केन्द्रीय विद्यालय संगठन

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ZONAL INSTITUTE OF EDUCATION AND TRAINING, MYSURU

विज्ञान में योग्यता आधारित मूल्यांकन: परीक्षण वस्तुओं की रचना

Competency Based Assessment in Science: Design of test items

(31.07.2024-02.08.2024)

CLASS IX

SCIENCE

DIRECTOR'S MESSAGE……

It is with profound delight and utmost pride that we present the Competency Based Assessment question bank for **CLASS IX** which was prepared by TGT(Science) of the feeder regions during the 03–day workshop on "**Competency Based Assessment in Science: Design of test items**" It's my firm belief that access to quality education should know no boundaries, transcending social and economic constraints. Our collective vision is to empower all students and teachers with the tools for success and intellectual growth.

With their steadfast dedication, the TGT(Science) from the feeder Regions namely Bangalore, Chennai, Ernakulam and Hyderabad have invested their knowledge and expertise in preparation of the CBA test items.

It is with pleasure that I place on record my commendation for the commitment and dedication of the team of TGT(Science) from the four Regions, Shri. Manoj Kumar Paliwal, Principal KV No.1 Madurai, Chennai Region&
Associate Course Director, the Resource persons Ms Seema Saraswat, TGT(Science) KV Vijaypura and Ms Neeta Wage TGT(Science) KV Hebbal and Mr. Dinesh Kumar, Training Associate (Physics) from ZIET Mysore who has been the Coordinator of this assignment.

Wishing you all the very best in your academic journey!

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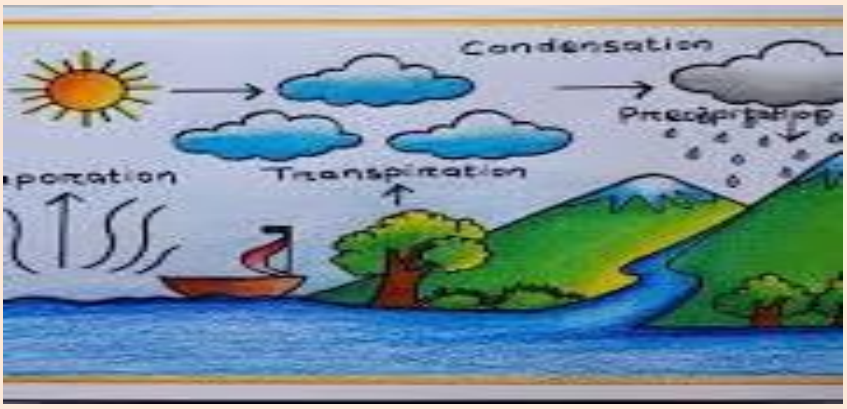
CLASS – IX

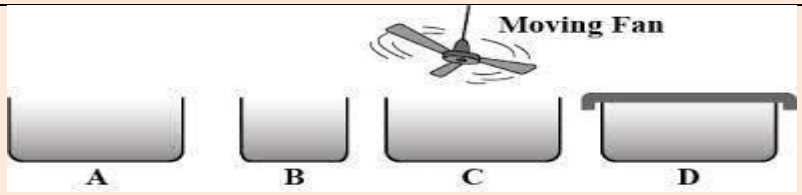
COMPETENCY BASED TEST ITEMS: CHAPTER WISE

CHAPTER – 1 MATTER AROUND OUR SURROUNDINGS

Q NO	SECTION A	MARKS
1	Many modern tanks for water and liquid fuels are made spherical in nature what could be the reason behind this? a) It is easier to build spherical tanks of other shapes b) for a given surface area, spherical tanks enclosed maximum value c) It is easier to transport spherical tanks when repair etc are required liquid get preserved better when they are stored in spherical tanks	1
2	Which phase change at standard temperature and pressure represents sublimation? a) CO(s)-CO(g) b) H(I)-H(g) c) CO(I)-CO(g) D. H(s)-H(I)	1
3	People sometimes add salt to the water in Which eggs are to be boiled. What is the MAIN reason for this? a) Adding salt to the Water before the Egg is cooked makes the egg tastier. b) Adding salt to the water increases its Boiling point and cooks the egg better c) Adding salt to the water Reduces the water Temperature cooking the egg faster. Adding salt to the Water kills micro Organisms making The egg safer to eat.	1
4	Rama suspects that the LPG cylinder is Leaking, and immediately turns the Cylinder valve to the OFF position. What Should she do next? a) Switch on all lights. b) Switch off all lights. c) Open all the windows d) Close all the Windows.	1
5	It is easier to break a piece of chalk than an iron nail. Which characteristic property of a matter is it mentioning about. a. Particles are continuously moving b.Particles of matter attract each other. C.Inter mixing of particles pf different types d. Latent heat of vaporization	1
6	Units of temperature a. Bar and pascal b. Milligram and kilogram c. Degree Celsius and kelvin d. Gram per centimetre cube and kilogram per metre cube	1
7	***Directions:*** In each of the following questions, a statement of Assertion is given, and a corresponding statement of Reason is given just below it. Of the statements, given below, mark the correct answer as: (a) Both assertion and reason are true, and reason is the correct	1

