

Science

Sample Question Paper 3 Answers (Class 9) (Term – 1) (Session 2021-22)

SECTION – A

Section - A consists of 24 questions.

The first attempted 20 questions would be evaluated.

1. ANSWER: [A]

Explanation: Product Z is formed by the combination of X and Y, thus having a greater mass than X and Y separately. Furthermore, Z is a completely new product, thus cannot show the same properties as X and Y.

2. ANSWER: [C]

Explanation: Among the given statements, statement [C] is not true because the constituents of compound cannot be separated by simple physical methods.

3. ANSWER: [C]

Explanation: Option (I) Ice and (IV) Air are homogeneous in nature as their particles are not clearly visible. The entire mass of a homogeneous mixture has a uniform composition. There is no visible boundary of separation between its various components, e.g., ice, air, sugar solution, brass, etc. The entire mass of a heterogeneous mixture does not have a uniform composition. There are visible boundaries of separation between its various components, e.g., soil, wood, blood, etc.

4. ANSWER: [A]

Explanation: Homogeneous mixture have uniform distribution whereas heterogeneous mixture does not have uniform composition.

a) Carbon dioxide gas dissolved in water is a homogeneous mixture.

b) Air containing suspended particles is heterogeneous mixture.

c) Soap bubbles formed by blowing air into soap solution is heterogeneous mixture.

d) Water in milk is heterogeneous mixture but it seems homogeneous. Under a microscopic examination, it is proved as heterogeneous.

5. ANSWER: [C]

Explanation: Small holes on the epidermis of the leaf are called stomata. They are surrounded by two kidney-shaped cells called guard cells.

6. ANSWER: [C]

Explanation: The correct match is: A=3, B=2, C=1, D=4

Parenchyma provides support to plants and also store food. Chlorenchyma contains chlorophyll and perform photosynthesis. In aquatic plants, large cavities are present, which give buoyancy to plants. The flexibility in plants is due to another permanent tissue.

7. ANSWER: [C]

Explanation: Epidermis is present as the outermost layer of the plant body such as leaves, flowers, stems, and roots. It is covered with a cuticle (a waterproof layer of the waxy substance cutin).

The main function of the epidermis is to protect the plant from dryness and infection. The cuticle of the epidermis helps to reduce water loss by evaporation from the plant surface and also helps to prevent the entry of pathogens (bacteria, fungi etc.). Many plants have truncated hairs (trichomes) on the aerial surface to reduce transpiration.

8. ANSWER: [B]

Explanation: The conducting tissues in plants conduct different juices and have different structures. The primary conducting tissues of plants are xylem and phloem. The xylem carries water from the roots to other parts of the plant, while the phloem carries food and other materials from the leaves to other parts of the plant.

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9. ANSWER: [B]

Explanation: False, xylem fibres are mainly supportive in function. Xylem parenchyma stores food and helps in sideways conduction of water.

10. ANSWER: [B]

Explanation: Adipose tissue consists of oval and round cells filled with fat globules, which are scattered throughout the matrix. This tissue is found under the skin, between internal organs, and in the yellow bone marrow. It stores fat and acts as an insulator. Cuboidal epithelium helps in absorption, excretion, and secretion, while bones and cartilage are specialized connective tissues and they provide support to internal organs.

11. ANSWER: [A]

Explanation: The correct match is A-3, B-4, C-1, D-2 Chlamydomonas, Paramecium and bacteria are called unicellular organisms while some fungi, plants and animals are multicellular organisms. Organisms whose cells lack a nuclear membrane are called prokaryotes while organisms with cells having a nuclear membrane are called eukaryotes.

12. ANSWER: [B]

Explanation: Osmosis is a spontaneous process in which solvent molecules move from a region of low solute concentration to a region of high solute concentration through a partially permeable membrane, in order to equalize the solute concentration on both sides. When the movement of solvent is from outside to inside (internal movement) the process is endosmosis. It occurs in hypotonic solution and causes swelling of the cell.

13. ANSWER: [D]

Explanation: The plasma membrane or cell membrane allows or permits the entry and exit of some materials in and out of the cell. That's why, it is also known as selectively permeable membrane.

14. ANSWER: [B]

Explanation: When a living plant cell loses water through osmosis, shrinkage or contraction of the cell's contents away from the cell wall occurs. This phenomenon is known as "plasmolysis".

15. ANSWER: [B]

Explanation: The nucleus has a two-layered covering called the nuclear membrane. The nuclear membrane contains pores that allow the transfer of material from inside the nucleus to the outside.

16. ANSWER: [D]

Explanation: Prokaryotic cells lack a true nucleus and a circular DNA is in the naked state in the cytoplasm. The unknown nuclear region of the cell is called the nucleoid. Prokaryotic cells lack chromosomes and a nucleolus or nuclear membrane and the nucleoplasm remains inseparable from the cytoplasm.

