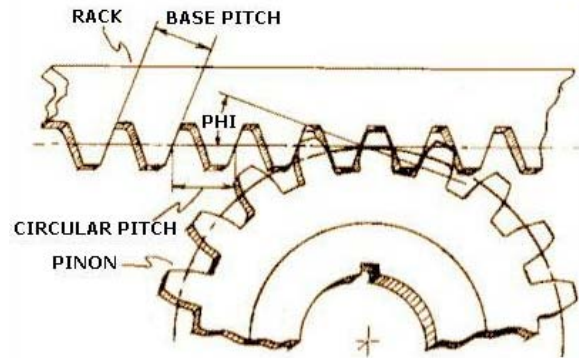




ST Review 1

Name _____

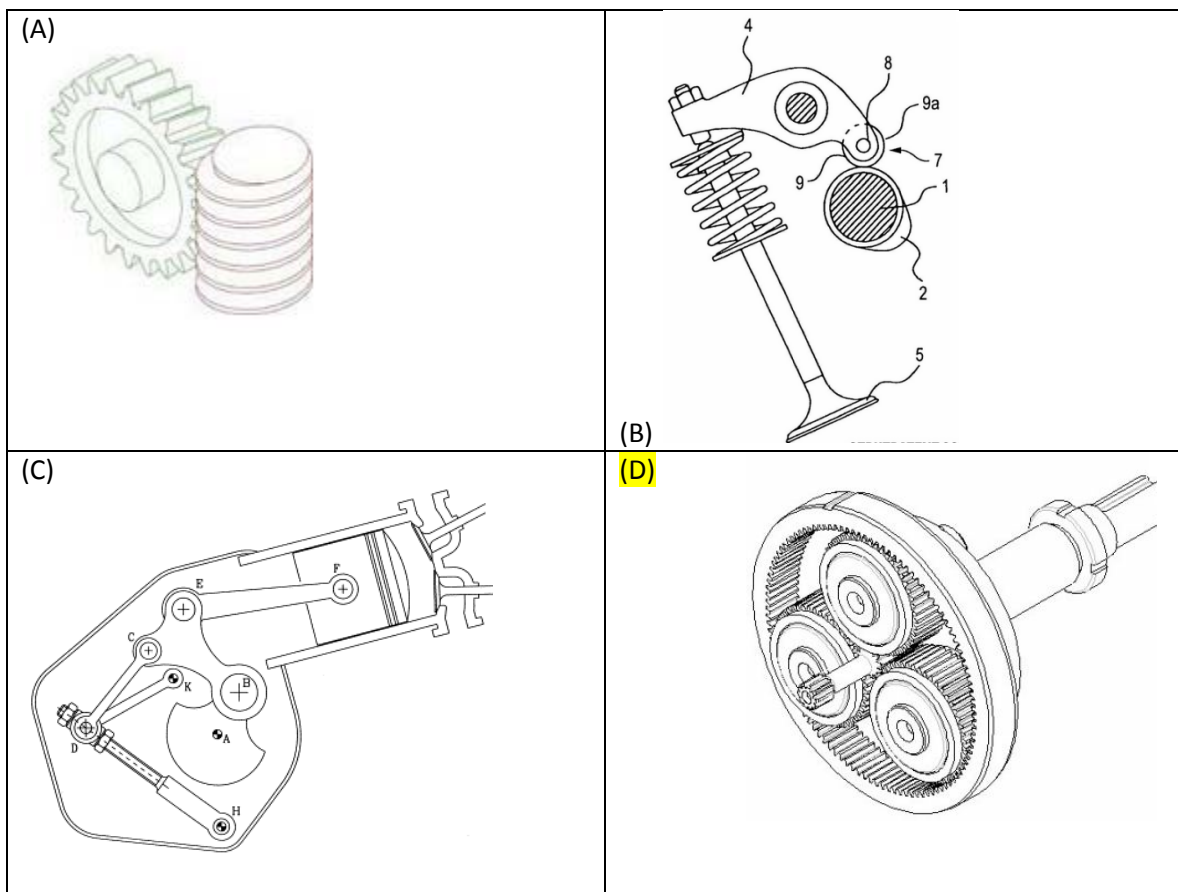
1. Which of the following statements regarding the link between the rack and pinion is correct?
(A) The link is indirect and partial.
(B) The link is indirect and complete.
(C) The link is direct and complete.
(D) The link is direct and partial.



