Science

Sample Question Paper 1 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: [C]
Explanation: Oil in water is a heterogeneous mixture because they are immiscible liquids and visible boundary of separation is present between them.

2. ANSWER: [C]
Explanation: Metal is a substance consists of only a single type of constituent particles. In heterogeneous mixture, visible boundaries of separation between its constituent can be seen clearly.

3. ANSWER: [D]
Explanation: Air is regarded as mixture because it is composed of various gases in different composition and its composition is not fixed but vary with place and time.

4. ANSWER: [D]
Explanation: Salt solution will not show Tyndall effect as it is a true solution and particles of salt solution are very small size. So, these cannot scatter a beam of light, hence do not show Tyndall effect.

5. ANSWER: [C]
Explanation: Areolar tissue is a loose and cellular connectivity tissue. It is a matrix consisting of two types of fibers i.e. white collagen fibers (which turn into gelatin when boiled in water) and yellow elastic fibers or elastin.

6. ANSWER: [B]
Explanation: Ciliated columnar epithelium consists of columnar cells with cilia on their free surface. This epithelium lines the respiratory tract and most of the fallopian tubes (oviducts). It also lines the ventricles of the brain and the central canal of the spinal cord.

7. ANSWER: [C]
Explanation: Cuboidal epithelium is present in the tubular parts of the nephron. It consists of small, cube-shaped cells with a round nucleus located in the center of the cell. These cells often form microvilli to increase the absorbent surface area of the cell.

8. ANSWER: [A]
Explanation: The correct match is A (3), B (1), C (4), D (2). Simple squamous epithelial cells are extremely thin. Stratified squamous epithelium are arranged in a pattern of layers. Columnar epithelium movement across the epithelial barrier. Cuboidal epithelium with cube shaped cells provides mechanical support.

9. ANSWER: [B]
Explanation: False, the endoplasmic reticulum is not the site of energy production. It transports material between different regions in the cytoplasm.

10. ANSWER: [B]
Explanation: Columnar epithelium consists of column-like cells with their nucleus towards the base. They line the stomach, small intestine, and colon, forming a mucous membrane. Their main functions are absorption (e.g., stomach, intestine) and secretion (e.g., mucosa by goblet cells). Stratified squamous epithelium, also called pavement epithelium, is covered with fibrous protein (keratin) that covers the skin. This epithelium is waterproof and resistant to mechanical injury. Cuboidal epithelium is found in renal tubules, thyroid vesicles, and glands.

10. ANSWER: [C]
Explanation: Areolar tissue is a loose and cellular connectivity tissue. It is a matrix consisting of two types of fibers i.e. white collagen fibers (which turn into gelatin when boiled in water) and yellow elastic fibers or elastin.

11. ANSWER: [B]
Explanation: The correct match is A-3, B-4, C-1, D-2. The plant cell wall is made up of cellulose. Chromosomes are present in the nucleus which contain information for inheritance of features from parents to next generation in the form of DNA molecules. Functional segments of DNA are called genes. The cytoplasm contains specialised cell organelles.

12. ANSWER: [A]
Explanation: Lipid molecules in the cell are synthesized by the smooth endoplasmic reticulum present in the cell.

13. ANSWER: [C]
Explanation: Rough endoplasmic reticulum is the site of protein formation, while smooth endoplasmic reticulum helps in the formation of fat molecules.

14. ANSWER: [C]
Explanation: Smooth endoplasmic reticulum in the liver cells of vertebrates helps in detoxification. It metabolizes various toxic or toxic substances such as drugs, aspirin, pesticides (DDT), petroleum products, and pollutants. These toxic substances enter the body of animals through food, air, or water.

15. ANSWER: [B]
Explanation: Bone cells are embedded in a rigid matrix, strengthened by fibers, and hardened by calcium and phosphorus salts. The matrix is deposited as concentric layers of lamellae formed around the central Haversian canal.

16. ANSWER: [D]
Explanation: 1) The Golgi apparatus consists of a system of membrane-bound vesicles arranged in stacks called cisternae.
2) The synthesized material is packaged near the ER and sent to various targets through the Golgi apparatus.
3) Its functions include storage, modification, and packaging of products in vesicles.
4) Sugar complex can be made from simple sugar in Golgi apparatus. It is also involved in the formation of lysosomes.

