SATISH SCIENCE ACADEMY

DHANORI PUNE-411015

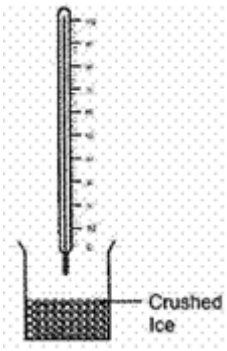
MATTER IN OUR SURROUNDINGS

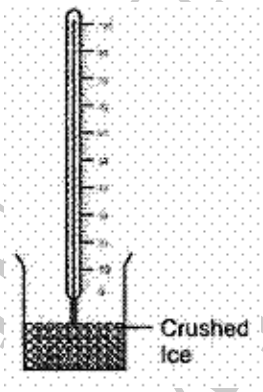
Class 09 - Science

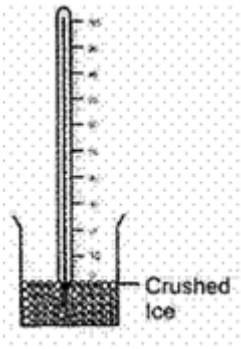
Time Allowed: 3 hours **Maximum Marks: 185**

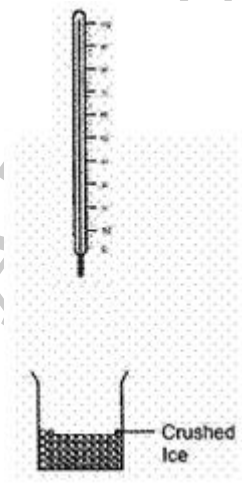
Section A

1. The correct set-up for finding the melting point of ice is: **[1]**

a) 

b) 

c) 

d) 

2. Sulphur dioxide is collected in the lab in a gas jar by upward displacement of air. Which of the following statement is correct regarding the density of the gas? **[1]**

a) It is heavier than air.

b) Its density is equal to that of air.

c) It is lighter than air.

d) No correct statement can be made about the density of the gas.

3. A desert cooler gave comfort due to cooling caused by the evaporation of water. Under which one of the following conditions it work more effectively? **[1]**

a) A hot and sunny day

b) Hot and rainy weather

c) On a rainy day

d) Hot and dry weather

4. During summer, water kept in an earthen pot becomes cool because of the phenomenon of **[1]**

a) transpiration

b) evaporation

c) osmosis

d) diffusion

5. Which one of the following sets of phenomena would increase on raising the temperature? **[1]**

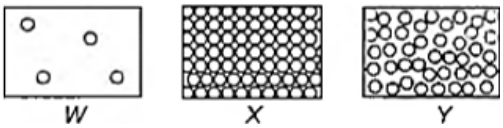
a) Evaporation, compression of gases, solubility

b) Evaporation, diffusion, expansion of gases

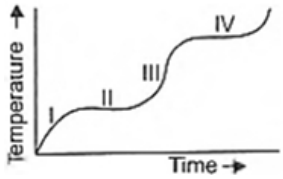
c) Evaporation, solubility, diffusion, compression of gases

d) Diffusion, evaporation, compression of gases

6. Diagrams W, X and Y show how the particles of a substance are packed at different temperatures. **[1]**



The given graph shows the temperature changes which occur on warming the substance.



In which region of the graph would all the particles be packed as in Y?

a) I

b) II

c) III

d) IV

7. Water in a container is heated uniformly from 0^oC to 100^oC. Then volume : **[1]**

a) Increases continuously

b) Increases upto 4^oC and decreases further

c) Decreases continuously

d) Decreases upto 4^oC and increases further

8. Select the incorrect statement(s). **[1]**

i. Rapid formation and breaking of bubbles in the bulk of a liquid being heated is called evaporation.

ii. The spreading out and mixing of a substance with another substance due to motion of its particles is called diffusion.

iii. Petrol evaporates faster than water because interparticle forces are stronger in water.

iv. Ice-cream feels colder than ice cold water because of latent heat of fusion.

