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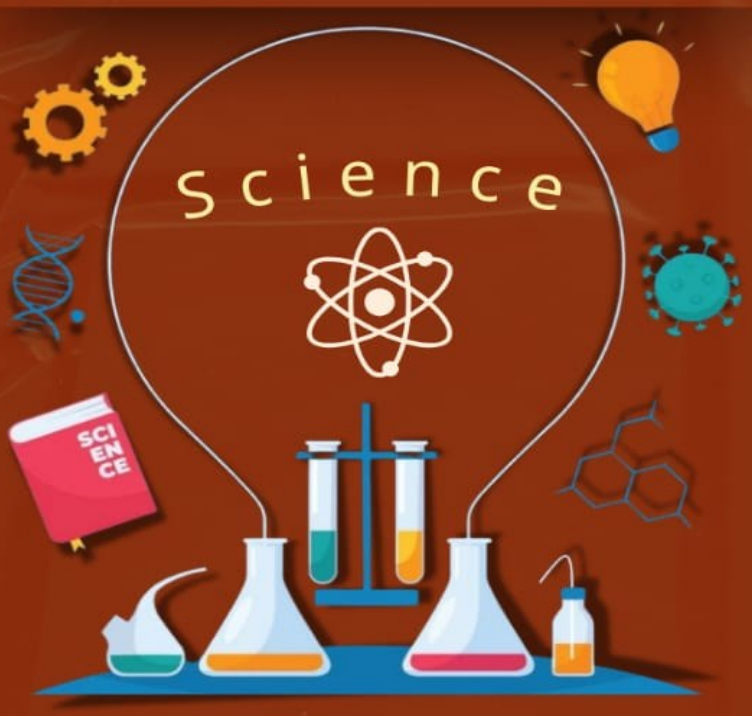
بنك أسئلة

Science

Review for February and March

2026

Science



Middle

2nd

Second term

Prepared By

Mrs/Menna Hussein

Trust Academy Online

Exclusive Manager

Mr. Amr Mohi

TRUST ACADEMY ONLINE

مراجعات النخبة
من
تراست أكاديمى اونلاين
2026

أكاديمية تراست
اونلاين
ابتدائي-إعدادي-ثانوي

لغات -تجريبي- عربي-أزهري

ناشيونال-انترناشيونال

(مناهج امريكي-كامبردج-مناهج خليج

- متاح حجز مجموعات الشرح الشهرية مع فريق اساتذة اعداد مراجعات النخبة
- أنظمة مجموعات شهرية تناسب الجميع
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يمكنكم الحصول على مراجعات النخبة لجميع الصفوف
وفيديوهات الشرح المميزة من خلال مسح رمز الـ QR CODE

يرجى مراعاة حقوق صاحب المحتوى

Unit 1

1 Write down what the following sentences mean

1. Reactions that require the absorption of thermal energy from the surrounding environment, causing its temperature to decrease. .....
2. Energy cannot be created or destroyed, but it can be converted from one form to another. .....
3. A diagram showing the path and changes of energy during a chemical reaction from reactants to products. .....
4. A chemical reaction that results in the release of heat energy from the reaction products to the surrounding environment. .....
5. A chemical process in which the bonds in the molecules of the reactants are broken and new bonds are formed in the molecules of the products. .....
6. The name given to the calcium hydroxide produced by the reaction of quicklime with water .....
7. An isolated system in which the total energy remains constant (as defined by Helmholtz). .....
8. A closed and repeated thermal process, in which heat is withdrawn from inside the refrigerator to the outside, using eco-friendly freons. .....
9. The refrigerator coolant liquid. .....
10. The amount of heat absorbed or released when dissolving a specific quantity of solute in a known volume of solvent to form a solution. .....
11. Dissolution accompanied by a rise in the temperature of the surroundings. .....
12. A physical change accompanied by the absorption of thermal energy from the surroundings when a substance dissolves in water. .....
13. Substances whose molecules are linked to a specific number of water molecules through an exothermic process. .....
14. A salt whose colour changes from blue to pink when drops of water are added to it. .....
15. Compresses used only once, in which endothermic or exothermic dissolution occurs. .....

16. Energy is neither destroyed nor created, but it is transformed from one form to another. .....

17. A scientist who explained that the total energy remains constant within the isolated system. .....

18. Cans used for warming coffee or heating the food inside them. .....

19. The reaction of heating aluminum with red iron oxide. .....

20. A simple model that illustrates the three main elements of the combustion process. .....

21. Flammable materials used in the production of thermal energy as a result of the occurrence of an exothermic reaction. .....

22. The non-renewable fuel which is the most used worldwide till now. .....

23. The amount of energy produced from the combustion of 1 g of fuel in excess oxygen gas. .....

24. The combination of fuel with oxygen, accompanied usually by the emission of light, heat, or both. .....

25. A flame produced from the ignition of a mixture of a gaseous fuel and oxygen. .....

26. The combustion of fuel in a limited amount of oxygen gas. .....

27. The temperature at which fuel begins to ignite. .....

28. Ignition of materials without the presence of an external source of heat .....

29. A chemical process in which the percentage of oxygen increases in the substance or the percentage of hydrogen decreases in it. .....

30. A chemical process in which the percentage of oxygen decreases in the substance or the percentage of hydrogen increases in it. .....

31. The substance that takes away oxygen or gives hydrogen during the chemical reaction. .....

32. The substance that gives oxygen or takes away hydrogen during the chemical reaction. .....

33. A scientist who believed that objects do not continue moving unless a force acts continuously on them. .....

34. A scientist who explained that objects tend to maintain their state of rest or motion unless acted upon by an external force. .....

35. The total force in magnitude and direction resulting from the effect of a number of forces acting on an object. .....

36. The scientist who formulated the laws of motion and the universal law of gravitation. .....

37. object keeps its state of rest or motion at a constant velocity in a straight line, unless acted upon by external unbalanced forces that change its state. .....

38. The time taken for the moving object to stop. .....

39. The distance travelled by the moving object during the stopping time. .....

40. A device used to keep the velocity of cars constant on highways without direct driver intervention. .....

41. The change in the velocity of an object per unit time. .....

42. If a net force (F) acts on an object with a mass (m), it causes the object to have an acceleration (a) in the same direction as the net force. .....

43. A safety device that works with the seat belt in the car to prolong the time of collision, and thus reduce the rate of change in velocity, which in turn minimizes the force of collision acting on the driver. .....

44. For every action, there is an equal and opposite reaction. .....

45. A collision between a stationary object and a moving object having the same mass and no loss of kinetic energy occurs. .....

46. A collision between a stationary object and a moving object having the same mass in which kinetic energy is lost. .....

---

2 Complete the following sentences

Unit 1

1. The processes of material transformation and dissolution are ..... accompanied by Processes that are ..... or ..... energy from the

surrounding medium.

2. Exothermic dissolution is accompanied by..... such ..... and .....
3. Endothermic dissolution is accompanied by ..... Such as ..... and .....
4. The combination of molecules of some substances with a specific number of water molecules. These substances are called ..... and if the water molecules are removed by heating, the molecules are called .....
5. The color of hydrated copper sulphate is ..... while the anhydrous copper sulphate is .....
6. Instant Hot compresses help relieving the pain of ..... while .... compresses are used in cases of swelling.
7. The color of hydrated cobalt chloride is ..... , while the anhydrous cobalt chloride is .....
8. When the released energy from combination of solute with solvent is greater than the absorbed energy , the solubility is .....
9. Ammonium nitrate (NH_4NO_3) is used in ..... instant pressure compresses because its dissolution in water is an endothermic process.
10. Doubling the mass of the solute leads to ..... in the amount of change in the temperature of the solvent (water).
11. Substances that lower the temperature of water when dissolved (such as ammonium nitrate) are described as ..... dissolving.
12. Examples of fuel include : ..... and ..... and .....
13. Examples of fossil fuels include ..... and ..... and .....
14. Butagas consists of two gases : ..... and .....
15. Ethanol is an example of ..... fuel that is prepared from plants rich in ..... such as corn.
16. Fuel begins to ignite when it reaches ..... point.
17. Highly flammable materials have a ignition point of ..... flammable while slow- materials have a ignition point of .....

18. Fires can be extinguished by ..... or ..... or .....

19. The oxyacetylene flame is produced by the complete combustion of ..... gas in presence of ..... gas and reaches a temperature of ..... Celsius degrees.

20. ..... Materials that have a low ignition point, while ..... materials that have a high ignition point.

21. ..... flame is produced by the complete combustion of acetylene gas in present of excess oxygen, reaching a temperature of ..... ℃

22. Oxidization process leads to shortage of ..... the percentage in the substance. While the reduction process causes an increase ..... percentage in the substance.

23. The oxidizing agent undergoes a process of ..... and the reducing agent undergoes a process of .....

24. In a chemical reaction, bond breaking is a ..... process, while forming bonds is a ..... process.

25. In the energy diagram of the endothermic reaction, the energy of the products is ..... of the energy of the reactants.

26. The "thermit" reaction is used in ..... and it is ..... reaction

27. In a lemon battery, ...energy stored in lemon juice is converted to ..... energy

Unit 2

28. Newton's first law states that the object remains ..... or ..... unless an external force affects on it.

29. Force is anything that is capable of changing ..... of the object.

30. Newton's second law states that the resulting force exerted on an object is equal to ..... × .....

31. If the force acting on an object is zero, then ..... of the body does not change.

32. Newton's third law states that for every action there is an equal in ..... and opposite in .....

33. When you push a ball on a flat surface, the value of the acceleration with which it moves depends on the affecting ..... and .....of the ball.

34. If the force acting on an object increases and its mass remains constant, the ..... of the object increases.

35. When you sit in a car that suddenly stops, your body leans forward due to .....

36. Elastic collision is the collision that keeps both body's ..... and body's .....

37. In elastic collision between two objects, the relative velocity of the two objects after the collision is ..... their relative velocity before collision

38. In inelastic collision, a loss of energy occurs in the form of ..... or .....

39. Air hockey is a fun game in which ..... is used Circular in the push of ..... It slides on a smooth table with holes through which a constant stream of air rushes to reduce ..... between the disc and the table.

40. When balanced forces act on an object, the body ..... While when unbalanced forces affect the same body it .....

41. Unit of force measurement is ..... , the speed measurement unit is ..... while the acceleration measurement unit is .....

42. If the resulting force is not equal to zero, so the force is .....

43. It is recommended to wear a ..... when driving a car.

44. ..... allows the user to fly in the air upwards as the water rushes down through Its openings.

45. The property of the body's resistance to changing its dynamic state is known as .....

46. ..... works by pushing air from the motors downwards, which is followed by pushing the air upwards with equal force.

---

3 Give reason for (scientific explanation) for each of the following

Unit 1

1) We feel cold when washing our hands with antiseptic hand gel :

.....

2) We feel the warmth of our hands when the laundry powder dissolves in water.

.....

3) Special precautions must be taken when diluting concentrated acids by adding the acid to water, not the other way around.

.....

4) Instant Hot packs (using magnesium sulfate) are used to relieve pain associated with muscle strain

.....

5) The mass of the dissolved substance is directly proportional to the change in temperature resulting from the melting process.

.....

6) You feel a cooling sensation in your mouth when you eat fizzy candy containing sodium bicarbonate

.....

7) The reaction of magnesium with hydrochloric acid is an exothermic reaction.

.....

8) Water droplets at the bottom of the flask freeze when barium hydroxide reacts with ammonium chloride.

.....

9) The use of thermite reaction in welding railroad tracks.

.....

10) The difference in heat content between reactants and products in chemical reactions.

.....

11) A reaction is called exothermic if the energy released during bond formation is greater than the energy absorbed during bond breaking.

.....

12) Scientists resort to using self-heating containers in expeditions or military applications.

.....

13) Fireflies are called by this name (in relation to energy transformations).

.....

14) A small percentage of ethanethiol gas is added to both natural gas and Butagas

.....

15) Biofuel is prepared from corn plants

.....

16) In some countries, biofuel is mixed with gasoline

.....

17) The combustion of a price of steel wool (scouring pad) in a cylinder contatining pure oxgen is faster than its combustion in atmospheric air.

.....

18) The color of the Bunsen flame used in laboratories varies :

.....

19) The Bunsen flame sometimes has a yellow flame and sometimes a blue flame:

.....

20) Spark plugs are used in car engines :

.....

21) The combustion of carbohydrates produces CO_2 , H_2O : gas

.....

22) An oxyacetylene flame is used for cutting or welding metals :

.....

23) Potassium permanganate powder reacts when drops of glycerin are added to it :

.....

24) Extinguishing sodium or potassium fires with water is strictly prohibited.

.....

25) Water is not used to extinguish petroleum fires

.....

26) Water is used to extinguish most fires

.....