17. ANSWER: [A]

Explanation: Let "s" be the distance covered, then $t_1 = s/2/3 = s/6$

$$s/2 = 4.5t_2 + 7.5t_3 = 12t_2$$

$$\text{Average Speed} = \text{Total Distance/Total Time} = S/(s/6 + s/24 + s/24) = 4 \text{ m/s}$$

18. ANSWER: [A]

Explanation: As we know that, the total distance covered,

$$S = \text{final reading of odometer} - \text{initial reading of odometer} = (4460 - 4200) \text{ km} = 260 \text{ km}$$

$$\text{Total displacement} = 0 \text{ km}$$

$$\text{Total time taken, } t = 4 \text{ h } 20 \text{ m} = 4.33 \text{ h}$$

$$\text{Average velocity} = \text{total displacement (d)/total time taken (t)} = 0/4.33 = 0$$

19. ANSWER: [A]

Explanation: Given, $u = 60 \text{ km/h} = 60 \times 5/18 \text{ m/s} = 50/3 \text{ m/s}$,

$$T = 1.6 \text{ s}, V = 0$$

$$\text{Average Acceleration: } a = v - u/t = -50/3 \times 1.6 = -100/3 \times 3.2 = -1000/96 = -10.4 \text{ m/s}^2$$

20. ANSWER: [C]

Explanation:

A = 4: when a train starts moving from station, then the acceleration is in the direction of motion.

B = 3: When brakes are applied to a moving car, then the acceleration is against the direction of motion.

C = 1: The motion of a freely falling body is an example of uniform acceleration.

D = 2: The motion of car moving through a congested market is an example of non-uniform acceleration.

21. ANSWER: [B]

Explanation: Given, mass $m = 2 \text{ kg}$, velocity $v = 4 \text{ ms}^{-1}$.

As the object is moving with a constant velocity i.e., 4 ms^{-1} .

So, the acceleration of the object is zero i.e., $a = 0$ and according to the property of inertia if there is no external force acting on the body, then body remains as it is i.e., if the body is at rest, remains at rest and if it is in motion, remains in motion.

22. ANSWER: [D]

Explanation: % Change = $\Delta p/p \times 100 = 4p - p/p \times 100 = 300 \%$

($2m \cdot 2v = 4mv = 4p$)

23. ANSWER: [D]

Explanation: If, $m = 1 \text{ kg}$, $F = 1 \text{ N}$, then, $F = ma$

Or, $1 \text{ N} = 1 \text{ kg} \times a$

Or, $a = 1 \text{ N} / 1 \text{ kg}$

$= 1 \text{ kg} \cdot \text{ms}^{-2} / 1 \text{ kg} = 1 \text{ ms}^{-2}$

24. ANSWER: [A]

Explanation: The Newton's second law of motion, can be expressed as –

Force \propto change in momentum/time taken

or, $F \propto mv - mu/t$

or, $F \propto m(v - u)/t$

or, $F \propto ma$ or, $F = kma$ [where k is constant]

But the value of constant k is 1.

So, the numerical formula for force is $F = ma$

SECTION - B

Section - B consists of 24 questions (Sl. No. 25 to 48).

The first attempted 20 questions would be evaluated.

25. ANSWER: [C]

Explanation: When a horse pushes the ground backwards (as action), then ground forces back the horse (as reaction) in forward direction. Due to this, the horse is able to pull a Tanga in forward direction.

26. ANSWER: [B]

Explanation: The slope of distance time graph represents the speed. From the graph, it is clear that the slope of distance-time graph for car B is less than all other car. Hence, car B is the slowest.

27. ANSWER: [D]

Explanation: Slope ($= \tan \theta$), displacement time graph shows velocity:

$$V_1/V_2 = \tan \theta_1 / \tan \theta_2 = \tan 30^\circ / \tan 60^\circ = 1/\sqrt{3} / \sqrt{3} = 1/3 = 1:3$$

28. ANSWER: [C]

Explanation: Slope of velocity time graph gives acceleration. Because slope of the curve $= v/t$, where $v/t =$ acceleration.

29. ANSWER: [A]

Explanation: From the given $v-t$ graph, it is clear that the velocity of the object is not changing with time i.e., the object is in uniform motion.

30. ANSWER: [D]

Explanation: As, the slope of speed-time graph is a straight line inclined to time-axis. So, the object moves with a constant acceleration.

31. ANSWER: [C]

Explanation: A solution having same composition throughout is homogeneous.

32. ANSWER: [A]

Explanation: Longitudinal growth of plants occurs because of Apical meristem at shoot and root tips.

