

1. **Lepidopterology deals with the study of**
 - (A) bugs and bees.
 - (B) moths and butterflies.
 - (C) grasshopper and crickets.
 - (D) dragonflies and damselflies.

2. **Tapetum occurs in the jacket layer of**
 - (A) Leptosporangiate sporangia
 - (B) Eusporangiate sporangia
 - (C) All homosporous sporangia
 - (D) All heterosporous sporangia

3. **Phagocytosis may be characterized by which of the following statements ?**
 - (A) It is a constitutive process
 - (B) It involves fluid uptake by small vesicles
 - (C) It is important in digestive processes in mammals
 - (D) It involves the uptake of cellular debris in large endocytic vesicles

4. **Carbohydrates, lipids and proteins are formed from their basic building blocks by**
 - (A) addition of carbon to each molecule.
 - (B) addition of oxygen to each molecule.
 - (C) removal of a water molecule between building blocks
 - (D) addition of a water molecule between building blocks

5. Which of the following statements regarding brown fat is correct ?
- (A) It is poorly vascularized
 - (B) It functions in unilocular energy storage
 - (C) It is directly innervated by the parasympathetic
 - (D) It produces heat through the uncoupling of the electron transport chain from oxidative phosphorylation

6. **An iron ball is dropped into a long jar containing castor oil. How will it move ?**
- (A) It will fall with a constant acceleration equal to that of gravity.
 - (B) It will fall with an acceleration slightly less than that due to gravity.
 - (C) It will ultimately acquire a constant velocity.
 - (D) It will float in the oil.
7. **A soap bubble assumes a spherical shape. Which of the following statements is wrong ?**
- (A) The soap film tends to shrink to as small surface area as possible.
 - (B) The soap film consists of two surface layers.
 - (C) Pressure of air enclosed by the soap film is same as that of the atmosphere outside.
 - (D) Pressure of air enclosed by the soap film is more than the atmospheric pressure.
8. **A ball hits the floor and rebounds after an inelastic collision. What happens in this case ?**
- (A) The momentum of the ball just after the collision is the same as that just before the collision.
 - (B) The mechanical energy of the ball remains the same in the collision.
 - (C) The total momentum of the ball and the earth is conserved.
 - (D) The total energy of the ball and the earth is conserved.

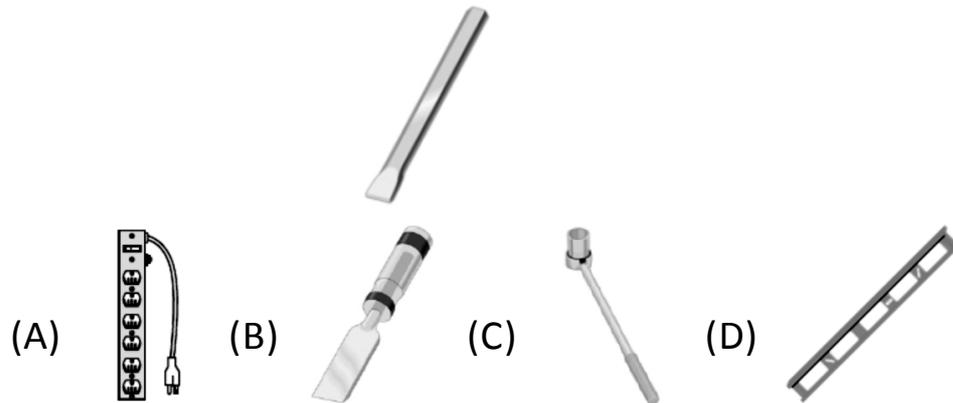
9. A small sphere is suspended by a string from the ceiling of a car. If the car begins to move with a constant acceleration a , then what is the inclination of the string to the vertical ?
- (A) $\tan^{-1} (a/g)$ in the direction of motion.
(B) $\tan^{-1} (a/g)$ opposite to the direction of motion.
(C) $\tan^{-1} (g/a)$ in the direction of motion.
(D) $\tan^{-1} (g/a)$ opposite to the direction of motion.
10. Viscous force is somewhat like friction as it opposes the motion and is non-conservative but not exactly so, Why ?
- (A) It is velocity dependent while friction is not.
(B) It's velocity decreases and becomes zero.
(C) It is temperature independent while friction is not.
(D) It is independent of area like surface tension while friction depends on the area of contact.