27) Red-hot copper is oxidized when a stream of air passed over it.

.....

28) Black copper oxide is reduced when a stream of hydrogen gas passed over it.

.....

29) Food can be preserved by evacuating air from preservation bags.

.....

30) The substance that happened to oxidation process is called the reducing agent

.....

Unit 2

31) The stationary body remains stationary if it is not affected by force

.....

32) Water spilling from the cup if the cup is moved suddenly

.....

33) Pushing of an empty cart requires less force than pushing.a full cart

.....

34) Increasing the acceleration the greater the force exerted on the body

.....

35) The boat moves backwards when you jump from it towards the shore

.....

36) A moving ball stops when it hits a wall

.....

37) A ball bounces from another ball when it collides

.....

38) In elastic collisions, there is no loss of kinetic energy

.....

39) In inelastic collisions, there is a loss of kinetic energy

.....

40) The passengers of the bus rush forward when it comes to a sudden stop.

.....

41) The static bag on the counter remains at rest unless affected by an external force.

.....

42) A large truck loaded with goods is harder to park than a small car moving at the same speed.

.....

---

4 what can be observed when (what happen if)

Unit 1

1. Adding water to concentrated sulphuric acid.

.....

2. If the energy required to break the bonds in a reaction exactly equal to the energy released when the bonds were formed?

.....

3. Thermometer reading when : ammonium chloride powder dissolves in water, magnesium strip reacts with hydrochloric acid?

.....

4. Passing a stream of air over red-hot copper powder.

.....

5. Passing a stream of hydrogen gas over black copper oxide with heating.

.....

6. Evacuating air from food preservation bags.

.....

7. Extinguish sodium or potassium fires with water.

.....

8. Dipping two rods of copper and zinc into two lemons and connect them to LED bulb.

.....

9. Increasing the bond energy in the reactant molecules relative to their case of breakage.

.....

10. A chemical reaction occurs in which the energy released during bond formation is "less" than the energy absorbed to break the bonds.

.....

11. Adding aluminum oxide powder to iron oxide (thermite reaction).

.....

12. Decreased amount of oxygen during the combustion of a benzene flame.

.....

13. Add drops of glycerin to potassium permanganate powder.

.....

14. Placing a piece of steel wool wire on fire in a laboratory with pure oxygen.

.....

Unit 2

15. If no force affects on a stationary object

.....

16. If a constant force affects on an object in relation to its acceleration of motion

.....

17. A person pushing a heavy vehicle

.....

18. Elastic collision between two objects

.....

19. The collision of two objects is an inelastic collision

.....

20. All the forces acting on an object moving at a constant speed stopped.

.....

21. If the effective force increases when pushing a box on a smooth surface relative to the acceleration

.....

22. If a small car collides with a big car with a low speed (in terms of kinetic energy)

.....

23. If the driver presses the brakes of a car that is moving at a constant speed suddenly relative to the passengers

.....

24. When a person jumps in a boat that is on the surface of the water

.....

25. The resulting force acting on an object if it is exerted by two forces of equal in magnitude and opposite in direction?

.....

26. The distance covered by the truck to stop when the brakes are pressed if its load (mass) increases?

.....

27. Pulling quickly a tablecloth from under food plates?

.....

28. Increasing both the net force acting on the object and its mass to double.

.....

29. To the acceleration of a moving object when its mass increases while the force acting on it remains constant?

.....

30. When two equal-mass objects, moving at the same velocity in opposite directions collide with each other?

.....

31. when an elastic collision occurs between two identical balls, one is moving and the other is stationary?

.....

32. Which takes less time to stop when applying the brakes: A truck or a car moving at the same velocity?

.....

---

5 Answer the following

Unit 1

1- If the initial temperature $T_1 = 20°C$ and the final temperature $T_2 = 15°C$, calculate :

- The change in temperature ΔT and determine the type of dissolution.

.....

2- List three examples of substances that dissolve in water and represent exothermic dissolution.

.....

3- List three examples of substances that dissolve in water and represent endothermic dissolution.

.....

4- Mention the names of the processes of matter transformation, then specify whether they are exothermic or endothermic.

.....

5- What is the role of citric acid in lemons when making a battery?

.....

6- Hydrogen gas reacts with chlorine gas, according to the following thermochemical equation :

$$H_{2(g)} + Cl_{2(g)} \rightarrow 2HCl_{(g)} + heat$$

(1) Is this reaction exothermic or endothermic? Explain your answer.

.....

(2) Which is greater: The energy absorbed during breaking bonds or the energy released during forming new bonds?

.....

7- Write the thermochemical equation expressing the thermite reaction, then mention the importance of this reaction.

.....

8- Ammonia burns completely in excess of oxygen gas according to the following balanced equation :

$$4NH_{3(g)} + 5O_{2(g)} \xrightarrow{\Delta} 4NO_{(g)} + 6H_2O_{(v)}$$

(1) Identify the substances that undergo oxidation and those that undergo reduction.

.....

(2) What is the reducing agent in this reaction?

.....

(3) Write a balanced equation for the incomplete combustion of ammonia.

.....

9- How can understanding of oxidation and reduction help in preservation of food?

.....

10- Is water or sand used to extinguish sodium fires?

.....

Unit 2

11- What makes a ball rolling on the ground gradually stop?

.....

12- When pulling the rope between two groups which the force does each team feel?

.....

13- A rocket that goes forward when the gas exits backwards. This is explained by Newton's third law

.....

14- illustrates inertia : Give an example from your daily life

.....

15- An object with a mass of 5 kg is affected by a force of 20 newtons Calculate the acceleration

.....

16- What happens to the acceleration if the mass doubles as the force is constant ?

.....

17- What is the mathematical relationship between.force and acceleration ?

.....

18- A car gains more speed when the engine power increases. What law makes this clear?

.....

19- Mention an example from daily life that illustrates Newton's third law?

.....

20- If a light ball is replaced by another heavy one, which the ball will be affect of more ? why?

.....

21- A person pushes the wall, why doesn't the wall move despite thepushing?

.....

22- A car moving at a constant speed on a straight road Which law explains this ?

.....

23- When jumping out of the boat, the boat moves backwards Which law makes this clear?

.....

24- Calculate the acceleration at which a car of mass 1000 kg moves when the engine force is 1300 N (Ignoring friction force affecting the car).

.....

25- A person pulled a 10 kg block box with a force of 50 N on a horizontal frictionless surface. How much acceleration does the box move?

.....

26- An object with a mass of 15 kg is placed on the ground. How much force is needed to lift it vertically? (Note that the acceleration of gravity = 10 m/s^2)

.....

27- Mention four characteristics that describe the two forces mentioned in Newton's third law.

.....

6 Mark (✓) or (✗) for each statement, with correction

Unit 1

1. Butagas is a mixture of methane and propane gases. ( )
2. Nitrogen gas is described as the fuel of the future. ( )
3. Bunsen flame changes colour according to the amount of oxygen mixed with the fuel. ( )
4. The oxidizing agent undergoes a reduction process. ( )

Unit 2

5. The action and the reaction affect the same body ( )
6. The forces of action and reaction are equal in magnitude ( )
7. The forces of action and reaction are opposite in the direction ( )

7 What is the use of each of the following

Unit 1

1. Refrigeration cycle in the refrigerator

.....

2. Polystyrene cups

.....

3. Instant cold compresses

.....

4. Instant hot compresses

.....

5. Exothermic reactions for some types of insects

.....

6. Self-heating cans

.....

7. The thermite reaction

.....

8. Ethyl alcohol (ethanol)

.....

9. Fuel of the future

.....

10. Natural gas and butagas

.....

11. Ethanethiol gas

.....

12. The flame of Bunsen burner

.....

13. Sparks plugs (Bougies)

.....

14. Oxyacetylene flame

.....

15. Fire extinguishers

.....

16. Sand in laboratories

.....

17. Closing gas valves during fires

.....

18. Newton meter (Spring balance)

.....

19. Cruise control

.....

20. The seat belt

.....

21. The airbag

.....

8 Choose the correct answer

Unit 1

1- The correct definition of endothermic dissolution is .....

Ⓐ A process in which thermal energy is absorbed from the surrounding environment.
Ⓑ A process in which no exchange of thermal energy occurs.
Ⓒ A process in which chemical energy is converted into thermal energy.
Ⓓ A process in which thermal energy is released into the surrounding environment.

2- A common example of endothermic dissolution is .....

Ⓐ the dissolution of sodium carbonate
Ⓑ dissolving (NH4NO3) in water
Ⓒ the dissolution of sodium hydroxide
Ⓓ the dissolution of calcium chloride

3- A common example of exothermic dissolution is .....

Ⓐ Dissolving potassium sulphate.
Ⓑ Dissolving ammonium nitrate (NH_4NO_3) in water.
Ⓒ Dissolving sodium hydroxide.
Ⓓ Dissolving ($NaHCO_{3-}$)

4- When instant cold compresses are used, it works by ..... the blood vessels in the affected area, which leads to reduced blood flow and reduced swelling.

Ⓐ Widening Ⓑ narrowing Ⓒ Heating Ⓓ Dissolving

5- ..... Raise the temperature of the water when dissolved in it.

Ⓐ Ammonium nitrate. Ⓑ Potassium chloride.
Ⓒ Sodium hydroxide. Ⓓ Hydrated copper sulfate.

6- In exothermic reactions, the final temperature (T_2) is ..... the initial temperature (T_1)

Ⓐ Lower than Ⓑ higher than Ⓒ equal to Ⓓ half

7- When a magnesium strip reacts with dilute hydrochloric acid, heat is transferred from .....

Ⓐ The surrounding medium to the system
Ⓑ The system to the surrounding medium
Ⓒ The products to the reactants
Ⓓ The beaker to the thermometer only

8- Which of the following reactions is an example of an endothermic reaction ?

Ⓐ Magnesium reacting with hydrochloric acid
Ⓑ Calcium oxide reacting with water
Ⓒ Barium hydroxide reacting with ammonium chloride
Ⓓ Thermite reaction

9- The German scientist who proved that energy cannot be created or destroyed is :

Ⓐ Einstein Ⓑ Newton Ⓒ Hermann von Helmholtz Ⓓ Dalton

10- The process of breaking the bonds between atoms in reacting substances is :

Ⓐ Exothermic Ⓑ endothermic
Ⓒ Not accompanied by heat change Ⓓ produces electrical energy

11- In the energy diagram of an exothermic reaction, the energy level of the products is..... the energy level of the reactants.

Ⓐ Higher than Ⓑ lower than Ⓒ equal to Ⓓ parallel to

12- The substance ..... is used in self-heating packages.

(A) Ammonium chloride
(B) Calcium oxide (quicklime)
(C) Sodium bicarbonate
(D) Ammonium nitrate

13- The substance responsible for the "refreshing sensation" (coolness) when eating fizzy sweets is .....

(A) Citric acid only
(B) Glucose
(C) A mixture of sodium bicarbonate and citric acid
(D) Iron oxide

14- The thermite reaction is used in .....

(A) Cooling drinks
(B) welding railroad tracks
(C) Making lemon batteries
(D) making candy

15- In the lemon battery experiment, energy is converted from ..... energy to electrical energy.

(A) Thermal (B) kinetic (C) chemical (D) light

16- When ammonium chloride powder is added to barium hydroxide and the mixture is stirred, we observe .....

(A) The temperature of the beaker rises.
(B) The mixture ignites.
(C) The temperature of the beaker drops and a layer of frozen water forms.
(D) No change occurs.

17- The correct equation for the reaction of quicklime with water is .....

(A) $Ca\,O + H_2O \rightarrow Ca(OH)_2 + heat$
(B) $Ca\,CO_3 \rightarrow Ca\,O + CO_2$
(C) $2Mg + 2HCl \rightarrow Mg\,Cl_2 + H_2$
(D) $2H_2 + O_2 \rightarrow 2H_2O$

18- In an endothermic reaction, the value of the change in heat content is .....

(A) Negative (B) positive (C) zero (D) variable

19- The thermal change resulting from the melting of a certain amount of solute in a known volume of solvent to form a solution is called .....

(A) Activation energy.
(B) enthalpy of the material.
(C) Heat of dissolution.
(D) Specific heat.

20- Which of the following material transformations is considered "exothermic"? .....

Ⓐ Fusion. Ⓑ Evaporation. Ⓒ Sublimation. Ⓓ Freezing.

21- When a crystalline (hydrated) salt such as $CuSO_4 . 5H_2O$ is dissolved in water, the color turns into .....

Ⓐ White. Ⓑ Pink. Ⓒ Blue. Ⓓ The color does not change.

22- In the cooling cycle inside the refrigerator at any stage the heat is "absorbed" from the food .....

Ⓐ During the process of compressing the gas by the motor.