	explanation of assertion. (b) Both assertion and reason are true, but reason is not the correct explanation of assertion. (c) Assertion is true, but reason is false. (d) Assertion is false, but reason is true Assertion : Disinfectants are rubbed on our hands before taking injections and it feels cold. Reason :Particles of disinfectant gains energy from the surroundings and evaporate and leaves our hand cold.	
8	Assertion:Steam is more dangerous than boiled water Reason:Solid particles have high melting point than water.	1
	SECTION B	
9	Read the following situations and categorise them into diffusion / osmosis a. Smell of biriyani while passing through a restaurant. b. Spread of corona virus c. Swelling of Chana when soaked in water d. Earth worm dying when salt is sprinkled over it.	2
10	Camphor is a substance that we use for lighting lamp. a.List the state of camphor before and after burning. b.Elaborate the process	2
11	 Reemu was making steam cake. Suddenly she felt intense heat from the puff of steam gushing out of the vessel. She wondered whether the temperature of the steam was higher than that of the water boiling in the kettle. Comment.	2
12	a. Boiling point of Alcohol is 78 degree celsius. Convert it into Kelvin scale. b.Also mention the physical state of water at 100 degree Celsius.	2
13	Dried raisins were put in water, and it was observed after some time that it swells . Mention the phenomenon and Explain.	2

		
	SECTION C	
14	The temperature of a substance remain constant during its melting point or boiling point. Explain the reason behind it.	3
15	a.Rita made a lemon juice and added some ice cubes into it. She observed that ice floated in the juice. Give the reason for this. b. Plants use carbon dioxide for photosynthesis. Mention its natural state. How is it different from dry ice.?	3
16	 Interconversion of state of matter is a natural phenomena. Observe the picture and explain the conversion of matter taking place. Mention about the energy transfer also.	3
	SECTION D	
17	Observe the picture given below and suggest which of the vessels A, B, C or D will have the highest rate of evaporation? Explain with reference to each vessel.	5

		
18	Matter exist in three states. Compare and write the properties of different states of matter.	5
	SECTION E	
19	Evaporation causes natural cooling. The basic concept is that in order for matter to change state, it must either receive or lose energy. When molecules of matter changes from liquid to gas, they require energy to overcome their potential energy through kinetic energy. As a result, the liquid absorbs energy from its surroundings. a. Clothes dry faster in a winter day than on a rainy day. Why? b. It is easy to drink a hot tea from a saucer faster than from a cup. Why? c. Evaporation requires energy. Explain.	4
20	In an experimental activity, crushed ice was taken in a beaker. A thermometer is fitted in such a way that its bulb was thoroughly surrounded by ice. The beaker is now slowly heated and the temperature was regularly noted. The temperature rises gradually as the heating is continued and becomes constant when the ice starts changing into liquid. a)Where does the heat energy go when the temperature does not rise? b)Name the process explained here. c)Differentiate melting and boiling point.	4

ANSWER KEY CHAPTER -1 MATTER AROUND OUR SURROUNDINGS

QNO	**SECTION A**	**MARKS**
1	b.	1
2	a.	1
3	B	1
4	D	1
5	b.	1
6	C	1
7	a.	1
8	c.	1
	SECTION B	
9	a. Diffusion b.Diffussion c.Osmosi d.osmosis	½ each
10	a. Solid to gas b. The change of state from solid to gas without changing to liquid state is called Sublimation.	1 1
11	The temperature of steam is not different from that of boiling	2

