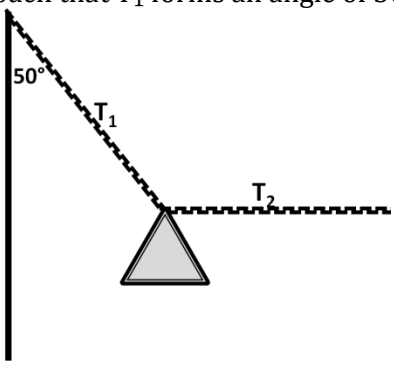
63. A box slides freely on a plane inclined at 28 ° with the horizontal. Determine its acceleration.

64. Find the force of the cables that hold an elevator of 700 kg, if it ups with an acceleration of 0.7 m/s^2.

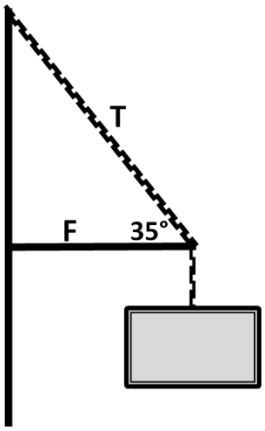
65. A horizontal force of 424 N moves a steel block 980 N, if the coefficient of friction between the block and the horizontal floor is 0.31, what will be the acceleration of the block?

66. A force parallel to the plane of movement causes displacement of a wooden box of 100 kg, with a constant velocity and the horizontal wooden floor whose coefficient of kinetic friction is 0.31, what is the value of force?

67. A body of 14 kg suspended by a rope T_1 is stretched sideways horizontally by a rope and held T_2 such that T_1 forms an angle of 50˚ with the wall. Determine the Tensions T_1 and T_2.



68. A body weight W is suspended from a frame as shown in the figure. If the magnitude of the tension of the rope T is 500 N and the angle is 35˚ to the horizontal. Determine the magnitude of the weight W and the thrust F of the bar.



69. Determine the Gravitational force between 80 kg and 60 kg stones which are spaced 4m.

70. Two artificial satellites of equal mass are placed in orbit so that their centers are spaced by 20 meters. If the gravitational force between them is $5x10^{-8}$N. What is the mass of the satellites?

71. An object of 4 kg rises to a height of 1.5 meters in a time of 5 seconds.
a) What is the work done on the object?
b) What is the Power output?

72. Calculate the kinetic energy of a wheel with a mass of 120g moving at 24 m / s.

73. What will be the speed with which a 65gr bullet travels to acquire a kinetic energy of 550 J?

74. If a book of 1.2 kg rises to a height of 1.6 m, how much Potential energy will acquire the book?

75. Calculate the **momentum** of a 1200 kg car with a speed of 6m / s.

76. Calculate the velocity of a 70 kg cyclist, if its linear momentum is 1800 kg.

77. Find the **mass** of a skier whose speed is 72 km and his linear momentum is equal to 1000 kg m/ s.

78. Find the impulse that has to be given to a 10500 N car, to change its speed from 6m/s to 10m/s.

79. A 5kg repeating rifle fires a 15 grams bullet with a speed of 1700 km/h. Determine the speed with which the rifle back.

80. A 3 kg projectile is shot by a cannon of 500 kg, if the projectile is shot at a speed of 220 km/h What is the speed with which the cannon back?

81. A 1500 kg car travels at 50 km/h and reaches another car of 1100kg that travels at 30 km/h in the same direction, colliding with it. If the vehicles remain united after the crash:
a) Find the speed of the cars after the collision.
b) Calculate the loss of kinetic energy.
c) Find the collision type.