Ⓑ While the coolant is expanding and evaporating inside the refrigerator.

Ⓒ While the gas is condensing in the grid behind the refrigerator.

Ⓓ During the transfer of heat to the surrounding medium (air).

23- Using the following thermal equation :

$$CaO\ (s) + H_2O\ (l) Ca \rightarrow (OH)_2 (aq) + heat$$

Which of the following statements is true regarding this reaction?

Ⓐ Used in the manufacture of instant refrigeration packaging.

Ⓑ The final temperature of T_2 is lower than the primary T_1.

Ⓒ The energy released when the bonds are formed is greater than the energy absorbed to break them.

Ⓓ The reaction represents the pyrolysis of the material.

24- The combustion process is based on 3 basic elements called "fire represented". Which of the following represents these elements from .....

Ⓐ Fuel, nitrogen gas, heat. Ⓑ Fuel, oxygen gas, heat.

Ⓒ Carbon dioxide, fuel, oxygen. Ⓓ Water, heat, oxygen.

25- According to the chemical reaction $CuO + H_2 \xrightarrow{\Delta} CU + H_2O$.

Which substance is considered the reducing agent .....

Ⓐ Copper oxide (CuO). Ⓑ Copper (Cu).

Ⓒ Hydrogen gas (H_2). Ⓓ Water vapor (H_2O).

26- It is completely forbidden to use water to extinguish sodium or potassium fires in laboratories .....

(A) Because water evaporates quickly.
(B) Because water freezes when it comes into contact with these metals.
(C) Because the reaction with water is highly exothermic and leads to the ignition of the rising hydrogen gas.
(D) Because the density of water is less than that of sodium.

27- When the amount of oxygen is abundant (too sufficient) in a gasoline stove, the flame appears in ..... colour.

(A) Yellow. (B) Red. (C) Blue (complete combustion). (D) Orange.

28- A small percentage of ethanethiol gas is added to the natural gas used in households .....

(A) To raise the calorific value of natural gas when it is combusted.
(B) to act as a catalyst that increases the speed of natural gas combustion.
(C) To facilitate the detection of gas leaks due to its characteristic garlic-like smell.
(D) To reduce carbon dioxide emissions from combustion.

29- When a stream of hydrogen gas is passed over the heated black copper oxide powder .....

(A) The tube explodes due to the rise of oxygen gas.
(B) No reaction occurs because hydrogen is an inert gas.
(C) Hydrogen oxide is formed and the powder turns into red copper.
(D) The colour of the powder changes from black to white.

30- Ethanol prepared from cornstarch is a ..... fuel, while hydrogen is a ..... fuel.

(A) Artificially / Biologically (B) Fossil / Naturally
(C) Biologically / Artificially (D) Solid / Liquid

31- ..... is the substance that gives oxygen during a chemical reaction."

(A) Combustible material (B) Catalyst
(C) Biofuel (D) Oxidizing agent

32- Water is not used to extinguish oil fires because .....

(A) The density of oil is lower than that of water, so it floats on its surface and remains burning.
(B) The water cools the petroleum quickly, causing it to freeze.
(C) Water chemically reacts with petroleum and produces toxic gases.
(D) Water hydrolyses by heat into oxygen that increases the ignition of a fire.

33- Which is the substance that changes colour from blue to pink when drops of water are added to it?

(A) Anhydrous cobalt chloride.
(B) Anhydrous copper sulphate.
(C) Hydrated cobalt chloride.
(D) Hydrated copper sulphate.

34- What change occurs in all endothermic processes?

(A) A change in the solution colour.
(B) Solid substances melt.
(C) A gas evolves.
(D) The temperature of the surrounding medium decreases.

35- The dissolution of the following substances in water is accompanied by the release of thermal energy, except .....

(A) Sodium hydroxide.
(B) Calcium chloride.
(C) Sodium carbonate.
(D) Sodium bicarbonate.

36- The dissolution of which of the following substances in water leads to a chemical change accompanied by the release of thermal energy?

(A) Sodium hydroxide.
(B) Calcium oxide.
(C) Sodium carbonate.
(D) Sodium chloride.

37- Each of the following represents an element of the fire triangle, except .....

(A) heat. (B) water. (C) fuel. (D) Oxygen.

38- Which fuel of the following has the highest calorific value?

(A) Natural gas. (B) Ethanol. (C) Hydrogen. (D) Wood.

39- Which of the following describes the reaction of potassium permanganate with glycerin?

(A) Endothermic and spontaneous ignition reaction.
(B) Exothermic and spontaneous ignition reaction.
(C) It occurs by heating although it is exothermic.
(D) It occurs by cooling although it is endothermic.

40- A net force of 1 N means an object of mass 1 kg is .....

(A) moving at an acceleration of 10 m/s^2
(B) moving at an acceleration of 1 m/s^2
(C) lifted vertically at a velocity of 1 m/s.
(D) lifted vertically at a velocity of 10 m/s

Unit 2

41- Which of the following did Newton discover?

(A) Electricity (B) Gravity (C) Nuclear Forces (D) Laws of Electromagnetism

42- Which of Newton's laws explains the relationship between force, mass, an acceleration?

(A) First Law (B) Second Law (C) Third Law (D) Law of Attraction

43- Why is Newton considered one of the greatest scientists?

(A) Because he invented electricity
(B) because he contributed to physics and mathematics
(C) Because he discovered penicillin
(D) because he invented the airplane

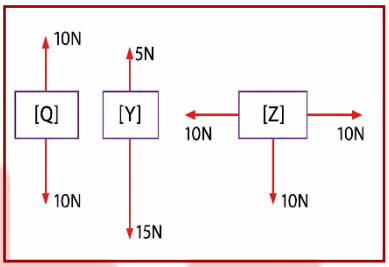
44- An object moves at an acceleration (a), if the object mass is halved and the net force acting on it is doubled, its acceleration of motion will be .....

(A) a (B) 2 a (C) 3 a (D) 4 a

45- Which of the following bodies has the greatest inertia?

(A) A ball of mass 0.1 kg moving at velocity 50 m/s
(B) A runner of mass 70 kg moving at velocity 30 m/s
(C) A car of mass 1000 kg moving at velocity 50 m/s
(D) A van of mass 2000 kg moving at velocity 30 m/s

46- The opposite figures show three objects X, Y, Z each object is affected by several forces :



Which object is affected by a non-zero net force (unbalanced forces)?

Ⓐ Objects X, Y, Z
Ⓑ Object X only.
Ⓒ Objects Y and Z only.
Ⓓ Object Y only.

47- Launching a rocket in a direction opposite to that of the expelled gases is explained by .....

Ⓐ Newton's first law.
Ⓑ Newton's second law.
Ⓒ Newton's third law.
Ⓓ law of universal gravitation.

9 Define the following (what is meant by)

Unit 1

Refrigeration cycle in the refrigerator	.....
Heat of dissolution	.....
Exothermic dissolution	.....
Endothermic dissolution	.....
Law of conservation of energy	.....
Exothermic reactions	.....
Endothermic reactions	.....

Fuel	.....
Calorific value of fuel	.....
Combustion	.....
Ignition point	.....
Spontaneous combustion	.....
Oxidation process	.....
Reduction process	.....
Reducing agent	.....
Oxidizing agent	..... Unit 2
Net force	.....
Newton's first law (Law of inertia)	.....
Stopping time	.....
Stopping distance	.....
Acceleration (a)	.....
Newton's second law	.....
Newton's third law Newton's laws	.....

10 compare between each of the following

Unit 1

1- Exothermic process and Endothermic process

2- Instant hot compresses (Packs) and Instant cold compresses (Packs)

3- Exothermic reactions and Endothermic reactions

4- Fossil fuel, Biofuel and Synthetic fuel

5- The fire triangle (Combustion triangle) and The extinguishing fire triangle

6- Oxidation process and Reduction process

7- Reducing agent and Oxidizing agent

8- Elastic collision and Inelastic collision

11 Correct the following statements

Unit 1

1- In exothermic reactions, the final temperature T_2 is lower than the initial temperature T_1.

2- The $CaCO_3$ decomposition reaction is an example of exothermic reactions.

3- The less energy the bond, the harder it is to break.

4- In an endothermic reaction, the system absorbs heat energy that causes the increase in the temperature of the surrounding medium

5- Self-heating packaging is based on the reaction of calcium oxide with water, which is an endothermic reaction.

6- Natural gas is mainly made up of propane gas

7- Oxidation is a process that results in a lack of oxygen in a material.

8- A reducing agent is defined as the substance that gives oxygen during a reaction.

9- The calorific value of wood is higher than the calorific value of hydrogen.

Unit 2

10- The acceleration with which the object moves increases as its mass increases when the force is constant.

.....

11- The forces of action and reaction affect on the same body and therefore do not cancel each other out.

.....

12- Newton's second law is known as the law of inertia.

.....

13- If two forces of equal magnitude and opposite in direction act along same line of action, the resultant is the sum of the two forces.

.....

14- Mass is considered a vector physical quantity.

.....

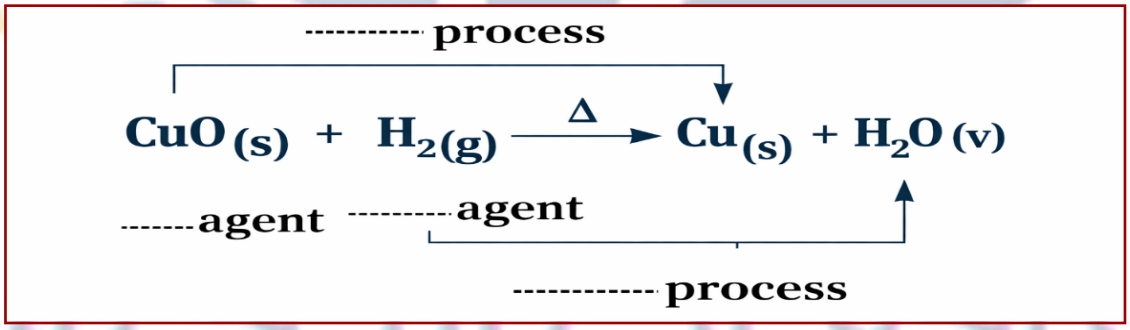
12 Various questions

Unit 1

1. The combustion triangle consists of :

1- ..... 2- ..... 3- .....

2. Study the following equation carefully, then answer the question:



Complete the data on the previous equation :

1. Oxidized to increase the oxygen content Is .....
2. CuO Called by ..... agent because .....

3. It reduced ..... to decrease the amount of .....

4. H_2 Called by ..... agent because ....

3. Technology of food preservation by air evacuation

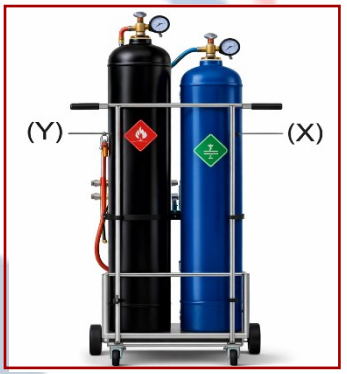


Evacuating air from food packing creates a low ..... which reducces ..... and ..... reactions which lead to spoiling of .....

4. Draw the energy diagram for an endothermic reaction.

.....

5. The figure shows a cylinder (X) containing a compressed gas that helps burning, and a cylinder (Y) containing a compressed flammable gas. Their mixture can produce a flame used in welding metals :



(1) Name the gases in cylinders (X) and (Y).

.....

(2) What is the name of the flame produced? What is its temperature?

.....

Unit 2

6. The figure in front of you is a ball rolling on a rough ground and then stopping after a distance.



1- What is the reason for the ball stopping?

.....

2- What is the name of the force acting on the ball?

.....

3- Can an object be moving and stationary at the same time? Illustrate your answer with an example from everyday life

.....

4- What happens to the motion of the ball if the rough surface is replaced by a smooth surface?

.....

7. Look at the picture in front of you Then answer the following :



1- Determine the direction of each force acting on the vehicle (use arrows)

.....

2- Calculate the net force if each force is 50 newtons.

.....

3- Does the car move or remain stationary? With the explanation? and if it moves, what is the direction of its movement?

.....

4- Choose the correct answer : the net force is .....

- (A) The greatest force acting on the body
- (B) The sum of the forces acting on the body
- (C) The sum of the masses acting on the body
- (D) The sum of the forces acting on a same line of action

8. Types of Forces :

Choose the appropriate type of force for each of the following images (Push-Pull)



(.....)



(.....)



(.....)



(.....)

9. Balanced and unbalanced forces



(.....)



(.....)

1. What happens if two tug-of-war teams are equal in force?

.....

2- How do you know if a rope is moving due to an unbalanced force?

.....

3-What is the relationship between the number of players or the force they exert on the movement of the rope?

