scientific attitude scale
Attitudes Toward Science and Scientists

1. Main principle of science is discovery.
2. Science is a way of thinking and working.
3. The method of science is rigid.
4. One of the distinguishing characteristic of science is that it recognizes its own limitations.
5. The spirit of inquiry is the spirit of science.
6. Science improves increased individuality.
7. Nobel prizes in science are a good gesture for the scientists.
8. Scholarships to the National Science Talent Search Awarded help in promoting scientific talent.
9. The basic objective of science is the generation of knowledge with technological application.
10. Science tries mainly to develop new machines.
11. Indian society demands greater participation of scientists in public affairs.
12. The eternal (राजकत) search for truth is the quest of science.
13. Development of modern science is a result of the use of technology.
14. Science and authoritarianism (अधिकारवाद) are not opposite to each other.
15. The primary objective of the working scientist is to improve human welfare.
16. A spirit (साधन) of indomitable perseverance (अद्वायदृढता) has characterised all successful scientists.
17. Scientists use truth as a goal, in procedure in reporting.
18. Most scientists would probably prefer to spend a day off planning their next experiment.
19. Scientists are judged by what their friends say about them.
20. Scientists are effective partners in the formulation of national economic policies.
21. Government policies affect the work of scientists.
22. Scientists are interested in ideas than men.
23. Without science we would still be living in the prehistoric age.

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Main principle of science is discovery. Science is a way of thinking and working. The method of science is rigid. One of the distinguishing characteristic of science is that it recognizes its own limitations. The spirit of inquiry is the spirit of science. Science improves increased individuality. Nobel prizes in science are a good gesture for the scientists. Scholarships to the National Science Talent Search Awarded help in promoting scientific talent. The basic objective of science is the generation of knowledge with technological application. Science tries mainly to develop new machines. Indian society demands greater participation of scientists in public affairs. The eternal (राजकत) search for truth is the quest of science. Development of modern science is a result of the use of technology. Science and authoritarianism (अधिकारवाद) are not opposite to each other. The primary objective of the working scientist is to improve human welfare. A spirit (साधन) of indomitable perseverance (अद्वायदृढता) has characterised all successful scientists. Scientists use truth as a goal, in procedure in reporting. Most scientists would probably prefer to spend a day off planning their next experiment. Scientists are judged by what their friends say about them. Scientists are effective partners in the formulation of national economic policies. Government policies affect the work of scientists. Scientists are interested in ideas than men. Without science we would still be living in the prehistoric age.
ACHIEVEMENT TEST (II)
(Post-Test)

Time: 40 minutes

Q.1 The value of gas constant is:
   a. 6.67 Joule / mole K
   b. 8.3 Joule / mole K
   c. 5.3 Joule / mole K
   d. 8.7 Joule / mole K

Q.2 Which of the following is not true in the case of kinetic theory of gases?
   a. All molecules of a given gas are alike.
   b. There is hardly any force of attraction between gas molecule.
   c. Gas molecules have elastic collisions.
   d. Time of impact of molecular collisions is comparable to the time between two successive collisions.

Q.3 For a given gas at temperature T and pressure P, the root mean square (r.m.s.) velocity of molecules is \( c \). At temperature T and pressure 2P, the new r.m.s. velocity will be:
   a. \( c \)
   b. \( c/2 \)
   c. \( \sqrt{2}c \)
   d. \( c / \sqrt{2} \)

Q.4 Molecules of a gas at -73°C have certain r.m.s. speed. To what temperature must gas be heated to double its r.m.s. speed?
   a. 527°C
   b. 800°C
   c. 573°C
   d. none of the above.

Q.5 When a gas molecule having momentum \( p \) collides with the wall of a container and rebounds, the change in momentum is:
   a. zero
   b. 2p
   c. \( p \)
   d. \( p/2 \)

Q.6 If the length of a cylindrical container is doubled with a gas inside it, the number of collisions per second on the face of the container will become:
   a. twice
   b. four times
   c. half
   d. one-fourth.

contd... P.2
Q.14 The atoms of a molecule are connected end-to-end as shown. The degree of freedom of the molecule will be:

\[ 0 \quad \bigcirc \quad 0 \quad 0 \]

a. 6  
b. 7  
c. 9  
d. 8

Q.15 Three atoms of a molecule are connected as shown. What will be the degree of freedom of the molecule?

\[ \bigtriangleup \]

a. 6  
b. 9  
c. 3  
d. 7

Q.16 The energy per unit degree of freedom for a monoatomic gas molecule is:

a. \( \frac{3}{2} \) RT  
b. 2  
c. \( \frac{4}{3} \) RT  
d. \( \frac{1}{3} \) RT.