	water. The temperature of boiling water as well as that of steam is 100 °C, but steam has more energy because of the latent heat of vaporization.	
12	a. 78+273=351 degree Celsius. b. At 100-degreeCelsius, water exists in both the liquid state as well as in gaseous state.	1 1
13	Osmosis Solution outside the raisin has a higher concentration of water molecules. Therefore, water from outside enters the raisin through the process of osmosis and hence the raisin swells up when kept in water. The outer membrane of the cells of the raisin acts as a semi-permeable membrane.	½ 1 ½
	SECTION C	
14	Ans: The temperature of a substance remains constant at its melting and boiling points until all the substance melts or boils. The heat supplied is continuously used up in overcoming the forces of attraction between the particles of the substance during the transition of physical state of the substance. This is known as the latent heat of fusion or the latent heat of vaporization, as per the situation. Thus, heat energy is absorbed by the substance without showing any rise in temperature.	½ 2 ½
15	a.Ice is the solid state of water. It has a greater amount of space between its molecules compared to water molecules. As a result, the volume of ice is larger than that of water, leading to a lower density of ice. This is the reason why ice tends to float on water, as water has a higher density than ice. b. Carbon dioxide is seen in gaseous state. When carbon di oxide is stored in high pressure it becomes solid with out coming into liquid state. This dry ice.	1 1/2 ½ 1
16	Evaporation – Change of water from liquid state to gaseous state Condensation Change of gaseous state to liquid state of water. s During evaporation heat is absorbed from the surrounding During Condensation heat is released into the surrounding.	½ each
	SECTION D	
17	Vessel (c) will have the highest rate of evaporation. Evaporation is a surface phenomenon; the rate of evaporation increases with an increase in surface area. The moving fan will reduce humidity and increase the rate of evaporation. The particles of water vapours will move away with wind (moving air) with an increase in air speed. Surface area in vessel (b) is lesser than that in vessel (a) and vessel (c) whereas vessel (d) is completely closed and offers no surface area for evaporation.	3 2

18		5

Solids	Liquids	Gases
Highly Strong intermolecular forces between the molecules, leads to a definite volume in Solids.	The intermolecular forces are stronger than gases but weaker than solids.	The intermolecular forces Thus, there is no definite
Solids have a definite shape to them.	Liquids do not have a definite shape.	Gases do not have a defin
The intermolecular space between solids is absent.	The intermolecular space is moderate but present.	The intermolecular space
The force of attraction between the molecules is incredibly high.	The force of attraction between molecules is pretty moderate.	There is no intermolecula the molecules.
They are incompressible.	Liquids cannot be compressed.	Gases can be compressed
Solids have a definite shape and volume.	Liquids have a definite volume.	Gases have no definite vo

	SECTION E	
19	a. In winters though the sun is not very hot but the air is dry i.e it does not contain much moisture so evaporation of water takes place faster than rainy season where the air is fully moist. b. The rate of evaporation increases as the surface area of the liquid increases. c. Evaporation requires energy because it occurs when intermolecular bonds between liquid molecules break, and to break those bonds some amount of energy is required. This required energy is provided by the surrounding environment, hence it causes a cooling effect.	1 1 2
20	a.It is utilized for bringing out the complete change of state b. Latent heat of fusion c.Melting point is the temperature at which a solid becomes a liquid at normal atmospheric pressure. Boiling point is the Temperature at which a liquid starts boiling at atmospheric pressure	1 1 2

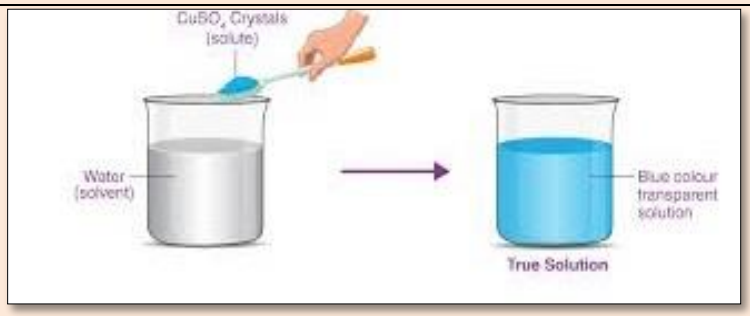
CHAPTER – 2 IS MATTER AROUND US PURE?