.....

10. The figure (3) in front of you shows a stationary object : that is affected by a set of forces

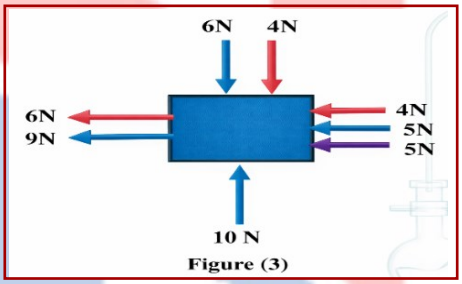


Figure (3)

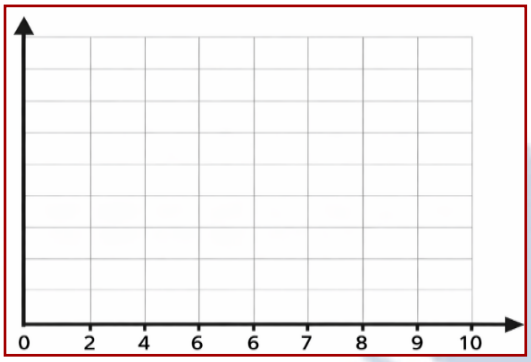
a) Calculate the net forces

.....

b) Does the object remain stationary or will it move? mentioning the reason

.....

11. Draw the following graph from the following table :



Force	Acceleration
2	1
4	2
6	3
8	4
10	5

-From the graph :

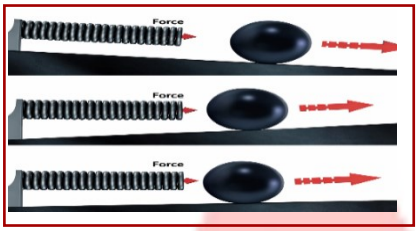
1- Calculate the object's mass?

.....

2- Determine the independent factor, the dependent factor and the control factor

.....

12. Notice the following set of images and then select which of Newton's laws applies to them?



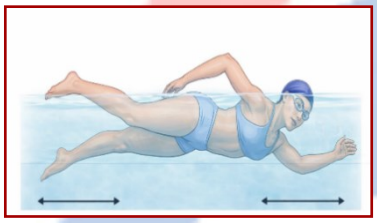
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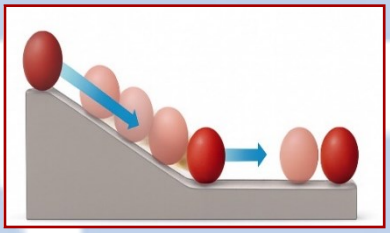
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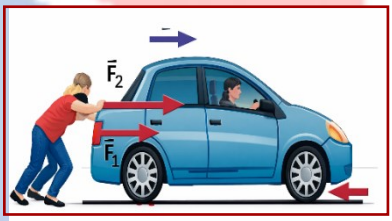
(.....)



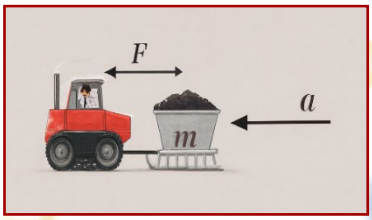
(.....)



(.....)



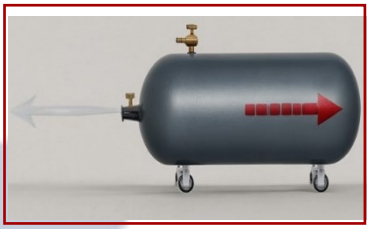
(.....)



(.....)

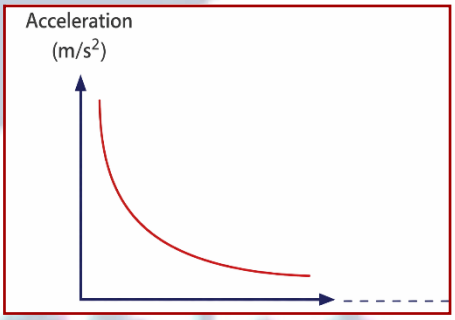


(.....)



(.....)

13. Based on your understanding of Newton's second law :



What does the horizontal axis represent in the given graph?

.....

مراجعات النـــخبة

بنك أسئلة

Science

Review for February and March

2026

Science

Answer Form



Middle

2nd

Second term

Prepared

Mrs/Menna Hussein

Trust Academy Online

Unit 1

1 Write down what the following sentences mean

1. Reactions that require the absorption of thermal energy from the surrounding environment, causing its temperature to decrease. endothermic reaction
2. Energy cannot be created or destroyed, but it can be converted from one form to another. law of energy conservation
3. A diagram showing the path and changes of energy during a chemical reaction from reactants to products. energy diagram
4. A chemical reaction that results in the release of heat energy from the reaction products to the surrounding environment. exothermic reaction
5. A chemical process in which the bonds in the molecules of the reactants are broken and new bonds are formed in the molecules of the products. chemical reaction
6. The name given to the calcium hydroxide produced by the reaction of quicklime with water limewater
7. An isolated system in which the total energy remains constant (as defined by Helmholtz). law of energy conservation
8. A closed and repeated thermal process, in which heat is withdrawn from inside the refrigerator to the outside, using eco-friendly freons. Refrigeration cycle in the refrigerator.
9. The refrigerator coolant liquid. Eco-friendly freons.
10. The amount of heat absorbed or released when dissolving a specific quantity of solute in a known volume of solvent to form a solution. Heat of dissolution.
11. Dissolution accompanied by a rise in the temperature of the surroundings. Exothermic dissolution.
12. A physical change accompanied by the absorption of thermal energy from the surroundings when a substance dissolves in water. Endothermic dissolution.
13. Substances whose molecules are linked to a specific number of water molecules through an exothermic process. Hydrated substances.
14. A salt whose colour changes from blue to pink when drops of water are added to it. Anhydrous cobalt chloride salt.

15. Compresses used only once, in which endothermic or exothermic dissolution occurs. Instant cold and hot compresses (Packs).

16. Energy is neither destroyed nor created, but it is transformed from one form to another. Law of conservation of energy.

17. A scientist who explained that the total energy remains constant within the isolated system. Scientist Hermann Von Helmholtz.

18. Cans used for warming coffee or heating the food inside them. Self-heating cans.

19. The reaction of heating aluminum with red iron oxide. Thermite reaction.

20. A simple model that illustrates the three main elements of the combustion process. Fire triangle (combustion triangle).

21. Flammable materials used in the production of thermal energy as a result of the occurrence of an exothermic reaction. Fuel.

22. The non-renewable fuel which is the most used worldwide till now. fossil fuel

23. The amount of energy produced from the combustion of 1 g of fuel in excess oxygen gas. Calorific value of fuel

24. The combination of fuel with oxygen, accompanied usually by the emission of light, heat, or both. Combustion.

25. A flame produced from the ignition of a mixture of a gaseous fuel and oxygen. Bunsen flame.

26. The combustion of fuel in a limited amount of oxygen gas. Incomplete combustion.

27. The temperature at which fuel begins to ignite. Ignition point.

28. Ignition of materials without the presence of an external source of heat Spontaneous combustion.

29. A chemical process in which the percentage of oxygen increases in the substance or the percentage of hydrogen decreases in it. Oxidation process.

30. A chemical process in which the percentage of oxygen decreases in the substance or the percentage of hydrogen increases in it. Reduction process.

31. The substance that takes away oxygen or gives hydrogen during the chemical reaction. Reducing agent.

32. The substance that gives oxygen or takes away hydrogen during the chemical reaction. Oxidizing agent.

Unit 2

33. A scientist who believed that objects do not continue moving unless a force acts continuously on them. Aristotle.

34. A scientist who explained that objects tend to maintain their state of rest or motion unless acted upon by an external force. Galileo.

35. The total force in magnitude and direction resulting from the effect of a number of forces acting on an object. Net force.

36. The scientist who formulated the laws of motion and the universal law of gravitation. Isaac Newton.

37. object keeps its state of rest or motion at a constant velocity in a straight line, unless acted upon by external unbalanced forces that change its state. Newton's first law (Law of Inertia).

38. The time taken for the moving object to stop. Stopping time.

39. The distance travelled by the moving object during the stopping time. Stopping distance.

40. A device used to keep the velocity of cars constant on highways without direct driver intervention. Cruise control.

41. The change in the velocity of an object per unit time. Acceleration.

42. If a net force (F) acts on an object with a mass (m), it causes the object to have an acceleration (a) in the same direction as the net force. Newton's second law.

43. A safety device that works with the seat belt in the car to prolong the time of collision, and thus reduce the rate of change in velocity, which in turn minimizes the force of collision acting on the driver. Airbag.

44. For every action, there is an equal and opposite reaction. Newton's third law.

45. A collision between a stationary object and a moving object having the same mass and no loss of kinetic energy occurs. Elastic collision.

46. A collision between a stationary object and a moving object having the same mass in which kinetic energy is lost. Inelastic collision.

2 Complete the following sentences

Unit 1

1. The processes of material transformation and dissolution are physical accompanied by Processes that are absorbing or releasing energy from the surrounding medium.
2. Exothermic dissolution is accompanied by releasing such as sodium hydroxide NaOH and calcium chloride $CaCl_2$
3. Endothermic dissolution is accompanied by absorbing Such as Ammonium nitrate NH_4NO_3 and potassium sulphate K_2SO_4
4. The combination of molecules of some substances with a specific number of water molecules. These substances are called hydrated salt and if the water molecules are removed by heating, the molecules are called an hydrous salt
5. The color of hydrated copper sulphate is blue while the anhydrous copper sulphate is white
6. Instant Hot compresses help relieving the pain of muscle strain while Instant cold compresses are used in cases of swelling.
7. The color of hydrated cobalt chloride is pink , while the anhydrous cobalt chloride is blue
8. When the released energy from combination of solute with solvent is greater than the absorbed energy , the solubility is exothermic
9. Ammonium nitrate (NH_4NO_3) is used in cold instant pressure compresses because its dissolution in water is an endothermic process.
10. Doubling the mass of the solute leads to increase in the amount of change in the temperature of the solvent (water).
11. Substances that lower the temperature of water when dissolved (such as ammonium nitrate) are described as endothermic dissolving.
12. Examples of fuel include : fossil fuel and biofuel and synthetic fuel
13. Examples of fossil fuels include Oil and coal and natural gas
14. Butagas consists of two gases : Butane and propane
15. Ethanol is an example of bio fuel that is prepared from plants rich in starch such as corn.

16. Fuel begins to ignite when it reaches ignition point.

17. Highly flammable materials have a ignition point of low flammable while slow-materials have a ignition point of high

18. Fires can be extinguished by remove fuel or isolate oxygen or cooling

19. The oxyacetylene flame is produced by the complete combustion of acetylene gas in presence of O_2 gas and reaches a temperature of 3000 Celsius degrees.

20. Flammable Materials that have a low ignition point, while non-flammable materials that have a high ignition point.

21. Oxy-acetylene flame is produced by the complete combustion of acetylene gas in present of excess oxygen, reaching a temperature of 3000 ℃

22. Oxidization process leads to shortage of hydrogen the percentage in the substance. While the reduction process causes an increase hydrogen percentage in the substance.

23. The oxidizing agent undergoes a process of reduction and the reducing agent undergoes a process of oxidation

24. In a chemical reaction, bond breaking is a endothermic process, while forming bonds is a exothermic process.

25. In the energy diagram of the endothermic reaction, the energy of the products is less than of the energy of the reactants.

26. The "thermit" reaction is used in welding railway tracks and it is exothermic reaction

27. In a lemon battery, chemical energy stored in lemon juice is converted to electrical energy

Unit 2

28. Newton's first law states that the object remains at rest or in uniform motion in a straight line unless an external force affects on it.

29. Force is anything that is capable of changing the motion (velocity) of the object.

30. Newton's second law states that the resulting force exerted on an object is equal to mass × acceleration.

31. If the force acting on an object is zero, then the velocity (speed) of the body does not change.

32. Newton's third law states that for every action there is an equal in magnitude and opposite in direction.

33. When you push a ball on a flat surface, the value of the acceleration with which it moves depends on the affecting force and mass of the ball.

34. If the force acting on an object increases and its mass remains constant, the acceleration of the object increases.

35. When you sit in a car that suddenly stops, your body leans forward due to inertia

36. Elastic collision is the collision that keeps both body's kinetic energy and body's momentum or velocity

37. In elastic collision between two objects, the relative velocity of the two objects after the collision is equal to their relative velocity before collision

38. In inelastic collision, a loss of energy occurs in the form of heat or sound

39. Air hockey is a fun game in which two round paddles is used Circular in the push of light disc It slides on a smooth table with holes through which a constant stream of air rushes to reduce friction between the disc and the table.