Q.17 The number of rotational degrees of freedom for the molecule in Q.15 is:

a. two  
b. three  
c. six  
d. one

Q.18 The value of Boltzmann's constant is:

a. \( 1.38 \times 10^{-23} \) J/Molecule °K  
b. \( 1.38 \times 10^{23} \) J/Molecule °K  
c. \( 6.66 \times 10^{-23} \) J/molecule °K  
d. \( 6.66 \times 10^{23} \) J/molecule °K

Q.19 The atoms of a molecule are connected as shown below. The degree of freedom of the molecule is:

\[ \quad \bigcirc \quad \bigcirc \quad \bigcirc \]

a. 9  
b. 8  
c. 11  
d. 7

contd..P.4/
Q.30 Expression for the root mean square velocity is:
   a. \( \sqrt{\frac{\nu}{P}} \)
   b. \( \sqrt{\frac{\nu}{3P}} \)
   c. \( \sqrt{\frac{3P}{P^2}} \)
   d. \( \sqrt{\frac{P}{3P^2}} \)

Q.31 The pressure \( P \) of a gas and its mean K.E. \( E \) per unit volume are related as:
   a. \( P = \frac{4}{5} E \)
   b. \( P = E \)
   c. \( P = \frac{3}{2} E \)
   d. \( P = \frac{2}{3} E \)

Q.32 In a cyclic process represented graphically by changes in pressure and volume, the extended work done by the gas is given by:
   a. area under the upper curve.
   b. area enclosed by the curve.
   c. area under the lower curve.
   d. total area under the upper and lower curve.

Q.33 Work done by an expanding gas under adiabatic condition results in:
   a. no change in temperature.
   b. temperature increases.
   c. temperature decreases.
   d. temperature increase first and then decrease.

Q.34 An amount of heat given to a gas under isothermal condition will be used:
   a. for a temperature rise
   b. for doing external work
   c. for doing external work and also for a temperature rise.
   d. for increasing the internal energy of the gas.

Q.35 In adiabatic compression the decrease in volume is associated by:
   a. decrease in temperature and increase in pressure.
   b. decrease in temperature and decrease in pressure.
   c. increase in temperature and decrease in pressure.
   d. increase in temperature and increase in pressure.

contd. P.6/
Q. 36 The difference between two specific heats of a gas is equal to universal gas constant:
   a. when 1 gm of gas is heated
   b. when 1 molecule of gas is heated
   c. when 1 gm mole is heated.
   d. when any amount of gas is heated.

Q. 37 The internal energy of an ideal gas depends only on:
   a. pressure.
   b. volume
   c. temperature
   d. size of molecule.

Q. 38 In adiabatic change the system:
   a. takes heat from the surroundings
   b. gives heat to the surroundings
   c. exchange no heat with the surroundings
   d. partly takes heat and partly leaves to the surrounding.

Q. 39 In an isothermal change, the internal energy of molecules:
   a. slightly increases or decreases.
   b. does not change
   c. increase
   d. decrease.

Q. 40 A heat engine works on Carnot cycle with a sink at temperature of 27°C. The efficiency of engine is 10%.
   The temperature of heat source is:
   a. 30 °K
   b. 60 °C
   c. 270 °K
   d. 30 °C

Q. 41 Efficiency of a reversible heat engine working between 500 K and 300 K is:
   a. 5/3
   b. 2/5
   c. 3/5
   d. 27/227

Q. 42 A reversible engine and an irreversible engine are working between same temperatures, the efficiency of:
   a. the two engines are same
   b. the irreversible engine is greater
   c. the reversible engine is greater.
   d. each engine is equal to one.

Q. 43 In a Carnot cycle, at the end of the cycle, the temperature of the working substance:
   a. is less than the initial temperature.
   b. is greater than the initial temperature.
   c. equal to the initial temperature.
   d. becomes zero.

Q. 44 If the temperature of the source is increased, the efficiency of a Carnot engine:
   a. decreases
   b. increases
   c. does not change
   d. will become equal to the efficiency of a practical engine.