

Time allowed : 3 Hours

Maximum Marks: 80

General Instructions:

- i. This question paper consists of 39 questions in 5 sections.
- ii. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
- iii. **Section A** consists of 20 objective type questions carrying 1 mark each.
- iv. **Section B** consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.
- v. **Section C** consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words.
- vi. **Section D** consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
- vii. **Section E** consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

SECTION - A

Select and write one most appropriate option out of the four options given for each of the questions 1 – 20.

Q1. Liquids have the tendency to flow. This property of liquids is termed as



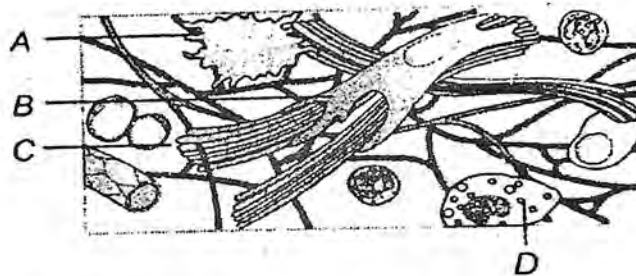
- | | |
|--------------|---------------|
| (a) Fluidity | (b) Rigidity |
| (c) Density | (d) Ductility |

(1)

- Q2. Sol and gel are examples of _____
- (a) solid-solid colloids
 - (b) solid-liquid colloid and liquid-solid colloid
 - (c) solid-solid colloid and solid-liquid colloid
 - (d) liquid-solid colloid and solid-liquid colloid
- Q3. A student filled two glasses with 100 ml water in each. To glass 1, she added 5 ml orange food colour, and to glass 2 she added 10 ml orange food colour. Which water would appear darker of the two?
- (a) Glass 1 because it has less solute
 - (b) Glass 2 because it has more solute
 - (c) Glass 1 because it has more solvent
 - (d) Glass 2 because it has more solvent
- Q4. The chemical symbol for sodium is _____
- (a) So
 - (b) Sd
 - (c) NA
 - (d) Na
- Q5. Which of the following correctly represents the electronic distribution in the Mg ion?
- (a) 3, 8, 1
 - (b) 2, 8, 2
 - (c) 1, 8, 3
 - (d) 2, 8
- Q6. Elements with valency 1 are
- (a) always metals
 - (b) always metalloids
 - (c) either metals or non-metals
 - (d) always non-metals
- Q7. Four elements W, X, Y and Z contain 10, 11, 13 and 19 protons per atom respectively. The element which cannot form a cation is most likely to be
- (a) W
 - (b) X
 - (c) Y
 - (d) Z
- Q8. Intestine absorbs the digested food materials. What type of epithelial cells are responsible for that?
- (a) Stratified squamous epithelium
 - (b) Columnar epithelium
 - (c) Spindle fibres
 - (d) Cuboidal epithelium

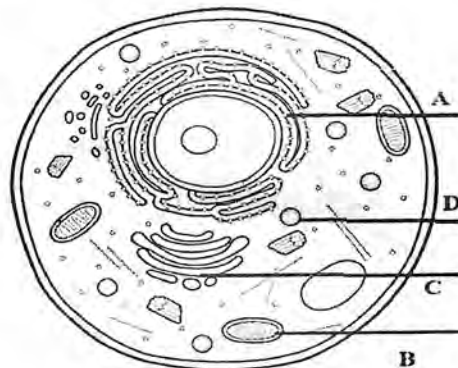
(2)

Q9. Identify 'A', 'B', 'C' and 'D' in the given figure and choose the correct answer.



- (a) A-Mast cell, B-Fibroblast, C-Collagen fibre, D-Macrophage
- (b) A-Mast cell, B-Macrophage, C-Collagen fibre, D-Fibroblast
- (c) A-Macrophage, B-Mast cell, C-Collagen fibre, D-Fibroblast
- (d) A-Macrophage, B-Fibroblast, C-Collagen fibre, D-Mast cell

Q10. Observe the given figure of an animal cell and identify 'A', 'B', 'C' and 'D'.



- (a) A-Lysosome, B-Chloroplast, C-Golgi body, D-Mitochondria
- (b) A-Endoplasmic reticulum, B-Mitochondria, C-Lysosome, D-Golgi body
- (c) A-Endoplasmic reticulum, B-Mitochondria, C-Golgi body, D-Lysosome
- (d) A-Endoplasmic reticulum, B-Chloroplast, C-Golgi body, D-Vacuole

Q11. The cell organelle involved in forming complex sugars from simple sugars is

- (a) Endoplasmic reticulum
- (b) Ribosomes
- (c) Plastids
- (d) Golgi apparatus

Q12. Which one of the following fishes is a surface feeder?