33. ANSWER: [D]

Explanation: Prokaryotic cells are smaller in size as compared to eukaryotic cells. These cells also lack cytoplasmic membrane bound organelles. Thus, most functions are performed by poorly developed parts of cytoplasm.

34. ANSWER: [C]

Explanation: In uniform motion, average and instantaneous velocities have same value and body moves with constant velocity.

35. ANSWER: [D]

Explanation: Inertia is the inherent property by virtue of which the body is unable to change its state of rest, or of uniform motion in a straight line unless acted upon by an unbalanced external force.

36. ANSWER: [B]

Explanation: Any two or more substance are mixed together in any state, a mixture is formed.

37. ANSWER: [D]

Explanation: Among the given statements, only adding milk in water results in the formation of a mixture.

38. ANSWER: [C]

Explanation: A mixture which has uniform composition throughout, i.e., without any clear boundary of separation is known as homogeneous mixture.

39. ANSWER: [C]

Explanation: Parenchyma serves as a packing tissue in plants. Therefore, they do not have intercellular spaces. Collenchymatous tissues are mechanical tissues in plants and are characterized by the deposition of cellulose at cell corners, leading to a localized thickening of the cell wall.

Apical and intercalary meristems bring about primary growth (increase in height) and secondary growth (increase in diameter) respectively and are classified under meristematic tissues. Meristematic tissues are dividing plant units and contain dense cytoplasm and large nuclei with few or no vacuoles at all.

40. ANSWER: [D]

Explanation: Animal tissues are categorised into four basic types on the basis of their structure and functions. The four basic types of tissues are epithelial connective, muscular, and nervous tissue.

41. ANSWER: [C]

Explanation: Statement in option [C] is true for epithelial cells, while other statements are incorrect.

42. ANSWER: [D]

Explanation: Leucoplast is a colourless plastid which stores proteins, lipids, and starch, while xanthophylls are yellow, red, orange pigment of green plants.

43. ANSWER: [B]

Explanation: DNA molecules contain the information necessary for building and organizing cells. Functional segments of DNA are called genes. In a cell that is not dividing, this DNA is present as a part of the chromatin material.

44. ANSWER: [A]

Explanation: The fluid content inside the plasma membrane is called cytoplasm. It also contains specialised cell organelles.

45. ANSWER: [A]

Explanation: According to the Newton's second law of motion, resultant force on a body is responsible for its acceleration.

46. ANSWER: [D]

Explanation: The goalkeeper draws his hands backwards after catching the ball to reduce the rate of momentum change by increasing the time. By doing this less force is exerted on his hands (force is proportional to the rate of change of momentum).

47. ANSWER: [C]

Explanation: According to Newton's second law of motion.

Force = Rate of change in momentum, $F = m(v-u)/t = 5(12 - 8)/4 = 5 \text{ N}$

48. ANSWER: [A]

Explanation: Plant cells have large and permanent vacuole, while animal cells have many, small and temporary vacuoles.

SECTION - C

Section - C consists of three Cases followed by questions. There are a total of 12 questions in this section. The first attempted 10 questions would be evaluated.

Case - 1:

49. ANSWER: [B]

Explanation: Separation of components of a mixture is done to obtain purity of a substance and remove undesirable components.

50. ANSWER: [A]

Explanation: Ethyl alcohol and water are completely miscible liquids, having different boiling points can be separated by the process of distillation.

51. ANSWER: [D]

Explanation: Farmers typically use techniques such as hand picking, breaking, and sifting to purify the grain.

52. ANSWER: [B]

Explanation: The principle of separation is based on the difference in physical or chemical properties of the components of a mixture. Depending on the type of components and their respective properties, different techniques are used.

Case - 2:

53. ANSWER: [C]

Explanation: The first cell was observed in cork slice. Robert Hooke in 1665, observed the cells in a cork slice with the help of a primitive microscope.

54. ANSWER: [D]

Explanation: Animal cells lacking nuclei would also lack in chromosomes because chromosomes are present in nucleus only.

55. ANSWER: [C]

Explanation: Eukaryotic cells have membrane bound organelles in their cytoplasm.

56. ANSWER: [A]

Explanation: In a cell, DNA is found in nucleus, mitochondria, and plastids.

Case – 3:

57. ANSWER: [A]

Explanation: Mass of rocket is greater than mass of gases as the rocket is used for carrying a satellite etc. to a suitable height above the ground.

58. ANSWER: [D]

Explanation: Fuel is burned in the rocket and the exhaust gases are made to escape in a downward direction through a narrow nozzle. As a response, the rocket accelerates upward.

59. ANSWER: [C]

Explanation: Newton's third law states that "For every action there is an equal and opposite reaction.

60. ANSWER: [B]

Explanation: Motion of rocket is an accelerated motion.