40. When balanced forces act on an object, the body remains stationary or moves at constant velocity While when unbalanced forces affect the same body it accelerates.

41. Unit of force measurement is Newton (N), the speed measurement unit is meter per second (m/s) while the acceleration measurement unit is meter per second squared (m/s^2), N/kg

42. If the resulting force is not equal to zero, so the force is unbalanced.

43. It is recommended to wear a seatbelt when driving a car.

44. flyboard allows the user to fly in the air upwards as the water rushes down through Its openings.

45. The property of the body's resistance to changing its dynamic state is known as inertia

46. A drone works by pushing air from the motors downwards, which is followed by pushing the air upwards with equal force.

3 Give reason for (scientific explanation) for each of the following

Unit 1

1) We feel cold when washing our hands with antiseptic hand gel :
Due to the absorption of heat from the hands when the alcohol present in the hand gel evaporates.

2) We feel the warmth of our hands when the laundry powder dissolves in water.
Due to releasing heat during dissolution of laundry powder in water

3) Special precautions must be taken when diluting concentrated acids by adding the acid to water, not the other way around.
Because when water is added to concentrated acid, a large amount of thermal energy is released, leading to violent instant boiling of the water and splashing of acid outside

4) Instant Hot packs (using magnesium sulfate) are used to relieve pain associated with muscle strain
Because they work by widening the blood vessels, which increases blood flow to the stressed areas, causing relaxing of the contracting muscles and relieving pain."

5) The mass of the dissolved substance is directly proportional to the change in temperature resulting from the melting process.
Because when mass of solute increases the change in temperature increases

6) You feel a cooling sensation in your mouth when you eat fizzy candy containing sodium bicarbonate
Due to absorbing heat from mouth (endothermic reaction)

7) The reaction of magnesium with hydrochloric acid is an exothermic reaction.
Due to release thermal energy to surrounding which increase its temp.

8) Water droplets at the bottom of the flask freeze when barium hydroxide reacts with ammonium chloride.
Due to absorbing thermal energy from surrounding leads to decrease its temperature and freeze of water

9) The use of thermite reaction in welding railroad tracks.
Because it is an exothermic reaction that results in the release of a significant amount of thermal energy, leading to melting iron which is produced from the reaction.

$$2Al_{(s)} + Fe_2O_{3\,(s)} \xrightarrow{\Delta} Al_2O_{3\,(s)} + Fe_{(\ell)} + heat$$

10) The difference in heat content between reactants and products in chemical reactions.

Due to the difference in energy between the bonds broken and the bonds formed during the reaction

11) A reaction is called exothermic if the energy released during bond formation is greater than the energy absorbed during bond breaking.

Because amount of released thermal energy is more absorbed energy

12) Scientists resort to using self-heating containers in expeditions or military applications.

Because an exothermic reaction occurs between calcium oxide and water, with releasing heat

$$CaO_{(s)} + H_2O_{(\ell)} \rightarrow Ca(OH)_{2(aq)} + heat$$

13) Fireflies are called by this name (in relation to energy transformations).

Because exothermic chemical reactions in their body produce light

14) A small percentage of ethanethiol gas is added to both natural gas and Butagas

To take appropriate safety measures in case of gas leaks, as both are odourless and ethanethiol gas is characterized by a garlic smell.

15) Biofuel is prepared from corn plants

Because it is rich in starch

16) In some countries, biofuel is mixed with gasoline

To used as fuel for cars

17) The combustion of a price of steel wool (scouring pad) in a cylinder contatining pure oxgen is faster than its combustion in atmospheric air.

To increase the concentration of pure oxygen in the cylinder compared to its concentration in the air, and the rate of combustion increases with the increase in the percentage of oxygen gas.

18) The color of the Bunsen flame used in laboratories varies :

Due to the difference in the amount of oxygen mixed with the fuel

19) The Bunsen flame sometimes has a yellow flame and sometimes a blue flame:

According to amount of oxygen (limited so the flame turns yellow, or abundant when the air hole in the Bunsen turns blue)

20) Spark plugs are used in car engines :
To produce spark to ignite the mixture of gasoline and air in combustion chamber of car engine during starting

21) The combustion of carbohydrates produces CO_2 , H_2O : gas
Because they consist of carbon and hydrogen

22) An oxyacetylene flame is used for cutting or welding metals :
Because its temperature reaches 3000°C

23) Potassium permanganate powder reacts when drops of glycerin are added to it :
Due to spontaneous exothermic reaction produce smoke and purple flame

24) Extinguishing sodium or potassium fires with water is strictly prohibited.
Because it increase fire and react with water in exothermic reaction and produce H_2 gas

25) Water is not used to extinguish petroleum fires
Because petroleum oil floats on the surface of water due to its lower density compared to that of water, which leads to the spread of fires instead of extinguishing them.

26) Water is used to extinguish most fires
Because of the high specific heat of water, which makes it absorbs a large amount of thermal energy and thus the temperature of the burning materials decreases.

27) Red-hot copper is oxidized when a stream of air passed over it.
Because percent of oxygen increase and Change to CuO

28) Black copper oxide is reduced when a stream of hydrogen gas passed over it.
Because hydrogen takes the oxygen away from the copper oxide to form water vapor, leaving behind red copper.

$$CuO + H_2 \rightarrow Cu + H_2O$$

29) Food can be preserved by evacuating air from preservation bags.
Because this provides a low-oxygen environment, which reduces oxidation and reduction reactions that lead to spoiling of food.

30) The substance that happened to oxidation process is called the reducing agent
Because it take oxygen from Other Substance and give H_2

31) The stationary body remains stationary if it is not affected by force
Due to Newton's First Law (Law of Inertia) An object at rest stays at rest unless acted upon by an external force.

32) Water spilling from the cup if the cup is moved suddenly
Because the inertia of water causes it to resist the sudden movement

33) Pushing of an empty cart requires less force than pushing.a full cart
Due to Newton's Second Law (F = m × a) , Greater mass requires greater force to produce the same acceleration

34) Increasing the acceleration the greater the force exerted on the body
Due to acceleration is directly proportional to the net force when mass is constant

35) The boat moves backwards when you jump from it towards the shore
Because the movement of the boat represents the reaction to the force of person jumping (action), and they act in opposite directions without any time difference.

36) A moving ball stops when it hits a wall
Because The ball exerts force on the wall (action), and the wall exerts an equal and opposite force back on the ball (reaction), stopping it

37) A ball bounces from another ball when it collides
Due to Each ball exerts an equal and opposite force on the other, causing them to bounce apart.

38) In elastic collisions, there is no loss of kinetic energy
Because in elastic collision the velocity doesn't change before or after collision

39) In inelastic collisions, there is a loss of kinetic energy
Because There is a loss of energy in the form of heat, sound, or deformation of the shape of the object.

40) The passengers of the bus rush forward when it comes to a sudden stop.
Because the inertia of the passenger causes him to resist the sudden change in their state of motion when pressing the brake (the brake pedal) to keep the state of motion they were in.

41) The static bag on the counter remains at rest unless affected by an external force.
Because a stationary object remains stationary unless acted upon by external unbalanced forces that change its state, according to Newton's first law (Law of Inertia).

42) A large truck loaded with goods is harder to park than a small car moving at the same speed.

Because as the mass of the object increases, its inertia increases, making it more difficult to stop.

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4 what can be observed when (what happen if)

Unit 1

1. Adding water to concentrated sulphuric acid.

release large amount of heat causing boiling of water and splashing of acid outside container causing damage

2. If the energy required to break the bonds in a reaction exactly equal to the energy released when the bonds were formed?

there isn't released or absorbed energy to or from surrounding so its temp not change

3. Thermometer reading when : ammonium chloride powder dissolves in water, magnesium strip reacts with hydrochloric acid?

The thermometer reading decreases because the first reaction is endothermic then it increase because the second reaction is exothermic

4. Passing a stream of air over red-hot copper powder.

Copper combines with oxygen of atmospheric air forming black copper oxide compound

$$2Cu_{(s)} + O_{2\,(g)} \xrightarrow{\Delta} H_2O_{(v)} + Cu_{(s)}$$

5. Passing a stream of hydrogen gas over black copper oxide with heating.

Reddish-brown copper is formed

$$CuO_{(s)} + H_{2\,(g)} \xrightarrow{\Delta} 2CuO_{(s)}$$

6. Evacuating air from food preservation bags.

It preserve food for long time as it decrease oxidation and reduction

7. Extinguish sodium or potassium fires with water.

The fire will increase because Sodium will react with water and form H_2 gas that increases fire.

8. Dipping two rods of copper and zinc into two lemons and connect them to LED bulb.

The LED bulb lights up because the lemon acts as a battery, converting chemical energy into electrical energy. The citric acid in the lemon acts as an electrolyte.

9. Increasing the bond energy in the reactant molecules relative to their case of breakage.

The reaction becomes harder to occur because more energy is needed to break the stronger bonds.

10. A chemical reaction occurs in which the energy released during bond formation is "less" than the energy absorbed to break the bonds.

The endothermic reaction will be occur

11. Adding aluminum oxide powder to iron oxide (thermite reaction).

A highly exothermic reaction occurs, releasing a large amount of heat and light, producing molten iron and aluminum oxide.

12. Decreased amount of oxygen during the combustion of a benzene flame.

Incomplete combustion occurs, and the flame becomes yellow colour.

13. Add drops of glycerin to potassium permanganate powder.

A spontaneous exothermic reaction occurs, leading to the emission of smoke with the formation of a purple-coloured flame.

14. Placing a piece of steel wool wire on fire in a laboratory with pure oxygen.

The steel wool burns very fast producing a large amount of heat and light

Unit 2

15. If no force affects on a stationary object

The object remains stationary due to Newton's First Law (Inertia).

16. If a constant force affects on an object in relation to its acceleration of motion

The object moves with constant acceleration due to Newton's Second Law (F = ma)

17. A person pushing a heavy vehicle

The vehicle exerts an equal and opposite force back on the person Due to Newton's Third Law.

18. Elastic collision between two objects

There is no loss in kinetic energy

19. The collision of two objects is an inelastic collision

There is loss in kinetic energy in the form of heat or sound

20. All the forces acting on an object moving at a constant speed stopped.

The object continues moving at the same constant speed due to Newton's First Law.

21. If the effective force increases when pushing a box on a smooth surface relative to the acceleration

The acceleration increases according to Newton's Second Law

22. If a small car collides with a big car with a low speed (in terms of kinetic energy)

The small car loses more kinetic energy and bounces back harder.

23. If the driver presses the brakes of a car that is moving at a constant speed suddenly relative to the passengers

The passengers will move forward due to inertia.

24. When a person jumps in a boat that is on the surface of the water

The boat moves backwards while the person jumps forward.

25. The resulting force acting on an object if it is exerted by two forces of equal in magnitude and opposite in direction?

The net force = zero, object remains at rest or moves at constant speed.

26. The distance covered by the truck to stop when the brakes are pressed if its load (mass) increases?

The stopping distance increases because greater mass requires greater force to stop.

27. Pulling quickly a tablecloth from under food plates?

The plates remain in place due to inertia

28. Increasing both the net force acting on the object and its mass to double.

Acceleration remains the same because ($a = F/m \rightarrow 2F/2m$)

29. To the acceleration of a moving object when its mass increases while the force acting on it remains constant?

The acceleration of the object's motion decreases.

30. When two equal-mass objects, moving at the same velocity in opposite directions collide with each other?

They will both move in the opposite direction and at the same velocity, as they acquire acceleration in the same direction as the force acting on each of them.

31. when an elastic collision occurs between two identical balls, one is moving and the other is stationary?

They are affected by two forces equal in magnitude and in opposite directions, so the moving object stops and the stationary object moves at the same velocity as the moving object before the collision.

32. Which takes less time to stop when applying the brakes: A truck or a car moving at the same velocity?

The car / Because its mass is the least, and the less the mass of the object, the less its inertia and thus it is easier to stop, so it takes less time to stop.

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5 Answer the following

Unit 1

1- If the initial temperature $T_1 = 20°C$ and the final temperature $T_2 = 15°C$, calculate :

- The change in temperature ΔT and determine the type of dissolution.

$t = 15 - 20 = -5\ c$ endothermic

2- List three examples of substances that dissolve in water and represent exothermic dissolution.

$NaOH - CaCl_2 - Na_2CO_3$

3- List three examples of substances that dissolve in water and represent endothermic dissolution.

$NH_4NO_3 - NaHCO_3 - K_2SO_4$

4- Mention the names of the processes of matter transformation, then specify whether they are exothermic or endothermic.