a) i only

b) ii, iii and iv only

c) I and IV only

d) iii and iv only

9. Which one of the following decreases the extent of evaporation of water? **[1]**

a) Large surface area

b) High temperature

c) High wind speed

d) Large humidity

10. When the liquid starts boiling, the further heat energy which is supplied **[1]**

a) is absorbed as latent heat of vaporization by the liquid

b) is lost to the surrounding as such

c) Increases the temperature of the liquid.

d) increases the K.E of the particle in the liquid

11. In the determination of boiling point of water correct reading in the thermometer is noted when : **[1]**

a) water starts boiling

b) temperature starts rising

c) temperature becomes constant

d) whole of the water evaporates

12. Match column I with column II and select the correct option from the codes given below. **[1]**

Column I	Column II
(a) Liquid	(i) Highly compressible
(b) Gas	(ii) Definite volume
(c) Plasma	(iii) Super low density
(d) Bose-Einstein condensate	(iv) Super energetic

a) (a) - (ii), (b) - (i), (c) - (iii), (d) - (iv)

b) (a) - (ii), (b) - (i), (c) - (iv), (d) - (iii)

c) (a) - (i), (b) - (ii), (c) - (iii), (d) - (iv)

d) (a) - (iii), (b) - (i), (c) - (ii), (d) - (iv)

13. When alcohol is kept in a china dish it evaporates, the temperature falls and cooling is produced. Which one is the correct method to record the temperature? **[1]**

a) By touching the surface of china dish

b) By taking the help of the teacher.

c) By using a thermometer

d) By smell of alcohol vapour

14. On converting 25°C, 38°C and 66°C to Kelvin scale, the correct sequence of temperature will be **[1]**

a) 298 K, 311 K and 339 K

b) 298 K, 310 K and 338 K

c) 298 K, 300 K and 338 K

d) 273 K, 278 K and 543 K

15. What are the characteristics of the particles of matter? **[1]**

A. Particles of matter are in continuous motion.

B. Particles of matters do not have spaces between them.

C. Particles of matter attract each other.

D. Particles of matter are very large in size.

a) All of these

b) (A), (B) and (C) is correct.

c) (B) and (C) is correct.

d) (A) and (C) is correct.

16. Which of the following set of apparatus is required to determine the boiling point of water? **[1]**

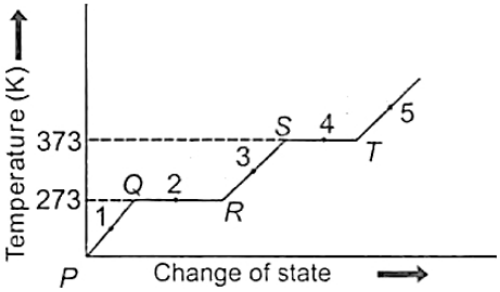
a) Round bottom flask, burner, thermometer, wire gauze, stand with clamp, cork with two holes, glass tube

b) Boiling tube, beaker, thermometer, burner, cork with one hole, stand with clamp, wire gauze

c) Tripod stand, conical flask, thermometer, wire gauze, stand with clamp, pair of tongs

d) Funnel, burner, clamp and stand, test tube, thermometer, wire gauze

17. Study the given heating curve of substance X carefully and select the correct statement. **[1]**



a) Substance X exists in solid state at point 1,

b) At QR, matter exists both in solid and liquid

in liquid state at point 3 and in gaseous state at point 5.

c) All of these

states, while at ST matter exists both in liquid and gaseous states.

d) QR represents latent heat of fusion, while ST represents latent heat of vaporisation.

18. When acetone or nail polish remover is applied cooling is experienced due to which factor? **[1]**

a) Reaction of nail polish with acetone

b) Boiling of acetone

c) Evaporation of acetone from the nail

d) Reaction of acetone with skin

19. **Statement 1:** Pieces of dry ice gradually get smaller when left at room temperature. **[1]**

Statement 2: Dry ice undergoes sublimation.

a) Both statements 1 and 2 are false.

b) Both statements 1 and 2 are true and statement 2 is the correct explanation of statement 1.

c) Both statements 1 and 2 are true but statement 2 is not the correct explanation of statement 1.

d) Statement 1 is true and statement 2 is false.