- (a) Rohus
- (b) Mrigals
- (c) Common carps
- (d) Catla

(3)

- Q13. A box, while sliding down a plane, has an acceleration of 4 cm/s^2 . What will be its velocity 6s after the start?
- (a) 0.24 m/s (b) 0.6 m/s
(c) 0.06 m/s (d) 2.4 m/s
- Q14. A girl stands on a box having 60 cm length, 40 cm breadth and 20 cm height in three ways. The pressure exerted by the brick will be
- (a) maximum when length and breadth form the base.
(b) maximum when breadth and height form the base.
(c) maximum when height and length form the base.
(d) the same in all the above three cases.
- Q15. When a body falls freely towards the Earth, then its total energy
- (a) increases (b) decreases
(c) remains constant (d) first increases and then decreases
- Q16. Sound travels in air if
- (a) particles of medium travel from one place to another.
(b) there is no moisture in the atmosphere.
(c) disturbance moves.
(d) both particles as well as disturbance, travel from one place to another.

Question No. 17 to 20 are Assertion- Reasoning based questions.

These consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below.

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

Q17. **Assertion (A) :** Ice floats on water.

Reason(R) : Liquids have lower density than solids.

Q18. **Assertion (A)** : The skin of our fingers shrinks when we wash clothes for a long time.

Reason (R) : Soap solution is hypertonic in nature which results in exosmosis.

Q19. **Assertion (A)** : A rubber ball will have less inertia as compared to a stone of the same size.

Reason (R) : Inertia is dependent on the mass of the object, the object with the greater mass will hold greater inertia.

Q20. **Assertion (A)** : Nerve impulse allows us to move our muscles when we want to.

Reason (R) : The signal that passes along the nerve fibre is called a nerve impulse.

SECTION - B

Question No. 21 to 26 are very short answer questions.

Q21. Give reasons.

- (a) When air is blown into a balloon, it inflates.
- (b) We feel uncomfortable when humidity is very high.

Q22. (a) What is Poultry farming?

- (b) What are Milch and Draught animals?

Q23. (a) Where are proteins synthesized inside the cell?

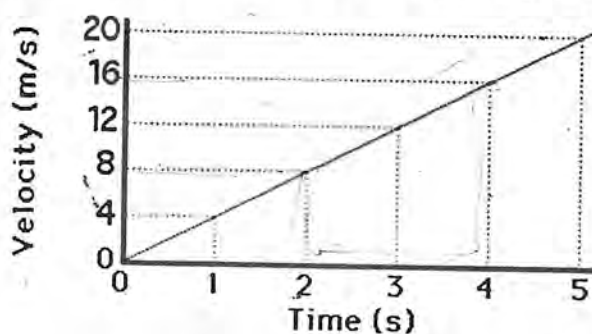
- (b) Why are mitochondria known as 'powerhouse of the cell'?

OR

- (a) Why do plant cells possess large sized vacuole?

- (b) Why does a Red Blood Cell shrink, if kept in a concentrated saline solution?

Q24. Study the given graph carefully and answer the following questions.



- (a) Calculate the acceleration between time interval 2s and 4s.
- (b) Calculate the displacement between time interval 1s to 2s.

4
1

(5)

- Q25. A car starts from rest and rolls down a slope with a constant acceleration. It travels a distance of 200 m in 10s. Find its acceleration. Find the force acting on it if its mass is 4 tonnes. 25, 50

OR

A truck of mass M is moved under a force F . If the truck is then loaded with an object equal to the mass of the truck and the driving force is halved, then how does the acceleration change?

- Q26. Distinguish between cuboidal and columnar epithelial tissue based on the following.

- (a) Location (b) Function

SECTION - C

Question No. 27 to 33 are short answer questions.

- Q27. (a) Calculate the amount of water required to prepare 500 g of 2.5% solution of sugar by mass.

- (b) Identify the homogeneous mixture from the following :

Soda water, Soil, Vinegar, Unfiltered tea

- Q28. Write any three postulates of Dalton's Atomic Theory.

OR

- (a) Calculate molecular mass of Aluminium Oxide and common salt.
(b) Formula of the carbonate of a metal M is M_2CO_3 . What is the valency of M ?
Write the formula of its chloride.

- Q29. Give reasons for the following.

- (a) Skeletal muscles are also called striated muscles.
(b) Intercellular spaces are absent in sclerenchymatous tissue.
(c) We get a crunchy and granular feeling when we chew pear fruit.

- Q30. (a) Explain composite fish culture.

- (b) What is mixed cropping and intercropping? Give one example of each.

- Q31. (a) Under what condition(s) is the magnitude of average velocity of an object equal to its average speed?

- (b) Why is the motion of a satellite around the Earth said to be accelerated?

(6)

- (c) An object moves around a circular path of radius 77cm. What will be the displacement shown by it after 4.5 rounds?