Endothermic : melting – evaporation – sublimation

Exothermic : freezing – condensation – deposition

5- What is the role of citric acid in lemons when making a battery?

store chemical energy which changes into electric energy

6- Hydrogen gas reacts with chlorine gas, according to the following thermochemical equation :

$$H_{2(g)} + Cl_{2(g)} \rightarrow 2HCl_{(g)} + heat$$

(1) Is this reaction exothermic or endothermic? Explain your answer.

Exothermic reaction / Because it is accompanied by the release of thermal energy as a product of the reaction to the surroundings.

(2) Which is greater: The energy absorbed during breaking bonds or the energy released during forming new bonds?

The energy released during forming new bonds is the greatest.

7- Write the thermochemical equation expressing the thermite reaction, then mention the importance of this reaction.

$$2Al_s + Fe_2O_{3(s)} \xrightarrow{\Delta} Al_2O_{3(s)} + 2Fe_{(\ell)} + \text{heat}$$

The importance of the reaction : It is used in welding the railway tracks.

8- Ammonia burns completely in excess of oxygen gas according to the following balanced equation :

$$4NH_{3(g)} + 5O_{2(g)} \xrightarrow{\Delta} 4NO_{(g)} + 6H_2O_{(v)}$$

(1) Identify the substances that undergo oxidation and those that undergo reduction.

- An oxidation process occurs to ammonia gas (NH_3).
- A reduction process occurs to oxygen gas (O_2).

(2) What is the reducing agent in this reaction?
Ammonia gas (NH_3).

(3) Write a balanced equation for the incomplete combustion of ammonia.

$$4NH_{3(g)} + 3O_{2(g)} \xrightarrow{\Delta} 2NO_{(g)} + 6H_2O_{(v)}$$

9- How can understanding of oxidation and reduction help in preservation of food?
Food is preserved by vacuuming the air because this provides a poor-oxygen environment, which minimizes the redox reactions that lead to spoiling of food.

10- Is water or sand used to extinguish sodium fires?
Sand / Because water increases the intensity of the fire instead of extinguishing it as a result of sodium reacting with water in an exothermic reaction accompanied by the ignition of the released hydrogen.

Unit 2

11- What makes a ball rolling on the ground gradually stop?
Friction between the ball and the ground acts as an opposing force that gradually slows down and stops the ball.

12- When pulling the rope between two groups which the force does each team feel?
Each team feels an equal and opposite force from the other team — Newton's Third Law.

13- A rocket that goes forward when the gas exits backwards. This is explained by Newton's third law
Because gas exiting backwards (action) pushes the rocket forward (reaction)

14- illustrates inertia : Give an example from your daily life

When a bus stops suddenly, passengers move forward because their bodies tend to continue moving.

15- An object with a mass of 5 kg is affected by a force of 20 newtons Calculate the acceleration

$a = F \div m$ $a = 20 \div 5$ $a = 4\ m/s^2$.

16- What happens to the acceleration if the mass doubles as the force is constant ?

Acceleration decreases to half because a = F/m → F/2m = a/2.

17- What is the mathematical relationship between.force and acceleration ?

F = m × a

18- A car gains more speed when the engine power increases. What law makes this clear?

Newton's Second Law — increasing force while mass remains constant increases acceleration.

19- Mention an example from daily life that illustrates Newton's third law?

When you swim, you push water backwards (action), and the water pushes you forward (reaction).

20- If a light ball is replaced by another heavy one, which the ball will be affect of more ? why?

The lighter ball is affected more because it has less mass, so the same force produces greater acceleration (a = F/m).

21- A person pushes the wall, why doesn't the wall move despite thepushing?

Because the wall exerts an equal and opposite reaction force back on the person, and the wall is fixed to the ground so it cannot move.

22- A car moving at a constant speed on a straight road Which law explains this ?

Newton's First Law (Inertia) an object continues moving at constant speed unless acted upon by an external force.

23- When jumping out of the boat, the boat moves backwards Which law makes this clear?

Newton's Third Law — jumping forward (action) pushes the boat backwards (reaction).

24- Calculate the acceleration at which a car of mass 1000 kg moves when the engine force is 1300 N (Ignoring friction force affecting the car).

$$a = \frac{F}{m} = \frac{1300}{1000} = 1.3\ m/s^2$$

25- A person pulled a 10 kg block box with a force of 50 N on a horizontal frictionless surface. How much acceleration does the box move?

$F = m \times a$ $a = F \div m$

$a = 50 \div 10$ $a = 5\ m/s^2$.

26- An object with a mass of 15 kg is placed on the ground. How much force is needed to lift it vertically? (Note that the acceleration of gravity = 10 m/s^2)

$F = m \times a$ $F = 15 \times 10$ $F = 150\ N$.

27- Mention four characteristics that describe the two forces mentioned in Newton's third law.

(1) Equal in magnitude.

(2) Opposite in direction.

(3) They act without any time difference.

(4) They act on two different objects.

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6 Mark (✓) or (✗) for each statement, with correction

Unit 1

1. Butagas is a mixture of methane and propane gases. (✗) a mixture of propane and butane gases.
2. Nitrogen gas is described as the fuel of the future. (✗) Hydrogen
3. Bunsen flame changes colour according to the amount of oxygen mixed with the fuel. (✓)
4. The oxidizing agent undergoes a reduction process. (✓)

Unit 2

5. The action and the reaction affect the same body (✓)
6. The forces of action and reaction are equal in magnitude (✓)
7. The forces of action and reaction are opposite in the direction (✓)

7 What is the use of each of the following

Refrigeration cycle in the refrigerator	Cooling the food inside the refrigerator by continuously transferring heat from inside the refrigerator to its outside
Polystyrene cups	They are used in thermal insulation.
Instant cold compresses	Compresses are used only once to reduce the severity of swelling.
Instant hot compresses	Compresses are used only once to relieve pain associated with muscles fatigue.
Exothermic reactions for some types of insects	Luminous insects use light as a result of exothermic reactions inside their bodies in various purposes such as mating and self-defense.
Self-heating cans	Warming coffee or heating the foods inside it without the need for an external heat source.
The thermite reaction	This reaction is used in welding the railway tracks.
Ethyl alcohol (ethanol)	It is used as fuel for cars in some countries after mixing it with gasoline.
Fuel of the future	It is used as fuel for cars and trucks powered by fuel cells (hydrogen fuel cells).
Natural gas and butagas	They are the main fuels used in households.
Ethanethiol gas	It is added with very small amount to natural gas and butagas to take the appropriate safety measures in case of gas leaks.
The flame of Bunsen burner	It is used as a source of heat in laboratories.
Sparks plugs (Bougies)	They produce a spark used to ignite the mixture of gasoline and air in the combustion chamber of the car engine during starting.

Oxyacetylene flame	It is used for cutting and welding metals, such as steel (iron) and copper.
Fire extinguishers	They are used to isolate fires from air (oxygen).
Sand in laboratories	It is used in extinguishing fires of some metals, such as sodium and magnesium fires.
Closing gas valves during fires	Fuel removal.
Newton meter (Spring balance)	It is used to measure the force.
Cruise control	Keeps the velocity of the cars constant on highways without any direct driver intervention, through using sensors
The seat belt	Reduces the rushing forward of the driver towards the steering wheel or the windshield during sudden stopping.
The airbag	Works with the seat belt to prolong (increase) the collision time and thus reducing the rate of change of the velocity (acceleration) which in turn minimizes the impact of the collision on the driver.

8 Choose the correct answer

Unit 1

1- The correct definition of endothermic dissolution is .....

Ⓐ A process in which thermal energy is absorbed from the surrounding environment.
Ⓑ A process in which no exchange of thermal energy occurs.
Ⓒ A process in which chemical energy is converted into thermal energy.
Ⓓ A process in which thermal energy is released into the surrounding environment.

2- A common example of endothermic dissolution is .....

Ⓐ the dissolution of sodium carbonate

Ⓑ dissolving (NH_4NO_3) in water

Ⓒ the dissolution of sodium hydroxide

Ⓓ the dissolution of calcium chloride

3- A common example of exothermic dissolution is .....

Ⓐ Dissolving potassium sulphate.

Ⓑ Dissolving ammonium nitrate (NH_4NO_3) in water.

Ⓒ Dissolving sodium hydroxide.

Ⓓ Dissolving ($NaHCO_{3-}$)

4- When instant cold compresses are used, it works by ..... the blood vessels in the affected area, which leads to reduced blood flow and reduced swelling.

Ⓐ Widening Ⓑ narrowing Ⓒ Heating Ⓓ Dissolving

5- ..... Raise the temperature of the water when dissolved in it.

Ⓐ Ammonium nitrate. Ⓑ Potassium chloride.

Ⓒ Sodium hydroxide. Ⓓ Hydrated copper sulfate.

6- In exothermic reactions, the final temperature (T_2) is ..... the initial temperature (T_1)

Ⓐ Lower than Ⓑ higher than Ⓒ equal to Ⓓ half

7- When a magnesium strip reacts with dilute hydrochloric acid, heat is transferred from .....

Ⓐ The surrounding medium to the system

Ⓑ The system to the surrounding medium

Ⓒ The products to the reactants

Ⓓ The beaker to the thermometer only

8- Which of the following reactions is an example of an endothermic reaction ?

Ⓐ Magnesium reacting with hydrochloric acid

Ⓑ Calcium oxide reacting with water

Ⓒ Barium hydroxide reacting with ammonium chloride

Ⓓ Thermite reaction

9- The German scientist who proved that energy cannot be created or destroyed is :

Ⓐ Einstein Ⓑ Newton Ⓒ Hermann von Helmholtz Ⓓ Dalton

10- The process of breaking the bonds between atoms in reacting substances is :

Ⓐ Exothermic Ⓑ endothermic
Ⓒ Not accompanied by heat change Ⓓ produces electrical energy

11- In the energy diagram of an exothermic reaction, the energy level of the products is…….. the energy level of the reactants.

Ⓐ Higher than Ⓑ lower than Ⓒ equal to Ⓓ parallel to

12- The substance ..... is used in self-heating packages.

Ⓐ Ammonium chloride Ⓑ Calcium oxide (quicklime)
Ⓒ Sodium bicarbonate Ⓓ Ammonium nitrate

13- The substance responsible for the "refreshing sensation" (coolness) when eating fizzy sweets is .....

Ⓐ Citric acid only Ⓑ Glucose
Ⓒ A mixture of sodium bicarbonate and citric acid Ⓓ Iron oxide

14- The thermite reaction is used in .....

Ⓐ Cooling drinks Ⓑ welding railroad tracks
Ⓒ Making lemon batteries Ⓓ making candy

15- In the lemon battery experiment, energy is converted from ..... energy to electrical energy.

Ⓐ Thermal Ⓑ kinetic Ⓒ chemical Ⓓ light

16- When ammonium chloride powder is added to barium hydroxide and the mixture is stirred, we observe .....

Ⓐ The temperature of the beaker rises.
Ⓑ The mixture ignites.
Ⓒ The temperature of the beaker drops and a layer of frozen water forms.
Ⓓ No change occurs.

17- The correct equation for the reaction of quicklime with water is .....

Ⓐ $Ca\,O + H_2O \rightarrow Ca(OH)_2 + heat$ Ⓑ $Ca\,CO_3 \rightarrow Ca\,O + CO_2$

Ⓒ $2Mg + 2HCl \rightarrow Mg\,Cl_2 + H_2$ Ⓓ $2H_2 + O_2 \rightarrow 2H_2O$

18- In an endothermic reaction, the value of the change in heat content is .....

Ⓐ Negative Ⓑ positive Ⓒ zero Ⓓ variable

19- The thermal change resulting from the melting of a certain amount of solute in a known volume of solvent to form a solution is called .....

Ⓐ Activation energy. Ⓑ enthalpy of the material.

Ⓒ Heat of dissolution. Ⓓ Specific heat.

20- Which of the following material transformations is considered "exothermic"? .....

Ⓐ Fusion. Ⓑ Evaporation. Ⓒ Sublimation. Ⓓ Freezing.

21- When a crystalline (hydrated) salt such as $CuSO_4 . 5H_2O$ is dissolved in water, the color turns into .....

Ⓐ White. Ⓑ Pink. Ⓒ Blue. Ⓓ The color does not change.

22- In the cooling cycle inside the refrigerator at any stage the heat is "absorbed" from the food .....

Ⓐ During the process of compressing the gas by the motor.

Ⓑ While the coolant is expanding and evaporating inside the refrigerator.

Ⓒ While the gas is condensing in the grid behind the refrigerator.

Ⓓ During the transfer of heat to the surrounding medium (air).

23- Using the following thermal equation :

$$CaO\,(s) + H_2O\,(l)Ca \rightarrow (OH)_2(aq) + heat$$

Which of the following statements is true regarding this reaction?

Ⓐ Used in the manufacture of instant refrigeration packaging.