20. When we observe the melting of ice, the melting point of ice is a constant temperature at which **[1]**

a) only ice is present

b) both ice and water are present

c) first water and then only ice

d) only water is present

21. **Assertion (A):** Evaporation of spirit from the skin make the skin feel cool. **[1]**

Reason (R): It liberates latent heat of vaporisation from the skin.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

22. **Assertion (A):** Liquids diffuse easily as compared to gases. **[1]**

Reason (R): Intermolecular forces are lesser in gas.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

23. **Assertion (A):** At normal pressure (1 atm) the boiling point of water is 100^{o}C or 373.15 K. **[1]**

Reason (R): As the pressure increases, boiling point of water also increases.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

24. **Assertion (A):** We feel cool when we touch a piece of ice. **[1]**

Reason (R): Our body temperature is higher than the temperature of ice.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.
d) A is false but R is true.

25. **Assertion (A):** Ice has lower density than water. **[1]**
Reason (R): As the volume of a substance increases, its density increases.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

26. **Assertion (A):** The term vapour is used to represent the gaseous state of a substance that is otherwise liquid at room temperature. **[1]**
Reason (R): It is proper to regard the gaseous state of ammonia as vapours.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

27. **Assertion (A):** The conversion of gas directly into solid is called condensation. **[1]**
Reason (R): Naphthalene leaves residue when kept open for some time.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

28. **Assertion (A):** Camphor disappears without leaving any residue. **[1]**
Reason (R): Camphor undergoes sublimation.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

29. **Assertion (A):** An iron almirah is a solid at room temperature. **[1]**
Reason (R): Water can flow and it assumes the shape of the containing vessel.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

30. **Assertion (A):** The diffusion rate of oxygen is smaller than nitrogen. **[1]**
Reason (R): Molecular size of nitrogen is smaller than oxygen.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

Section B

31. If the melting point of an object A is high then what state you expect it to be at room temperature? **[2]**
32. The Latent heat of vaporization of steam is more than that of the boiling water. Explain. **[2]**
33. Why does the temperature of a substance remain constant during its melting point or boiling point? **[2]**
34. Why it is that to smell cold food, we have to go close but smell of hot food reaches us several meters away? **[2]**
35. Why solids do not possess fluidity? **[2]**

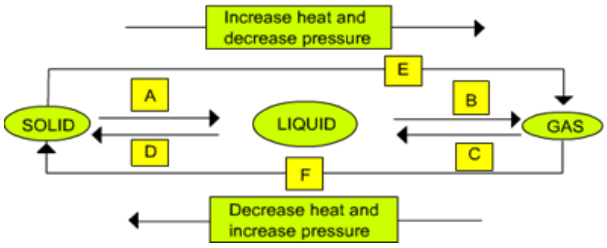
36. i. Conversion of solid to vapours is called sublimation. Name the term used to denote the conversion of vapours to solid. **[2]**

ii. Conversion of solid-state to liquid state is called fusion; what is meant by the latent heat of fusion?

37. Define latent heat of vaporization and latent heat of fusion. **[2]**

38. Alka was making tea in a kettle. Suddenly she felt intense heat from the puff of steam gushing out of the spout of the kettle. She wondered whether the temperature of the steam was higher than that of the water boiling in the kettle. Comment. **[2]**

39. Name A, B, C, D, E and F in the following diagram showing change in its state. **[2]**



40. Water as ice has a cooling effect, whereas water as steam may cause severe burns. Explain these observations. **[2]**

41. How does perspiration help to maintain the body temperature in summer? **[2]**

42. What are the characteristics of the particles of matter. **[2]**

43. **Classify the following into osmosis/diffusion:-** **[2]**

i. Swelling up of a raisin on keeping in water.

ii. Spreading of the virus on sneezing.

iii. Earthworm dying on coming in contact with common salt.

iv. Shrinking of grapes kept in thick sugar syrup.

v. Preserving pickles in salt.

vi. Spreading of the smell of cake being baked throughout the house.

vii. Aquatic animals using oxygen dissolved in water during respiration.

