

the forces acting thereon, and draw coloured lines to represent their "lines of action."

11. "Evaporation produces cold, condensation heat." Give some facts in explanation of the above statement.

12. Explain fully what takes place when (A) alcohol and water (B), sulphuric acid and water are mixed; when (C) water is poured upon dry lime (D); a paste of "plaster of Paris," and water "sets" or hardens.

13. Give some illustrations of the difference between solution and fusion.

14. "In solidifying, a body condenses." What remarkable exception to this is presented by water?

15. What is meant by "the Conservation of Energy," "the Dissipation of Energy," and "the Indestructibility of Matter?"

16. What facts can be given to show that water is not an element?

17. Give some illustrations in proof of the statement that "heat is a mode of motion."

18. What is the present view regarding the Constitution of Matter?

19. "Heat and cohesion are antagonistic powers." Explain this statement.

20. Mention some facts which prove that "condensation evolves, and evaporation absorbs heat."

21. If five pints of alcohol be added to five pints of water, the mixture grows hot, and finally measures nine pints. Why?

22. If one pound of salt be dissolved in a gallon of water the mixture becomes cold and its density is changed. Explain fully why these take place.

23. Some solids which do not dissolve readily in bulk, do so readily when powdered; some which are insoluble in cold, are easily soluble in hot water. Explain these assertions.

24. "Water of crystallization." What, and why so called?

25. If a gallon of sulphuric acid weighing 18.46 lbs. be poured into a gallon of water weighing 10 lbs., the mixture will weigh 28.46 lbs., but will *not* measure two gallons. Why? What additional phenomenon will be noticed?

26. Copper dissolves readily in nitric acid

*evolving* heat, while it *absorbs* a large amount of heat in melting. Why?

27. Give as many familiar illustrations as possible of two, of three and of four forces acting on a body and keeping it at rest.

28. Distinguish between "water of crystallization" and ice.

29. What are the more important distinctions between living and non-living bodies?

30. Into what two great classes may the carbonaceous materials of organic bodies be divided?

31. State the relation between the vegetable and the animal kingdoms.

32. Tell as fully as possible what is known regarding "germination," or the growth of the plant from the seed.

33. Albumen, fibrin, casein, syntonin, protoplasm, chlorophyll, cellulose. What, and how distinguished?

34. Give some facts to prove that water presses equally in all directions.

35. Illustrate the statement "There is no such thing as chance."

36. Distinguish between mental and physical phenomena.

37. Hypotheses. What is their use?

38. Distinguish between gluten and vegetable albumen.

39. If a cork of a bottle containing ammonia solution be brought near an open bottle containing hydrochloric acid, white fumes of ammonium chloride are found in the air. What is the physical nature of these fumes?

40. If gum mastic or gum olibanum be dissolved in alcohol, and if to the clear solution water be added, a milkiness or cloudiness results. Why? Compare with the preceding question.

41. What organic constituents of the fowl and of the wheat are of similar composition?

42. Distinguish between "mass" and "weight."

43. Mention some illustrations of the "energy" of moving water.

44. Illustrate the growth of mineral bodies by the formation of crystals of alum, of sugar-candy ("rock-candy" of our own shops), and of ice.