11. What are the favourable conditions for the manufacture of ammonia by the reaction $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$; $H = -21.8 \text{ kcal mol}^{-1}$?
- i) Low temperature ii) Catalyst
iii) High pressure
- (A) (i) and (ii) only (B) (ii) and (iii) only
(C) (i) and (iii) only (D) (i), (ii) and (iii)
12. Which of the following can be used to prepare a buffer solution ?
- (I) From a mixture of sodium acetate and acetic acid in water.
(II) From a mixture of sodium acetate and hydrochloric acid in water.
(III) From a mixture of ammonia and ammonium chloride in water.
- (A) (I) and (II) only (B) (II) and (III) only
(C) (I) and (III) only (D) (I), (II) and (III)
13. What is the purpose of exhaust system in limekilns where the decomposition of limestone takes place ?
- (A) To drive away, CO_2 gas and make the reaction proceed for completion.
(B) To reduce the temperature of the reaction.
(C) To make the reaction attain equilibrium in less time.
(D) All of the above

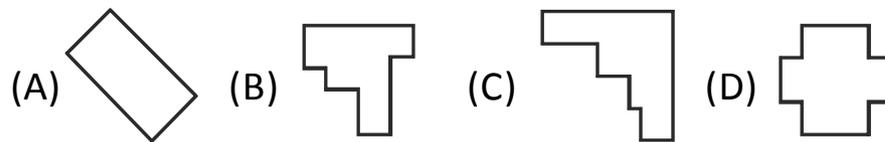
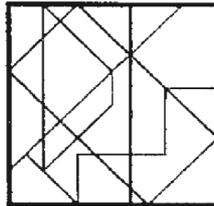
14. Why can H_2S in presence of dilute HCl precipitate out only second group radicals but not fourth group radicals ?
- (A) HCl activates H_2S .
- (B) HCl decreases concentration of sulphide ions.
- (C) HCl increases concentration of sulphide ions.
- (D) Sulphides of IV group are unstable in HCl.
15. Which of the following electronic configurations represents the violation of both Aufbau principle and Hund's rule ?

- (A) $\begin{array}{c} \boxed{1\downarrow} \\ 3s \end{array}$ $\begin{array}{c} \boxed{1\downarrow} \boxed{1\downarrow} \boxed{1\downarrow} \\ 3p \end{array}$ $\begin{array}{c} \boxed{1} \boxed{1} \boxed{1} \boxed{} \boxed{} \\ 3d \end{array}$ $\begin{array}{c} \boxed{1\downarrow} \\ 4s \end{array}$
- (B) $\begin{array}{c} \boxed{1\downarrow} \\ 3s \end{array}$ $\begin{array}{c} \boxed{1\downarrow} \boxed{1\downarrow} \boxed{1\downarrow} \\ 3p \end{array}$ $\begin{array}{c} \boxed{1} \boxed{1} \boxed{1} \boxed{1} \boxed{1} \\ 3d \end{array}$
- (C) $\begin{array}{c} \boxed{1\downarrow} \\ 3s \end{array}$ $\begin{array}{c} \boxed{1\downarrow} \boxed{1\downarrow} \boxed{1\downarrow} \\ 3p \end{array}$ $\begin{array}{c} \boxed{1\downarrow} \boxed{1} \boxed{1} \boxed{} \boxed{} \\ 3d \end{array}$
- (D) $\begin{array}{c} \boxed{1\downarrow} \\ 3s \end{array}$ $\begin{array}{c} \boxed{1\downarrow} \boxed{1\downarrow} \boxed{1\downarrow} \\ 3p \end{array}$ $\begin{array}{c} \boxed{1} \boxed{1} \boxed{1} \boxed{1} \boxed{} \\ 3d \end{array}$ $\begin{array}{c} \boxed{1} \\ 4s \end{array}$

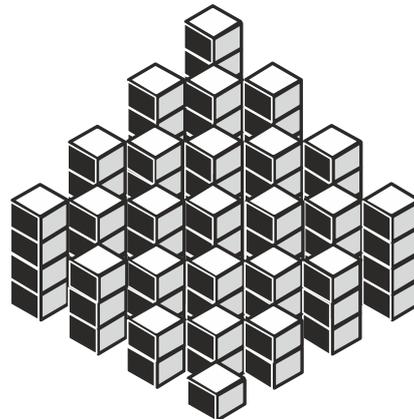
16. Recognize the tool in the question and choose the most closely related tool or object from the given choices.



17. The hidden figure in block 10 is _____.



18. Count the number of blocks in the given figure.



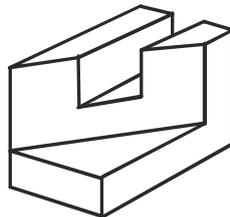
- (A) 105 (B) 98 (C) 102 (D) 100

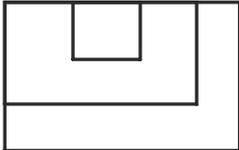
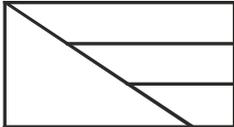
19. Recognize the tool in the question and choose the most closely related tool or object from the given choices.



- (A)  (B)  (C)  (D) 

20. Of these four choices, three are the correct two-dimensional views that would represent the top, front and side. The fourth is incorrect. Identify the response that would be INCORRECT.



- (A)  (B) 
 (C)  (D) 