44. Why is it that on increasing the wind speed the rate of evaporation increases? **[2]**

45. When a solid starts melting, its temperature does not rise till whole of it has melted. Explain. **[2]**

Section C

46. Why are gases compressible but not liquids? **[3]**

47. Why is it that a wooden chair should be called a solid and not a liquid? **[3]**

48. Liquids generally have low density as compared to solid. But you must have observed that ice floats on water. Find out why? **[3]**

49. Give reasons **[3]**

(a) A gas fills completely the vessel in which it is kept.

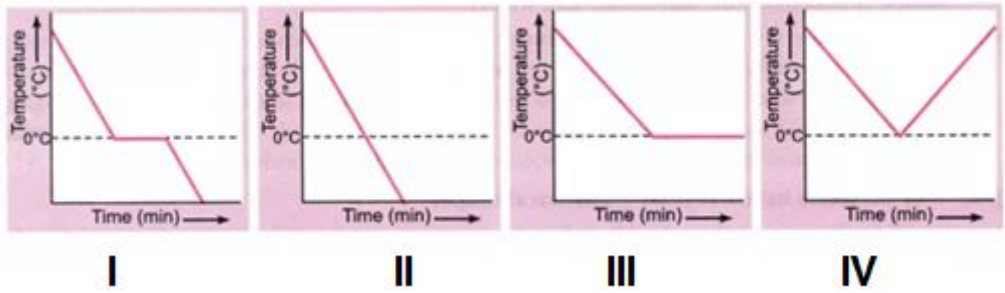
(b) A gas exerts pressure on the walls of the container.

(c) A wooden table should be called a solid.

(d) We can easily move our hand in air but to do the same through a solid block of wood we need a karate expert.

50. A glass tumbler containing hot water is kept in the freezer compartment of a refrigerator (temperature < $0^{\circ}C$). If you could measure the temperature of the content of the tumbler, which of the following graph would correctly **[3]**

represent the change in its temperature as a function of time?



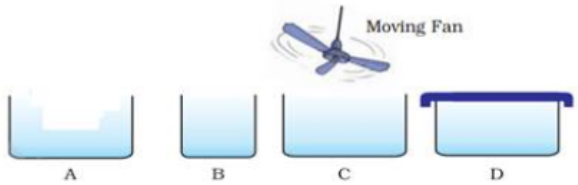
51. Liquids generally have lower density as compared to solids. But you must have observed that ice floats on water. Find out why. **[3]**

52. Distinguish between : Liquid state and gaseous state. **[3]**

53. Suggest an activity to show that the rate of diffusion of liquids decreases with increase in density of the liquid. **[3]**

54. Give two reasons to justify Water at room temperature is a liquid **[3]**

55. Suggest which of the vessels A, B, C or D in Fig. will have the highest rate of evaporation? Explain. **[3]**



Section D

56. **Read the following text carefully and answer the questions that follow:** **[4]**

Everything in this universe is made up of material "matter". The air we breathe, the food we eat, stones, clouds, stars, plants and animals, even a small drop of water or a particle of sand – everything is matter. when we make tea, coffee or lemonade, particles of one type of matter get into the spaces between particles of the other. This shows that there is enough space between particles of matter. Particles of matter are continuously moving, that is, they possess what we call kinetic energy. particles of matter have a force acting between them. This force keeps the particles together. The strength of this force of attraction varies from one kind of matter to another.

i. Define matter? give some examples. (1)

ii. Explain with activity that matter have space between them? (1)

iii. How can we say that solid has the strongest intermolecular force? (2)

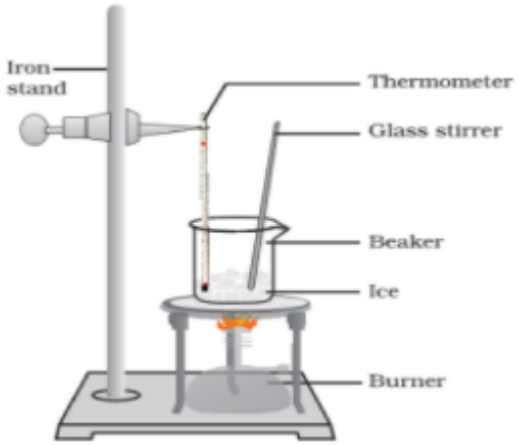
OR

Which kind of matter have the largest intermolecular space between them? (2)