Q32. Give reason for the following.

- (a) A stone tied to a string is whirled around. The stone flies off tangentially if the string breaks.
 - (b) After taking a high jump, the athlete lands on a cushioned surface.
 - (c) Before a person jumps out of a boat on the shore, the boat is tied with a hook on the shore.
- Q33. (a) How does the force of gravitation between two objects change when one of the masses is halved?
- (b) The volume of 20 g of a substance is 50 cm^3 . If the density of liquid is 1 g cm^{-3} . Will the substance float or sink in the liquid?

SECTION - D

Question No. 34 to 36 are long answer questions.

Q34. (a) Give reasons.

- (i) Oxygen has six valence electrons but its valency is 2.
 - (ii) The nucleus of an atom is positively charged but the atom as a whole is neutral.
 - (iii) Some of the alpha rays were deflected by small angles in Rutherford's experiment.
- (b) The mass number and atomic number of an isotope of uranium are 235 and 92 respectively. Calculate the number of protons and neutrons in the nucleus of this atom. Write one use of an isotope of uranium.

OR

- (a) Chlorine occurs in nature in two isotopic forms with masses 35u and 37u in the ratio of 3:1. Calculate the average atomic mass of chlorine on the basis of this data.
- (b) Classify the following as metals or non-metals on the basis of their valency.
Magnesium, Chlorine, Oxygen and Potassium
- (c) Draw the labelled schematic atomic structure of the Sodium atom having $Z=11$.

(7)

- Q35. (a) Write the role of Lysosome in a cell.
(b) What is cell division and why is it necessary?
(c) Differentiate between Mitosis and Meiosis. (Any two points)

OR

- (a) What would happen to the life of a cell if there was no golgi apparatus?
(b) What happens when dry apricots are left for some time in pure water and later transferred to sugar solution?
(c) Why is the plasma membrane called a selectively permeable membrane?
- Q36. (a) What is the work done by the force of gravity on a satellite moving round the earth? Justify your answer.
(b) The kinetic energy of an object of mass m moving with a velocity of 5 m/s is 25 J . What will be its kinetic energy when its velocity is doubled? What will be its kinetic energy when its velocity is increased three times?
(c) A battery lights a bulb. Describe the energy changes involved in the process.

OR

- (a) Can any object have momentum even if its mechanical energy is zero? Explain.
(b) Calculate the work required to be done to stop a car of 1200 kg moving at a velocity of 36 km/h .
(c) When is work done said to be negative? Explain with an example.

SECTION - E

Question No. 37 to 39 are case based/data based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts.

- Q37. Valency is a term used in chemistry to describe the number of bonds an atom can form with other atoms. It is essentially a measure of an element's combining power with other atoms when it forms compounds. Valency is determined by the number of electrons an atom needs to gain, lose, or share to achieve a stable electron configuration. Atoms can have positive or negative valency. Positive valency indicates an atom's tendency to lose electrons and form positive ions, while negative valency indicates a tendency to gain electrons and form negative ions.
- (a) What are polyatomic ions? Give an example.
(b) What is the atomicity of ozone and nitrogen gas molecules?

(8)

- (c) What is the ratio by mass of the combining elements in nitrogen dioxide?

OR

- (c) Give the names of the elements present in baking powder.

Q38. In older plants, the outer protective layer, that is, epidermis undergoes certain changes and the epidermis of the stem is replaced. There is cork cambium which is simple tissue having one type of the cell. The cells of cork cambium are rectangular and their protoplast is vacuolated and contains tannins. The cork cambium gives off new cells from its both sides. The cell of the cork cambium is dead and compactly arranged without the intercellular space.

- (a) Name the chemical present in the walls of cork cells.
(b) How does cork act as a protective covering?
(c) 'In desert plants, epidermis has a thick waxy coating of cutin on its outer surface'. Justify the statement.

OR

- (c) List any two differences between epidermal cells and cork cells.

Q39. A violin and a flute may both be played at the same time in an orchestra. Both sounds travel through the same medium, that is, air and arrive at our ears at the same time. Both sounds travel at the same speed irrespective of the source. But the sounds received are different. This is due to the different characteristics associated with the sound. Pitch is one of the characteristics. How the brain interprets the frequency of emitted sound is called its pitch. The faster the vibration of the source, the higher the frequency and the higher the pitch. The magnitude of the maximum disturbance in the medium on either side of the mean value is called the amplitude of the wave. It is usually represented by the letter (A).

- (a) How are the wavelength and frequency of a sound wave related to its speed?
(b) Frequency of a sound wave is 2Hz. What will be its time period?
(c) A sound wave travels at a speed of 339 m/s. If its wavelength is 1.5 cm, what is the frequency of the wave? Will it be audible?

OR

- (c) List any two applications of ultrasound.