Q NO	SECTION A	MARKS
1	Bronze is a (a) Compound (b) Elements (c) Homogeneous (d) Heterogenous	1
2	Which of the following statements is true for pure substances? (i) Pure substances contain only one kind of particles (ii) Pure substances may be compounds or mixtures (iii) Pure substances have the same composition throughout (iv) Pure substances can be exemplified by all elements other than nickel (a) (i) and (ii) (b) (i) and (iii) (c) (iii) and (iv) (d) (ii) and (iii)	1
3	Which of the following properties does not describe a compound? (a) It is composed of two or more elements (b) It is a pure substance. (c) It cannot be separated into constituents by physical means (d) It is mixed in any proportion by mass	1
4	Solid solution in which the solute is gas ———— (a) Copper dissolved in gold (b) Camphor in nitrogen gas (c) Solution of hydrogen in palladium (d) All of the above	1
5	In tincture of iodine, identify the solute and solvent? (a) alcohol is the solute and iodine is the solvent (b) iodine is the solute and alcohol is the solvent (c) any component can be considered as solute or solvent (d) tincture of iodine is not a solution	1
6	Two substances, A and B, were made to react to form a third substance, A_2B, according to the following reaction $2A + B \rightarrow A_2B$. Which of the	1

<table>
<tr><td></td><td>following statements concerning this reaction are incorrect?
(i) The product A_2B shows the properties of substances A and B
(ii) The product will always have a fixed composition
(iii) The product so formed cannot be classified as a compound
(iv) The product so formed is an element
(a) (i), (ii) and (iii),
(b) (ii), (iii) and (iv)
(c) (i), (iii) and (iv)
(d) (ii), (iii) and (iv)</td><td></td></tr>
<tr><td>7</td><td>Directions: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

7. Assertion : When a beam of light is passed through a colloidal solution placed in a dark place the path of the beam becomes visible.
Reason : Light gets scattered by the colloidal particles.</td><td>1</td></tr>
<tr><td>8</td><td>Assertion : Fog is an example of aerosol.
Reason : The dispersion medium is gas and dispersed phase is liquid in fog.</td><td>1</td></tr>
<tr><td></td><td>SECTION B</td><td></td></tr>
<tr><td>9</td><td>1. Classify the substances given in the column into elements and compounds.
<table><tr><td>copper</td><td>water</td><td>Calcium carbonate</td><td>iron</td></tr><tr><td>mercury</td><td>zinc</td><td>Sodium chloride</td><td>diamond</td></tr></table></td><td>2</td></tr>
<tr><td>10</td><td>Class 9 B students were asked to prepare a 10% (Mass/Mass) solution of sugar in water. Sita dissolved 10 g of sugar in 100 g of water while Neeta prepared it by dissolving 10 g of sugar in water to make 100 g of the solution.
(a) Are the two solutions of the same concentration?
(b) Compare the mass % of the two solutions.</td><td>2</td></tr>
</table>

11	Calculate the mass of sodium sulphate required to prepare its 20% (mass percent) solution in 100 g of water?	2
12	It is not possible to distinguish particles of a solute from the solvent in solution. Give reason?	2
13	Explain why particles of a colloidal solution do not settle down when left undisturbed, while in the case of a suspension they do	2
	SECTION C	
14	Sonu and his friends took an old shoe box and covered it with a black paper from all sides. They fixed a torch at one end of the box by making a hole in it and made another hole on the other side to view the light. They placed a glass of milk in the box . They were amazed to see that milk taken in the tumbler was illuminated. They tried the same activity by taking a salt solution but found that light simply passed through it. a) Explain why the milk was illuminated. Name the phenomenon involved. b)Same results were not observed with a salt solution. Explain. c) suggest two more solutions which would show the same effect as shown by the milk solution?	3
15	An element is sonorous and highly ductile. Under which category would you classify this element? Write any two other characteristics do you expect the element to possess?	3
16	Non-metals are usually poor conductors of heat and electricity. They are non-lustrous, non-sonorous, non-malleable and are coloured. (a) Name a lustrous non-metal. (b) Name a non-metal which exists as a liquid at room temperature. (c) Name a non-metal which is required for combustion.	3
	SECTION D	
17	a) Differentiate between a true solution and a colloid. b) Distinguish between compounds and mixtures.	5
18	a) Under which category of mixtures will you classify alloys and why? b) A solution is always a liquid. Comment. c) Can a solution be heterogeneou	5
	SECTION E	
19	**Read the given information and answer the following questions: (1 x 4 = 4 M)**	4