57. **Read the following text carefully and answer the questions that follow:** **[4]**

The minimum temperature at which solid melts to become a liquid at the atmospheric pressure is called its melting point. The energy supplied by heat overcomes the forces of attraction between the particles. The particles leave their fixed positions and start moving more freely. A stage is reached when the solid melts and is converted to a liquid. The process of melting, that is, change of solid state into a liquid state is also known as

fusion. The temperature of the system does not change after the melting point is reached, till all the ice melts.



i. Define fusion? (1)

ii. What is melting point ? what is the melting point of Ice? (1)

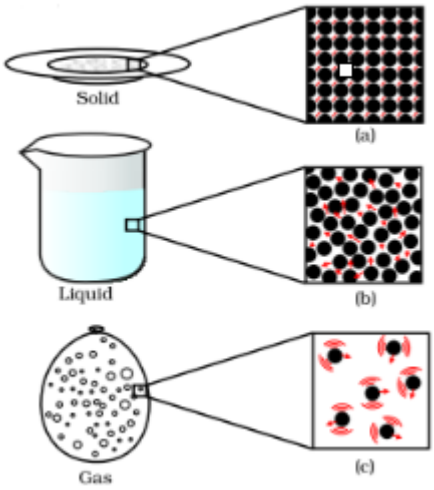
iii. What is latent heat of fusion? (2)

OR

What do you mean by latent heat? (2)

58. **Read the following text carefully and answer the questions that follow:** **[4]**

Gases are highly compressible as compared to solids and liquids. The liquefied petroleum gas (LPG) cylinder that we get in our home for cooking or the oxygen supplied to hospitals in cylinders is compressed gas. Compressed natural gas (CNG) is used as fuel these days in vehicles. The liquid takes up the shape of the container in which they are kept. Liquids flow and change shape, so they are not rigid but can be called fluid. Solids and liquids can diffuse into liquids. The aquatic animals can breathe underwater. The rate of diffusion of liquids is greater than solid.



i. Why Compressed natural gas (CNG) is used as fuel these days in vehicles? (1)

ii. How can we say that liquid do not have their fixed shape? (1)

iii. How do aquatic animals breathe under water? (2)

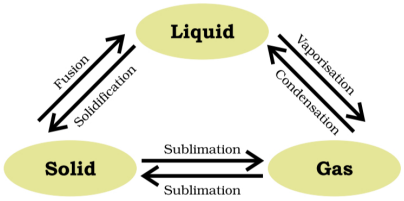
OR

What is diffusion? (2)

59. **Read the following text carefully and answer the questions that follow:** **[4]**

Matter around us exists in three different states–solid, liquid and gas. These states of matter arise due to the variation in the characteristics of the particles of matter. Solids have a tendency to maintain their shape when subjected to outside force. Solids may break under force but it is difficult to change their shape, so they are rigid.

the difference in various states of matter is due to the difference in the distances between the constituent particles. Pressure and temperature determine the state of a substance, whether it will be solid, liquid or gas.



i. write the properties of solid state of matter? (1)

ii. How does solid gets converted directly into gaseous states of matter? (1)

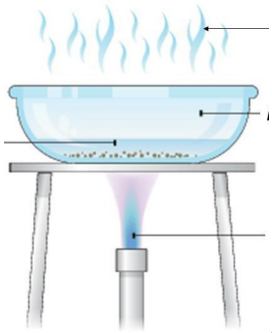
iii. What is vaporization? (2)

OR

Give an example from which we can say that gas can directly converted into solid state of matter? (2)

60. **Read the following text carefully and answer the questions that follow:** **[4]**