Ⓑ The final temperature of T_2 is lower than the primary T_1.

Ⓒ The energy released when the bonds are formed is greater than the energy absorbed to break them.

Ⓓ The reaction represents the pyrolysis of the material.

24- The combustion process is based on 3 basic elements called "fire represented". Which of the following represents these elements from .....

Ⓐ Fuel, nitrogen gas, heat.
Ⓑ Fuel, oxygen gas, heat.
Ⓒ Carbon dioxide, fuel, oxygen.
Ⓓ Water, heat, oxygen.

25- According to the chemical reaction $CuO + H_2 \xrightarrow{\Delta} CU + H_2O$.

Which substance is considered the reducing agent .....

Ⓐ Copper oxide (CuO).
Ⓑ Copper (Cu).
Ⓒ Hydrogen gas (H_2).
Ⓓ Water vapor (H_2O).

26- It is completely forbidden to use water to extinguish sodium or potassium fires in laboratories .....

Ⓐ Because water evaporates quickly.
Ⓑ Because water freezes when it comes into contact with these metals.
Ⓒ Because the reaction with water is highly exothermic and leads to the ignition of the rising hydrogen gas.
Ⓓ Because the density of water is less than that of sodium.

27- When the amount of oxygen is abundant (too sufficient) in a gasoline stove, the flame appears in ..... colour.

Ⓐ Yellow. Ⓑ Red. Ⓒ Blue (complete combustion). Ⓓ Orange.

28- A small percentage of ethanethiol gas is added to the natural gas used in households .....

Ⓐ To raise the calorific value of natural gas when it is combusted.
Ⓑ to act as a catalyst that increases the speed of natural gas combustion.
Ⓒ To facilitate the detection of gas leaks due to its characteristic garlic-like smell.
Ⓓ To reduce carbon dioxide emissions from combustion.

29- When a stream of hydrogen gas is passed over the heated black copper oxide powder .....

Ⓐ The tube explodes due to the rise of oxygen gas.
Ⓑ No reaction occurs because hydrogen is an inert gas.
Ⓒ Hydrogen oxide is formed and the powder turns into red copper.
Ⓓ The colour of the powder changes from black to white.

30- Ethanol prepared from cornstarch is a ..... fuel, while hydrogen is a ..... fuel.

Ⓐ Artificially / Biologically
Ⓑ Fossil / Naturally
Ⓒ Biologically / Artificially
Ⓓ Solid / Liquid

31- ..... is the substance that gives oxygen during a chemical reaction."

Ⓐ Combustible material
Ⓑ Catalyst
Ⓒ Biofuel
Ⓓ Oxidizing agent

32- Water is not used to extinguish oil fires because .....

Ⓐ The density of oil is lower than that of water, so it floats on its surface and remains burning.
Ⓑ The water cools the petroleum quickly, causing it to freeze.
Ⓒ Water chemically reacts with petroleum and produces toxic gases.
Ⓓ Water hydrolyses by heat into oxygen that increases the ignition of a fire.

33- Which is the substance that changes colour from blue to pink when drops of water are added to it?

Ⓐ Anhydrous cobalt chloride.
Ⓑ Anhydrous copper sulphate.
Ⓒ Hydrated cobalt chloride.
Ⓓ Hydrated copper sulphate.

34- What change occurs in all endothermic processes?

Ⓐ A change in the solution colour.
Ⓑ Solid substances melt.
Ⓒ A gas evolves.
Ⓓ The temperature of the surrounding medium decreases.

35- The dissolution of the following substances in water is accompanied by the release of thermal energy, except .....

Ⓐ Sodium hydroxide.
Ⓑ Calcium chloride.
Ⓒ Sodium carbonate.
Ⓓ Sodium bicarbonate.

36- The dissolution of which of the following substances in water leads to a chemical change accompanied by the release of thermal energy?

Ⓐ Sodium hydroxide.
Ⓑ Calcium oxide.
Ⓒ Sodium carbonate.
Ⓓ Sodium chloride.

37- Each of the following represents an element of the fire triangle, except .....

Ⓐ heat. Ⓑ water. Ⓒ fuel. Ⓓ Oxygen.

38- Which fuel of the following has the highest calorific value?

Ⓐ Natural gas. Ⓑ Ethanol. Ⓒ Hydrogen. Ⓓ Wood.

39- Which of the following describes the reaction of potassium permanganate with glycerin?

Ⓐ Endothermic and spontaneous ignition reaction.

Ⓑ Exothermic and spontaneous ignition reaction.

Ⓒ It occurs by heating although it is exothermic.

Ⓓ It occurs by cooling although it is endothermic.

40- A net force of 1 N means an object of mass 1 kg is .....

Ⓐ moving at an acceleration of 10 m/s^2

Ⓑ moving at an acceleration of 1 m/s^2

Ⓒ lifted vertically at a velocity of 1 m/s.

Ⓓ lifted vertically at a velocity of 10 m/s

Unit 2

41- Which of the following did Newton discover?

Ⓐ Electricity Ⓑ Gravity Ⓒ Nuclear Forces Ⓓ Laws of Electromagnetism

42- Which of Newton's laws explains the relationship between force, mass, an acceleration?

Ⓐ First Law Ⓑ Second Law Ⓒ Third Law Ⓓ Law of Attraction

43- Why is Newton considered one of the greatest scientists?

Ⓐ Because he invented electricity

Ⓑ because he contributed to physics and mathematics

Ⓒ Because he discovered penicillin

Ⓓ because he invented the airplane

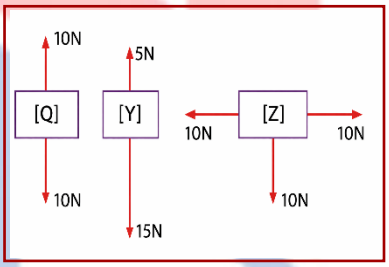
44- An object moves at an acceleration (a), if the object mass is halved and the net force acting on it is doubled, its acceleration of motion will be .....

Ⓐ a Ⓑ 2 a Ⓒ 3 a Ⓓ 4 a

45- Which of the following bodies has the greatest inertia?

Ⓐ A ball of mass 0.1 kg moving at velocity 50 m/s
Ⓑ A runner of mass 70 kg moving at velocity 30 m/s
Ⓒ A car of mass 1000 kg moving at velocity 50 m/s
Ⓓ A van of mass 2000 kg moving at velocity 30 m/s

46- The opposite figures show three objects X, Y, Z each object is affected by several forces :



Which object is affected by a non-zero net force (unbalanced forces)?

Ⓐ Objects X, Y, Z
Ⓑ Object X only.
Ⓒ Objects Y and Z only.
Ⓓ Object Y only.

47- Launching a rocket in a direction opposite to that of the expelled gases is explained by .....

Ⓐ Newton's first law.
Ⓑ Newton's second law.
Ⓒ Newton's third law.
Ⓓ law of universal gravitation.

9 Define the following (what is meant by) — Unit 1

Refrigeration cycle in the refrigerator	It is a closed and repeated thermal process, in which heat is withdrawn (extracted) from inside the refrigerator and transferred to the refrigerator the surrounding medium (air) using a refrigerant (eco-friendly freons).
Heat of dissolution	It is the amount of heat absorbed or released when dissolving a specific quantity of solute in a known volume of solvent to form a solution.
Exothermic dissolution	It is a physical change accompanied by the release of thermal energy to the surroundings when a substance dissolves in water.
Endothermic dissolution	It is a physical change accompanied by the absorption of thermal energy from the surroundings when a substance dissolves in water.

Law of conservation of energy	Energy is neither destroyed nor created, but can be transformed from one form to another.
Exothermic reactions	Reactions that release thermal energy to the surroundings as a product of the reaction, causing the temperature of the surroundings to rise.
Endothermic reactions	Reactions that require the absorption of thermal energy from the surroundings, causing the temperature of the surroundings to decrease (be lowered).
Fuel	It is a flammable material used to produce thermal energy (heat) as a result of the occurrence of an exothermic reaction.
Calorific value of fuel	It is the amount of energy produced from the combustion of 1 g of fuel in excess of oxygen gas.
Combustion	It is the process of the combination of fuel with oxygen which is usually accompanied by the emission of light, heat, or both.
Ignition point	It is the temperature at which the material begins to ignite.
Spontaneous combustion	It is the ignition of materials without the presence of an external source of heat.
Oxidation process	A chemical process in which the percentage of oxygen increases in the substance or the percentage of hydrogen decreases in it.
Reduction process	A chemical process in which the percentage of oxygen decreases in the substance or the percentage of hydrogen increases in it.
Reducing agent	It is the substance that gives (donates) hydrogen to, or takes oxygen away from another substance during the chemical reaction.
Oxidizing agent	It is the substance that gives (donates) oxygen to, or takes hydrogen away from another substance during the chemical reaction.

Net force	The total force in magnitude and direction resulting from the effect of a number of forces acting on an object. Unit 2
Newton's first law (Law of inertia)	The object keeps its state of rest or motion at a constant velocity in a straight line, unless acted upon by external unbalanced forces that change its state.
Stopping time	The time taken for the moving object to stop.
Stopping distance	The distance travelled by the moving object during the stopping time.
Acceleration (a)	The change in the velocity of the object per unit time. Or The rate of change of the velocity.
Newton's second law	If a net force (F) acts on an object of mass (m), it causes the object to have an acceleration (a) in the same direction as the net force.
Newton's third law Newton's laws	For every action, there is an equal and opposite reaction.

10 compare between each of the following

Unit 1

1- Exothermic process and Endothermic process

1	Exothermic process	Endothermic process
Definition	It is a physical change accompanied by the release of thermal energy to the surroundings when a substance dissolves in water.	It is a physical change accompanied by the absorption. of thermal energy from the surroundings when a substance dissolves in water.
Examples	• Sodium hydroxide • Calcium chloride • Sodium carbonate	• Ammonium nitrate • Potassium sulphate • Sodium bicarbonate

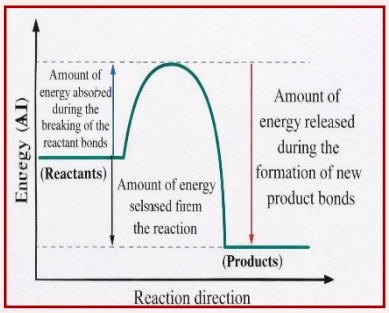
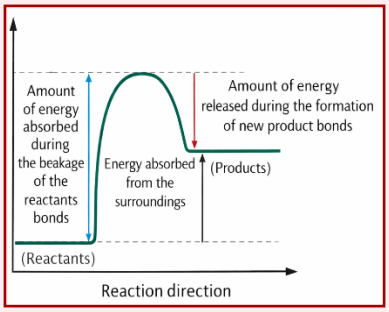
	• Magnesium sulphate • Anhydrous copper sulphate • Anhydrous cobalt chloride • Anhydrous lithium chloride	• Hydrated copper sulphate • Hydrated cobalt chloride • Hydrous lithium chloride

2- Instant hot compresses (Packs) and Instant cold compresses (Packs)

②	Instant hot compresses (Packs)	Instant cold compresses (Packs)
The solute (Dissolved salt)	Magnesium sulphate salt $MgSO_{4(s)}$	Ammonium nitrate salt $NH_4NO_{3(s)}$
Its use	They are used to relieve pain associated with muscle fatigue (strain)	They are used to reduce the severity of swelling.
The occurring thermal change	Exothermic dissolution	Endothermic dissolution

3- Exothermic reactions and Endothermic reactions

③	Exothermic reactions	Endothermic reactions
Thermal change for the system and surroundings	The temperature of system and the surroundings increases	The temperature of the system and the surroundings decreases.
Examples	• Reactions of metals with dilute Decomposition reaction of acids. • Reactions of alkalis with acids. • Reactions of metal carbonates with dilute acids.	• Decomposition reaction of calcium carbonate. • Decomposition reaction of ozone gas in the atmosphere. • Reaction of sodium bicarbonate with dilute acids.

Energy diagram		

4- Fossil fuel, Biofuel and Synthetic fuel

4	Fossil fuel	Biofuel	Synthetic fuel
Fossil fuel	• Petroleum oil. • Examples Natural gas. • Coal.	Ethyl alcohol (ethanol)	Hydrogen gas (fuel of the future)
Usage	The most widely used in the world till now, even though it is a non-renewable resource	It is used as a fuel for cars in some countries after being mixed with gasoline	It is used as a fuel for cars and trucks powered by fuel cells (hydrogen fuel cells)

5- The fire triangle (Combustion triangle) and The extinguishing fire triangle

5 The fire triangle (Combustion triangle)	The extinguishing fire triangle
It composes of three main elements, which are : • Fuel. • Oxygen. • Heat.	It composes of three main principles, which are : • Fuel removal. • Smothering. • Cooling.