	 **CASE-** Milk is actually a mixture of water, fat, proteins etc. When a scientist says that something is pure, it means that all the constituent particles of that substance are the same in their chemical nature. A pure substance consists of a single type of particles. The elements and compounds comes under the pure substances. As we look around, we can see that most of the matter around us exist as mixtures of two or more pure components, for example, sea water, minerals, soil etc. are all mixtures.Depending upon the nature of the components that form a mixture, we can have different types of mixtures; homogeneous and heterogeneous mixture. Q1. How will you describe a pure substance? Q2. Give two examples of a compound? Q3. Air is a homogeneous mixture. justify the statement.	
20	 A true solution is a homogeneous mixture of two or more substances . It consists of solute and solvent. The particle size of the true solution is less than 1 nanometer. A suspension is a heterogeneous mixture in which the solute particle does not dissolve but remains suspended throughout the bulk of the medium. A colloid is a mixture that is actually heterogeneous but appears to be homogeneous as the particles are uniformly spread throughout the solution. **1)**Identify the components of a solution? 2) Differentiate a colloid from a suspension? 3)Name the phenomenon shown by colloids and find out an example as you have seen it in nature?	4

ANSWER KEY CHAPTER- 2 IS MATTER AROUND US PURE?

Q NO	Section A	MARKS
1	c	1
2	b	1
3	d	1
4	**c**	1
5	b	1
6	**c**	1
7	a	1
8	a.	1
	SECTION B	
9	Elements – Copper,iron,mercury,zinc,diamond Compounds – Calcium carbonate,sodiumchloride,water	2
10	(a) No, Neeta has higher mass percentage. b)solution made by sita= Mass %= 10/(10+100) x 100 =10/110x100 =9.09% Solution made by Neeta = Mass% = 10/100 x100 =10%	2
11	Let the mass of sodium sulphate required be = x g The mass of solution would be = (x + 100) g x g of solute in (x + 100) g of solution $20\% = \frac{x}{x+100} \times 100$ $20x + 2000 = 100x$ $80x = 2000$ $x = \frac{200}{80} = 25$ g	2
12	A true solution is homogeneous in nature. The solute and solvent particles are very small. They cannot be distinguished even under a microscope.	2
13	Particle size in a suspension is larger than those in a colloidal solution. Also molecular interaction in a suspension is not strong enough to keep the particles suspended and hence they settle down.	2
	SECTION C	
14	(a) Milk is a colloid. If a beam of light is put on a milk sample contained in a beaker, the path of light beam is illuminated and becomes visible when seen from the other side. This is because the colloidal particles are big enough to scatter light falling on them. This scattered light enters our eyes and we are able to see the path of light beam.	3

	The scattering of light by colloidal particles is known as Tyndall effect. (b) Salt solution is a true solution. If a beam of light is put on a salt solution kept in a beaker in a dark room, the path of light beam is not visible inside the solution when seen from the other side. This is because salt particles present in it are so small that they cannot scatter light rays falling on them. (c) Detergent solution, sulphur solution.	
15	A metal is sonorous and ductile. Thus if an element possesses these qualities, we will keep this under the category of metals.other characteristics of metals are : • Metals are highly malleable.(any two) • Metals have a high melting and boiling point. • Metals are lustrous. • Metals have a high density and thus are hard. • Metals are a good conductor of heat and electricity.	3
16	a)Lustrous non-metal Iodine b).Non-metal, which exists as a liquid at room temperature. Bromine c) non metal oxygen	3
	SECTION D	
17	a) Any two differences b) Any three differences.	5
18	(a) Alloys are homogeneous mixture of two or more elements because the constituent elements mix together and give a mixture which is uniform throughout. (b) No, solid solutions and gaseous solutions are also possible. Examples are brass, air. (c) No, a solution cannot be heterogeneous in nature.	5
	SECTION E	
19	a. A pure substance consists of a single type of particles. b. Any 2 examples c. Yes. justification	4(1+1+2)
20	a . It consists of solute and solvent. b any one difference c Tyndall effect examples of Tyndall effect are(any 1) Sunlight entering into a dark room. Lots of dust particles suspended in a lit up room. When the weather is foggy and smoggy, beams of headlights are clearly visible. Scattering of light by water droplets present in the air.	4(1+1+2)