17. ANSWER: [B]
Explanation: Given, height = (h) and initial velocity = (u)
a = g (acceleration due to gravity)
Final velocity becomes zero i.e., At the highest point, v = 0
From, third equation of motion, $v^2 = u^2 - 2gh$
$0 = u^2 - 2gh$
$2gh = u^2$
Or, $h = u^2/2g$

18. ANSWER: [C]
Explanation: Given, velocity, v = 0, acceleration, $a = - 5 m/s^2$ from equation of motion, v = u + at
Or, u = - at = - (-5) × 10 = 50 m/s

19. ANSWER: [D]
Explanation: Since u = 0, so using, S, = u + a (n – 1/2)
s_1 = 0 + 7a/2 = 7a/2
s_2 = 0 + 11a/2 = 11a /2
s_1/ s_2 = 7/11

20. ANSWER: [A]
Explanation: Given, u = 0, v = 90 km/h = 90 x 5/18 = 25 m/s
From the equation of motion,
v = u + at
$a = v/t = 25/2x60 = 5/24 m/s^2$
Distance covered is: $S = ut + 1/2 at^2 = 0 + 1/2 x 5/24 x (120)^2$
= 1/2 x 5/24 x 120 x 120 = 1500 m = 1.5 km

21. ANSWER: [A]
Explanation: Given, u = 54 km/h = 54 x 5/18 m/s = 15 m/s
V = 0 and t = 5 s.
Retardation,
$a = v – u/t = 0 – 15/5 = - 3 m/s^2$
Avg retardation force, F = 400 x 3 = 1200 N

22. ANSWER: [B]
Explanation: Resultant force on a body, $F = F_2 - F_1 = 65 – 50 = 15 N$
By Newton's second law of motion, F = ma
Or, 15 = 5a
Or, $a = 3 m/s^2$

23. ANSWER: [C]
Explanation: A → Change in momentum = Force x Time = Ns
B → Momentum = Mass x Velocity = $kg\text{-}ms^{-1}$
C → Force = Mass x Acceleration = $kg\text{-}ms^{-2}$ = N
D → Mass = kg

24. ANSWER: [C]
Explanation: The force of friction between the object and surface is equal to the minimum force required to just move the object.

SECTION - B

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

The first attempted 20 questions would be evaluated.

25. ANSWER: [D]
Explanation: When an object is thrown vertically upwards, then it has some initial velocity. As the object goes up its velocity decreases, because it is moving against the gravity. At the highest point, its velocity becomes zero. After that object begins to fall and its velocity goes on increasing, but its sign would be negative, as it is now moving with the Gravity.

26. ANSWER: [B]
Explanation: Velocity time graph for a moving object is curved line, this means that object is moving with non-uniform accelerated motion. Therefore, body is moving with variable acceleration.

27. ANSWER: [B]
Explanation: A = 4, B = 3, C = 1, D = 2 defines well.
The same velocity is shown by a straight and positive sloping s–t graph along the time axis.
In uniform, the condition in retardation decreases with time.
The slope of the graph (1) shows uniform acceleration with the same initial velocity.
Graph (2) shows that the acceleration decreases continuously with time.

28. ANSWER: [B]
Explanation: Initial Velocity, u = 5 m/s
Acceleration, a = 2 m/s^2 and Time = t = 10 s
Final velocity (v) =?
V = u + at
V = 5 + 2 x 10 = 25 m/s

29. ANSWER: [A]
Explanation: The axle acts as the centre and blades move around it in a circle with uniform speed.

30. ANSWER: [D]
Explanation: Distance = πr = 22/7 x 14 = 44cm
Displacement = 2r = 2 x 14 = 28 cm

31. ANSWER: [D]
Explanation: The solvent which is dissolving phase is present in large amount in the solution.

32. ANSWER: [B]
Explanation: Lateral Meristem are present along the side of the organs such as vascular cambium in the plants. These are responsible for healing wounds of plants by its their meristematic activity.

33. ANSWER: [A]
Explanation: In hypotonic medium, cells take up water from the external medium by the osmosis. Due to high amount of water inside, the cells swell up and build up pressure against the cell wall.
As this point, the cell exerts an equal pressure against the swollen cell. Because, of the presence of cell wall, cells can withstand very dilute external media without bursting.

34. ANSWER: [D]
Explanation: Acceleration is false, because acceleration may be positive, negative or zero.

35. ANSWER: [A]
Explanation: According to Newton's second law, a = F/M
i.e., greater the mass, greater is the force required to change its state of rest or of motion. So, mass is a measure of opposition offered, when a force is applied. Hence, mass of a body is a measure of inertia.

36. ANSWER: [D]
Explanation: In the given statements [D] is not true as the particles of the solute cannot be separated from the mixture by filtration.

