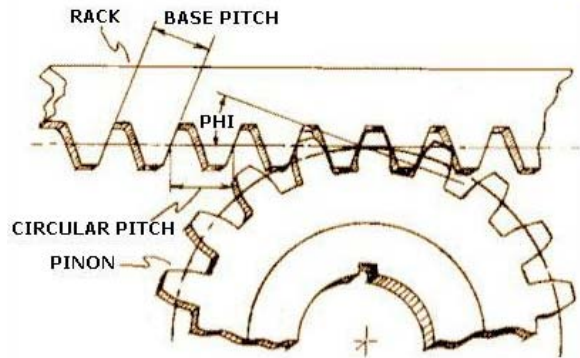




ST Review 2013

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.

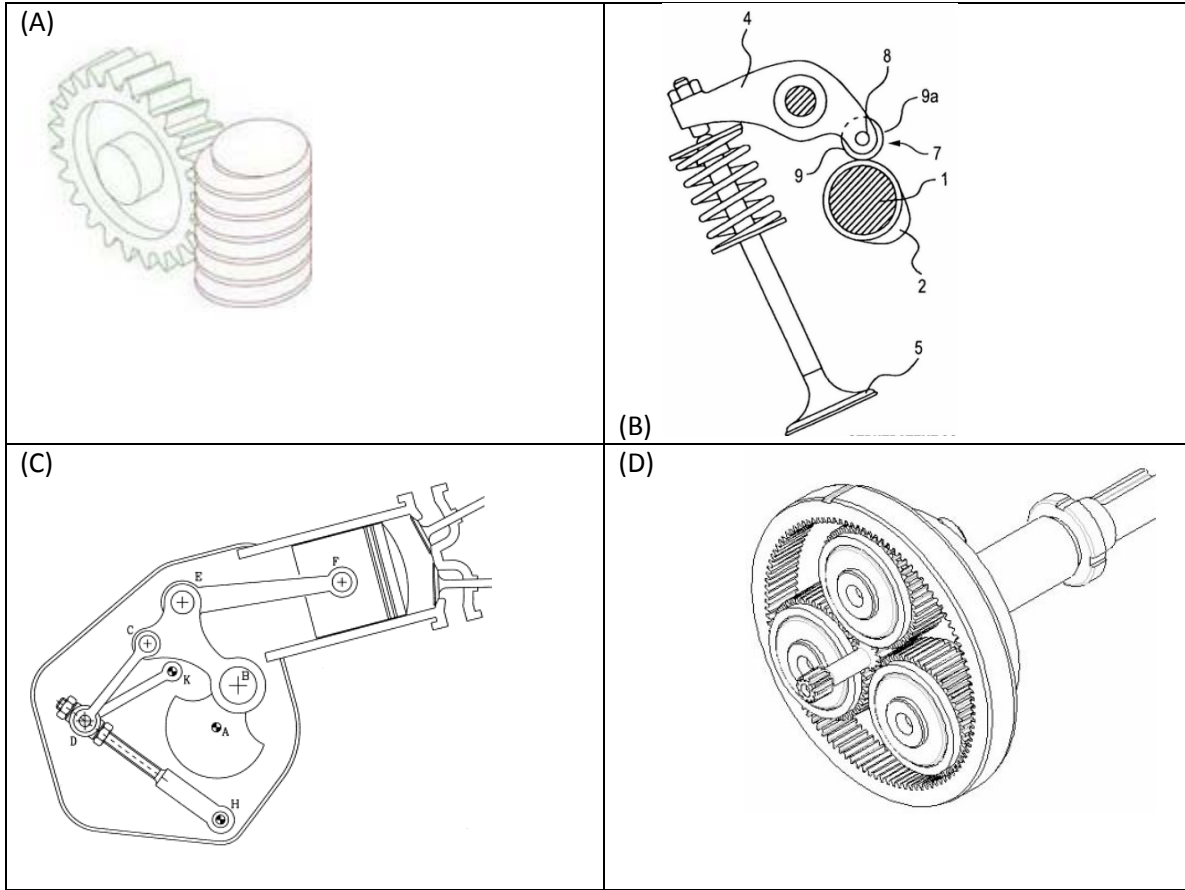
2. An example of helical guiding in which the moving part is kept rotating in the same axis is found in the _____
 - (A) Laptop screen
 - (B) C-clamp
 - (C) Window
 - (D) Zipper

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 gear 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 high heat conductivity but low specific heat?
 - (A) silicon
 - (B) iron
 - (C) polyethylene plastic
 - (D) chlorine pool tablets

5. Which of the following concerning energy are TRUE? _____ (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
 - b) Alkaline earth metals
 - c) Halogens
 - d) Noble gases
8. When would you add lime to a lake and how would you know when to stop adding it?

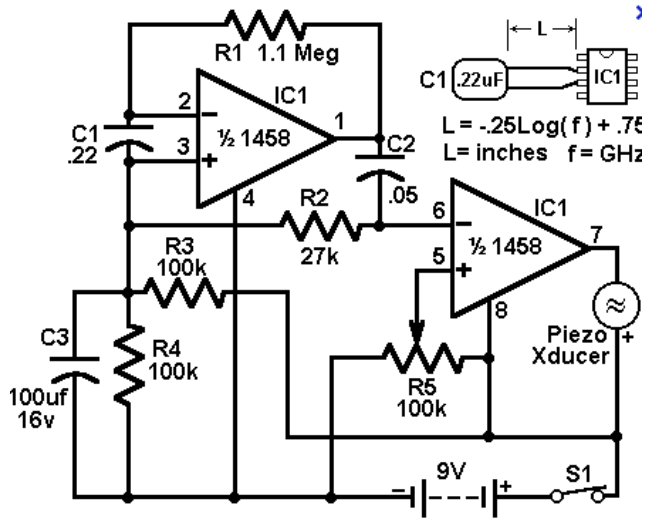


9. How does sodium form an ion? Be specific; mention the chemical needed and what happens to its atomic structure as it becomes an ion.

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

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

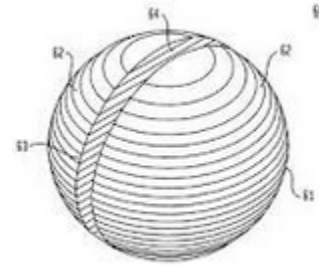
b) In this diagram, can the current return to any of the two power sources if the bar on switch S1 is lifted?



12. A) How does an iceberg form?

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

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



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

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

15. What is the difference between a copper ore, which if roasted leads to acid rain, and a mineral?



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



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