The phenomenon of change of a liquid into vapours at any temperature below its boiling point is called evaporation. In the case of liquids, a small fraction of particles at the surface, having higher kinetic energy, is able to break away from the forces of attraction of other particles and gets converted into vapour. If the amount of water in the air is already high, the rate of evaporation decreases. In an open vessel, the liquid keeps on evaporating. The particles of liquid absorb energy from the surrounding to regain the energy lost during evaporation. After a hot sunny day, people sprinkle water on the roof or open ground because the large latent heat of vaporisation of water helps to cool the hot surface. And we prefer cotton clothes.



i. What is evaporation? (1)

ii. Why clothes dry faster on a windy day? (1)

iii. why do we prefer cotton clothes during hot sunny day? (2)

OR

What happens when acetone is poured on palm? (2)

Section E

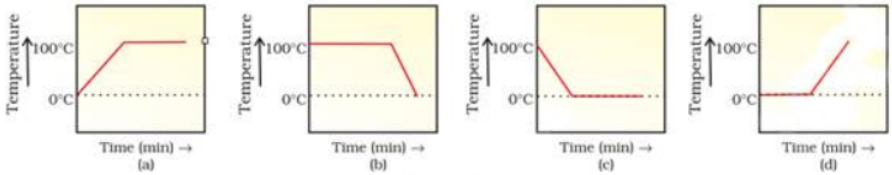
61. i. What is matter? Write two properties of solids and two properties of liquids. **[5]**

ii. Give reasons for the following:

a. Ice at 0°C appears colder in the mouth than water at 0°C.

b. Doctors advise to put the strips of wet cloth on the forehead of a person having high termperature.

62. A student heats a beaker containing ice and water. He measures the temperature of the content of the beaker as a function of time. Which of the following Fig. would correctly represent the result? Justify your choice. **[5]**



63. You are provided with a mixture of naphthalene and ammonium chloride by your teacher. Suggest an activity to separate them with well labelled diagram. **[5]**

64. Discuss the various factors which affect the rate of evaporation. Latent heat of evaporation of two liquids A and B is 100 J/kg and 150 J/kg respectively. Which one can produce more cooling effect and why? **[5]**

65. When a crystal of potassium permanganate is placed in a beaker containing water, its purple colour spreads throughout the water. What do you conclude from this observation about the nature of potassium permanganate and water? **[5]**

66. Comment on the following statements: **[5]**

(a) Evaporation causes cooling.

(b) Rate of evaporation of an aqueous solution decreases with increase in humidity.

(c) Sponge though compressible is a solid.

(d) Ice is solid at 0°C, while water is liquid at room temperature.

(e) Sugar crystals dissolve faster in hot water than cold water.

67. What are the differences between solid, liquid and gaseous states? **[5]**

68. In severe cold weather, a family burnt wood in the room during the night by keeping the door and windows close. After sometime, they felt suffocated. They immediately opened the windows and got relief. What did actually happen ? **[5]**

69. Describe an activity to determine the boiling point of water and melting point of ice. **[5]**

70. i. Explain the term density. Arrange different states of matter in increasing order of density. **[5]**

ii. Explain how ice floats on water?

71. i. What temperature in Kelvin scale is equal to 50°C? **[5]**

ii. Describe an activity to show that rate of evaporation increases with surface area,

iii. Describe the method of formation of plasma and Bose-Einstein condensate.

72. Comment upon the following: **[5]**

Rigidity, compressibility, fluidity, filling a gas container, shape, kinetic energy, and density.

73. Give reasons for the following observations: **[5]**

(a) A gas completely fills the vessel in which it is kept.

(b) A gas exerts pressure on the walls of the container.

(c) Naphthalene balls disappear with time without leaving any solid.

(d) We can easily move our hand in air but to do the same through a solid block of wood, we need a karate expert.

(e) Our palm feel cold when we put some acetone or petrol or perfume on it.

74. Tabulate the differences in the characteristics of states of matter. **[5]**

75. It is a hot summer day, Priyanshi and Ali are wearing cotton and nylon clothes respectively. Who do you think would be more comfortable and why? **[5]**