37. ANSWER: [B]
Explanation: In tea, sugar is called solute which dissolve in milk and water.

38. ANSWER: [C]
Explanation: The concentration of a solution represents the amount of solute present in a solution.
Concentration of solution = [Amount of solute / Amount of solution] x 1/100

39. ANSWER: [C]
Explanation: Tendons are cord-like, strong, in elastic, structure that join skeletal muscles to bones. A tendon is a white fibrous tissue which has great strength, but limited flexibility.

40. ANSWER: [C]
Explanation: Contractile proteins are found in muscles, as they are associated with the movement of the body or organs. The contraction and relaxation of contractile proteins present in the muscles lead to the movement of organs, internal organs, etc.
Bones are the major supporting tissue that form the endoskeleton of a vertebrate body. Blood is a liquid connective tissue which is responsible for the transport of oxygen, nutrients, hormones etc. and for the production of antitoxins and antibodies etc. Cartilage provides support and flexibility to body parts and lubricates the surface of joints.

41. ANSWER: [B]
Explanation: The cells of connective tissue are loosely spaced and embedded in an intracellular matrix. The matrix may be a hard, jelly-like liquid or dense.

42. ANSWER: [B]
Explanation: The Golgi apparatus is involved in formation of lysosome.

43. ANSWER: [C]
Explanation: Lysosomes are simple, small circular sac-like structures that are evenly distributed in the cytoplasm. Each lysosome is surrounded by a membrane and contains powerful enzymes capable of digesting or breaking down all organic matter. These enzymes are made by the rough endoplasmic reticulum.

44. ANSWER: [A]
Explanation: The outer membrane of mitochondria is very porous, while the inner membrane is deeply folded.

45. ANSWER: [C]
Explanation: Dyne is the unit of force in CGS system.
$1 N = 1 kgm/s^2 = 1000 g \times 100 cm/1 s^2$
$1 dyne = 1 / 10^5 N = 10^{-5} N$

46. ANSWER: [B]
Explanation: Given, m = 500 kg, u = 5 m/s and t = 20 s.
Resultant force, F = 500 – 200 = 300 N
Acceleration, a = F/m = 300/500 = 0.6 m/s^2
By question of motion: v = u + at = 5 + 0.6 x 20 = 17 m/s

47. ANSWER: [C]
Explanation: When a person jumps, the tarpaulin gets depressed at the place of impact, therefore impact time interval increases, which decreases the change in momentum. As a result, person experienced a very small force, hence he receives no injury.

48. ANSWER: [B]
Explanation: False, it obeys Newton's third law, as action-reaction forces applied on shock absorber.

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: a = slope of CD = 30-15/18-14 = 15/4 = 3.75 m/s^2

50. ANSWER: [C]
Explanation: s = area under v-t graph = 1/2 (AG + BF) GF = 1/2 (5 + 15) 8 = 80 m

51. ANSWER: [A]
Explanation: Slope AB = (15-5)/(8-10) = 1.25 m/s^2
Slope CD = 3.75 m/s^2
Difference = 3.75 – 1.25 = 2.50 m/s^2

52. ANSWER: [D]
Explanation: s = area of BCHF = BC X BF = 6 X 15 = 90 m

Case – 2:
53. ANSWER: [A]
Explanation: Plants have abundant dead supportive tissues, where as more number of living tissues are found in animals.

54. ANSWER: [B]
Explanation: The given figure shows ciliated columnar epithelium. Columnar epithelial cells have cilia for movement. A tissue found in sperm ducts, oviducts without renal tubules, etc.

55. ANSWER: [D]
Explanation: Epidermal tissue is a plant tissue that covers the leaves, flowers, roots, and stems of plants. Epithelial tissue is a protective tissue in the animal body. Blood is a fluid connective tissue that connects different parts of the body. Glandular epithelium is the inward folding of a portion of epithelial tissue that helps eliminate waste products from the body.

56. ANSWER: [A]
Explanation: Simple squamous epithelium is found covering the oesophagus and the lining of mouth. Ciliated columnar epithelium can be found in the rest three given parts.

Case – 3:
57. ANSWER: [B]
Explanation: The plant cell wall is made up of cellulose, hemicellulose, and pectin.

58. ANSWER: [D]
Explanation: Plants have plastids and chloroplast is a type of plastid where photosynthesis takes place.

59. ANSWER: [A]
Explanation: In a plant cell, vacuoles play very important role as they store toxic metabolic by products or and product and provide turgidity and rigidity to plant cell.

60. ANSWER: (C)
Explanation: Golgi helps in the synthesis of cellular secretions, vacuoles containing digestive enzymes, proteins etc.