2. An example of helical guiding in which the moving part is kept rotating in the same axis is found in the _____
(A) Laptop screen
(B) C-clamp
(C) Window
(D) Zipper
3. If the speed ratio for a gear train is $1/3$, then which of the following is true?
(A) The driver gear has more teeth than the output gear.
(B) There is one tooth on the driver for every 3 teeth on the output gear.
(C) The ratio of the diameters of the input to output gear is 3:1.
(D) The ratio of the circumferences of the input to output gear is 3:1.
4. Which material has a low specific heat but high electrical conductivity??

iron

5. Which of the following concerning energy are TRUE? 2,3,4 (not multiple choice)
 1. The energy contained in nectar eaten by a bee will all be used either in flight or in growth.
 2. The useful energy of a refrigerator is a fraction of the electrical energy used.
 3. If the energy of wasted heat, sound, lights, electronics etc. and motion of a car are added up, it will equal to the energy released by expanding combustion gases of gasoline.
 4. Heat depends on mass and temperature; temperature depends on the velocity of molecules.
6. In which of the following is there no transformation of rotational motion to translational motion?



7. Draw Lewis dot structures and Bohr Rutherford diagrams for the smallest nucleus of each of the following families:

a) Alkali metals

Li · Li 3p 2e)1e

b) Alkaline earth metals

Be: Be 4p 2e)2e

c) Halogens

F (with seven dots around it) F 9p 2e)7e

d) Noble gases



He: He 2p 2e)

8. When would you add lime to a lake and how would you know when to stop adding it?

If a lake is acidified it would need lime to neutralize the excess H^+ . You would have to constantly monitor pH to know when to stop adding acid, to know when it was neutral.

STE way: If you convert pH to H^+ , with that measurement and an estimation of the lake's volume, you can estimate the amount of base required for the whole base.

9. How does sodium form an ion? Be specific; mention the chemical needed and what happens to its atomic structure as it becomes an ion.

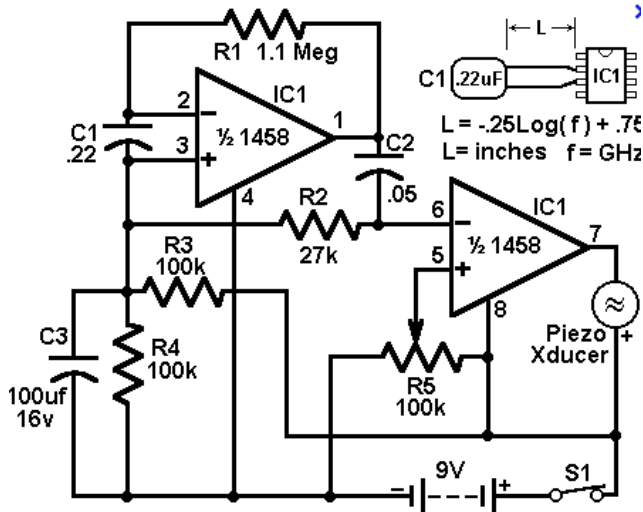
It forms an ion by losing one electron usually to a non metal or to a compound capable of accepting electrons.

After it loses the electron sodium acquires a positive charge and get attracted to a negative ion formed by whatever is accepting the electron.

10. Find the power of a circuit whose total resistance is 10Ω and whose current is 2A.

$$P = I^2 R = 2^2 (10) = 40 \text{ W}$$

11. a) Identify the switch in the circuit shown.



b) In this diagram, can the current return to any of the two power sources if the switch is off?

No

12. A) How does an iceberg form?



It forms when ice caps or smaller glaciers slide to the edge of the sea. The ice breaks off the land and falls into the water.

b) What is the impact on ocean salinity of melting icebergs?

It lowers the concentration of salt.

c) When does the melting of ice caps or large glaciers affect sea level?

As soon as the ice is added to sea water, the water level goes up. If there is meltwater from land that falls to sea, the effect is the same. But there is no raising of sea level from already floating ice that later melts.

13. What ocean characteristic is affected by latitude, depth and season?

Temperature

14. How does uneven heating of the earth lead to ocean circulation?
(It's not the only factor, however. Salinity is also a factor.)

Warmer water is less dense colder water, so if it blows to another area, it will not mix as readily, allowing the heat to spread to other surface waters.

15. What is the difference between a producer and a decomposer?

A producer makes its own food, usually by photosynthesis. A decomposer cannot make its own food. It breaks down simpler organic material either by ingesting small molecules (bacteria) or by releasing enzymes outside of its own cells to help decompose dead material. (fungi)



16. In this scenery there may or may not be permafrost. What two factors influence whether it exists?

Latitude and altitude

17. What property shared by carbon dioxide, methane and water leads to climate change?

These gases are transparent to invisible light but absorb and spread infrared(heat)---they are like glass, which prevents some heat from escaping but allows light energy through, and therefore allows the surface of the earth to heat up in the first place.