6- Oxidation process and Reduction process

6	Oxidation process	Reduction process
definition	A chemical process that leads to an increase in the percentage of oxygen in the substance or a decrease in the percentage of hydrogen in it	A chemical process that leads to a decrease in the percentage of oxygen in the substance or an increase in the percentage of hydrogen in it
Example	Passing a stream of air on a powder of red-hot copper, forming black copper oxide compound $2Cu_{(s)} + O_{2\,(g)} \xrightarrow{\Delta} 2CuO_{(g)}$	Passing a stream of hydrogen gas on black copper oxide with heating, forming reddish-brown copper $H_{2\,(g)} + CuO_{(g)} \xrightarrow{\Delta} Cu_{(g)} + H_2O_{(v)}$

7- Reducing agent and Oxidizing agent

7 Reducing agent	Oxidizing agent
• The substance that takes oxygen away or gives (donates) hydrogen during the chemical reaction. • Undergoes an oxidation process.	• The substance that takes hydrogen away or gives (donates) oxygen during the chemical reaction. • Undergoes a reduction process.

8- Elastic collision and Inelastic collision

8	Elastic collision	Inelastic collision
Loss of kinetic energy	No loss of energy occurs	There is a loss of energy
Velocity of objects after collision	• Stationary object : Its velocity becomes equal to the velocity of the moving object before the collision.	Both objects (stationary and moving) move after the collision at half the velocity of the moving object before the collision

	• Moving object: It stops and its velocity becomes zero.	

11 Correct the following statements

Unit 1

1- In exothermic reactions, the final temperature T_2 is lower than the initial temperature T_1.

In exothermic reactions, T_2 is higher than T_1

2- The $CaCO_3$ decomposition reaction is an example of exothermic reactions.

$CaCO_3$ decomposition is an example of endothermic reactions.

3- The less energy the bond, the harder it is to break.

The less energy the bond, the easier it is to break.

4- In an endothermic reaction, the system absorbs heat energy that causes the increase in the temperature of the surrounding medium

In endothermic reactions, the system absorbs heat causing decrease.

5- Self-heating packaging is based on the reaction of calcium oxide with water, which is an endothermic reaction.

It is an exothermic reaction

6- Natural gas is mainly made up of propane gas

Natural gas is mainly made up of methane (CH_4) gas.

7- Oxidation is a process that results in a lack of oxygen in a material.

Oxidation is a process that results in gaining oxygen.

8- A reducing agent is defined as the substance that gives oxygen during a reaction.

A reducing agent is the substance that takes oxygen during a reaction.

9- The calorific value of wood is higher than the calorific value of hydrogen.

The calorific value of hydrogen is much higher than that of wood.

Unit 2

10- The acceleration with which the object moves increases as its mass increases when the force is constant.

The acceleration decreases as mass increases when force is constant.

11- The forces of action and reaction affect on the same body and therefore do not cancel each other out.

Forces of action and reaction affect two different bodies.

12- Newton's second law is known as the law of inertia.

Newton's first law is known as the law of inertia..

13- If two forces of equal magnitude and opposite in direction act along same line of action, the resultant is the sum of the two forces.

The resultant is zero

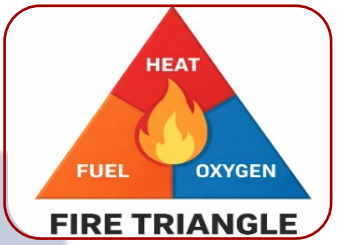
14- Mass is considered a vector physical quantity.

Mass is a scalar physical quantity.

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12 Various questions

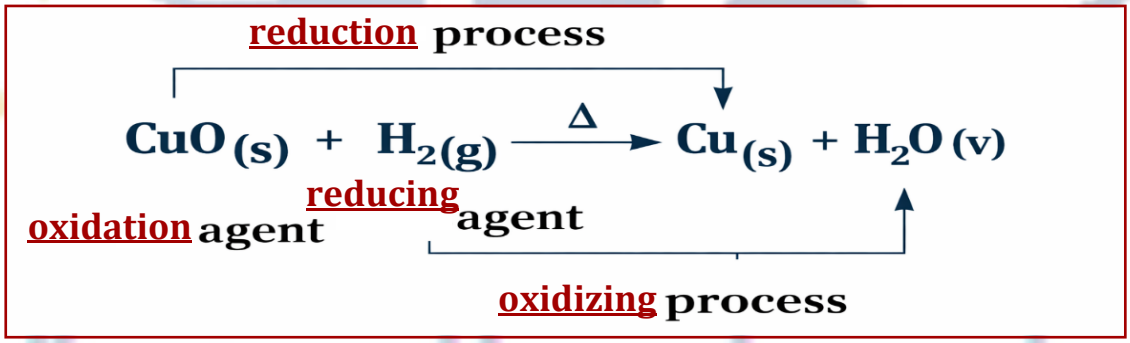
Unit 1



1. The combustion triangle consists of :

1- Fuel 2- Oxygen 3- Heat

2. Study the following equation carefully, then answer the question:



Complete the data on the previous equation :

1. Oxidized to increase the oxygen content Is hydrogen
2. CuO Called by oxidizing agent because it gives oxygen to hydrogen

3. It reduced CuO to decrease the amount of oxygen

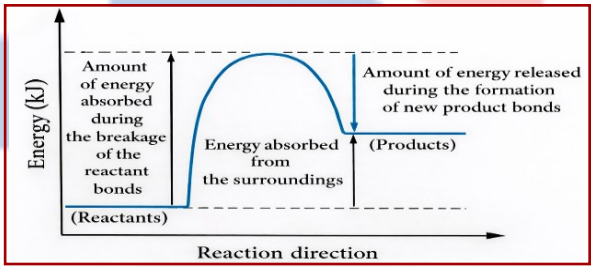
4. H_2 Called by reducing agent because it takes away oxygen form CuO



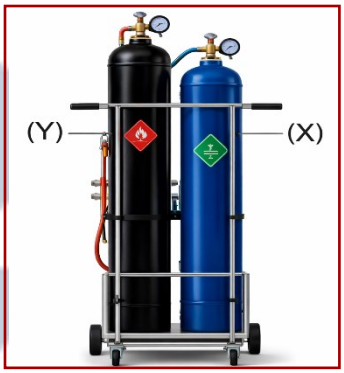
3. Technology of food preservation by air evacuation

Evacuating air from food packing creates a low oxygen environment which reducces Oxidation and reduction reactions which lead to spoiling of food

4. Draw the energy diagram for an endothermic reaction.



5. The figure shows a cylinder (X) containing a compressed gas that helps burning, and a cylinder (Y) containing a compressed flammable gas. Their mixture can produce a flame used in welding metals :



(1) Name the gases in cylinders (X) and (Y).

- (X): Oxygen gas.
- (Y): Acetylene gas.

(2) What is the name of the flame produced? What is its temperature?
Oxyacetylene flame / Its temperature reaches 3000°C

Unit 2

6. The figure in front of you is a ball rolling on a rough ground and then stopping after a distance.



1- What is the reason for the ball stopping?
The ball stops because of friction between the ball and the rough ground, which acts as an opposing force that slows the ball down.

2- What is the name of the force acting on the ball?
The force is called friction force.

3- Can an object be moving and stationary at the same time? Illustrate your answer with an example from everyday life

No. An object cannot be moving and stationary at the same time. Example: A ball rolling on the ground is moving — it cannot be stationary at the same moment.

4- What happens to the motion of the ball if the rough surface is replaced by a smooth surface?

The ball will continue moving for a much longer distance without stopping because there is no friction to slow it down.



7. Look at the picture in front of you Then answer the following :

1- Determine the direction of each force acting on the vehicle (use arrows)

Both people push the car in the same direction →

Both forces point forward (→)

2- Calculate the net force if each force is 50 newtons.

Net Force = 50 + 50 = 100 N

3- Does the car move or remain stationary? With the explanation? and if it moves, what is the direction of its movement?

The car will move to the forward direction with 100N force

4- Choose the correct answer : the net force is .....

Ⓐ The greatest force acting on the body
Ⓑ The sum of the forces acting on the body
Ⓒ The sum of the masses acting on the body
Ⓓ The sum of the forces acting on a same line of action

8. Types of Forces :

Choose the appropriate type of force for each of the following images (Push-Pull)



(.....pull...)



(.....push.....)



(.....pull.....)



(.....push.....)

9. Balanced and unbalanced forces



(Balanced Forces)



(..Unbalanced Forces)

1. What happens if two tug-of-war teams are equal in force?

The rope does not move and remains stationary because the forces are balanced and the net force = zero.

2- How do you know if a rope is moving due to an unbalanced force?

he rope moves towards the stronger team, which means one team is exerting a greater force

3-What is the relationship between the number of players or the force they exert on the movement of the rope?

The greater the number of players or the greater the force a team exerts, the more likely the rope will move towards their side

10. The figure (3) in front of you shows a stationary object : that is affected by a set of forces

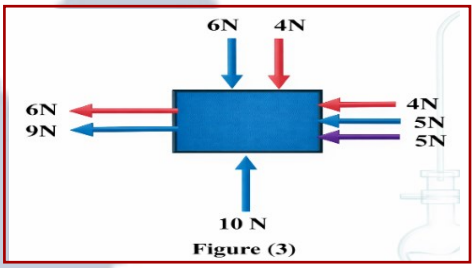


Figure (3)

a) Calculate the net forces

Net force right 5+5+4=14N

Net force left6+9=15N

Net force down6+4=10N

Force up 10N

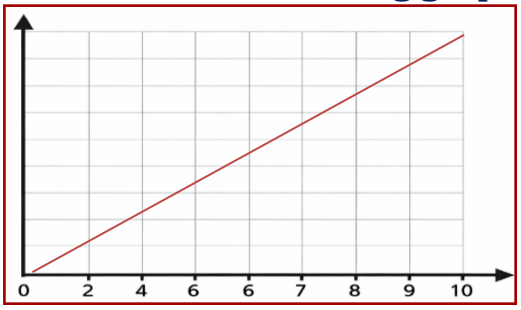
Total net force right+left =(14+15)=39N

Total net force up- down=(10+10)=0N

b) Does the object remain stationary or will it move? mentioning the reason

The object will MOVE because the forces are unbalanced — the net force is not equal to zero.

11. Draw the following graph from the following table :



Force	Acceleration
2	1
4	2
6	3
8	4
10	5

-From the graph :

1- Calculate the object's mass?

m = F ÷ a = 2 ÷ 1 = 2 kg

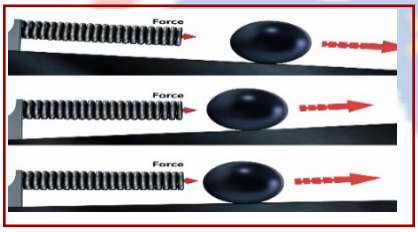
2- Determine the independent factor, the dependent factor and the control factor

Independent factor (what we change)Force (N)

Dependent factor (what changes as a result)Acceleration (m/s^2)

Control factor (what stays constant)Mass of the object (2 kg)

12. Notice the following set of images and then select which of Newton's laws applies to them?



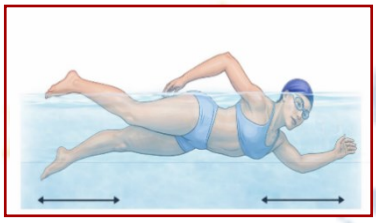
(Newton's Second Law)



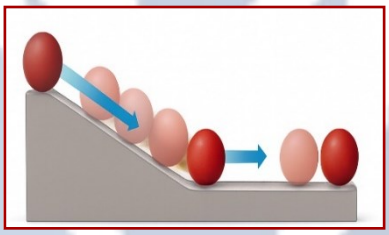
(Newton's Third Law)



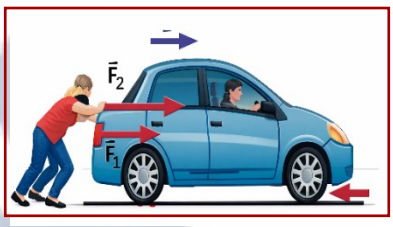
(Newton's Third Law)



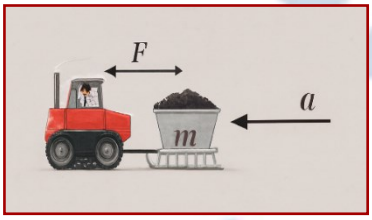
(Newton's Third Law)



(Newton's First Law)



(Newton's Second Law)



(Newton's Second Law)



(Newton's Third Law)



(Newton's Third Law)

13. Based on your understanding of Newton's second law :

What does the horizontal axis represent in the given graph?

Mass (kg).