CHAPTER - 3 ATOMS AND MOLECULES

<table>
<tr><th>Q.NO</th><th>SECTION A</th><th>MARKS</th></tr>
<tr><td>1</td><td>A student studies that magnesium and iron react with oxygen to form MgO and FeO. Although both compounds contain two atoms each of their molecular masses are different. What is the reason for the difference in their molecular masses?
(a) Difference in the atomic mass of iron and magnesium
(b) Difference in the number of iron and magnesium atoms
(c) Different in the atomic number of iron and magnesium
(d) Difference in the number of oxygen atoms in the two compounds.</td><td>1</td></tr>
<tr><td>2</td><td>Which of the following is correct symbol of sodium ion?
(a) Na (b) Na^+
(c) So (d) Na^-</td><td>1</td></tr>
<tr><td>3</td><td>A student finds the atomic radii of some elements.
<table>
<tr><th>Element</th><th>Atomic radii</th></tr>
<tr><td>Aluminium(Al)</td><td>143 X 10^{-12}m</td></tr>
<tr><td>Iron (Fe)</td><td>124 X 10^{-12} m</td></tr>
<tr><td>Zinc (Zn)</td><td>133 X 10^{-12} m</td></tr>
</table>
To see how an atom would appear, he observes an aluminium foil with a hand lens but is unable to see atoms that are made up the foil. What can be the possible reason for this?
a) Atoms of only gaseous substance can be observed.
b) Atoms are very tiny and cannot be observed by simple hand lens.
c) Atoms are joined with great force, so it is difficult to distinguish one atom.
Atoms of metals are in constant motion so they cannot be observed with a hand lens.</td><td>1</td></tr>
<tr><td>4</td><td>Identify triatomic molecule from the following?
a. Nitrogen
b. Hydrogen
b. Ozone
d. oxygen</td><td>1</td></tr>
<tr><td>5</td><td>Mass of 1 molecule of Oxygen is
a. 16g
b. 8u
c. 12x16u
d.32u</td><td>1</td></tr>
<tr><td>6</td><td>Identify correct statements-1u is the
A. mass of one C-12 atom
B. 1/12th of mass C-12 atom
C. Mass of one Hydrogen molecule
D. Mass of 1/16 of an Oxygen atom
a. B,C, D
b. B, C</td><td>1</td></tr>
</table>

	c. B d. B, D	
	Question number 7 and 8 consists of two statements, namely, Assertion (A) and Reason (R). Select the correct answer from the following (a) Both Assertion (A) and Reason (R) are the true and Reason (R) is a correct explanation of Assertion (A). (b) Both Assertion (A) and Reason (R) are the true but Reason (R) is not a correct explanation of Assertion (A). (c) Assertion (A) is true and Reason (R) is false. (d) Assertion (A) is false and Reason (R) is true.	
7	A -Assertion: Valency of Aluminium is 3 and it forms Al^{3+} R-Reason : Metals form cations by losing electrons in order to get stability.	1
8	A -Assertion: phosphorous is a polyatomic molecule R-Reason: Atomicity of phosphorous is 8	1
	SECTION B	
9	List any two elements which lack combining capacity? Justify your answer stating relevant reasons	2
10	What are monoatomic ions ? Give one example each for a. monoatomic cation b. monoatomic anion	2
11	Formula unit mass of compound is 58.5u. Identify the compound with its chemical formula. Mention any one use of the compound in our daily life	2
12	Write down the chemical name of a. $AlPO_4$ b. ZnO c.H_2S d.CCl_4	2
13	Identify anions and cations in the following compounds a. Calcium hydroxide b. Sodium carbonate	2
	SECTION C	
14	a. Mention any two-point difference between atoms and ions b. Represent following elements with their symbols Gold, Iron	3
15	8.25g of Lead nitrate reacts with 12.05g of sodium chloride. Predict the products formed and their total mass. State the law to support your answer	3

16	Write chemical formula of following compounds by crossing over valences a. Sodium hydrogen carbonate b. Calcium hydroxide c. Zinc phosphate	3
	SECTION D	
17	a.List the postulates of Dalton's Atomic theory which postulate/postulates were disproved later? c.Mention the discovery that led to this disapproval?	5
18	a.Design an experiment to prove law of conservation of mass b.Illustrate with the help of diagram and mention any two precautions	5
	SECTION E	
19	Atomic mass is the quantity of matter contained in an atom of an element. It is the sum of the mass of the protons, neutrons, and electrons that make up the atom. Carbon-12 was chosen as the reference substance because its atomic mass could be measured accurately. Atomic mass is expressed as a multiple of one-twelfth the mass of the carbon-12 atom ie $1.992646547 \times 10^{-23}$ gram, which is assigned an atomic mass of 12 units. The atomic mass unit is also called the unified mass (u) a)Name the international agency that approves standardized methods for measurement, atomic weights etc b). Define 1 unified mass(1u) c) Calculate molecular mass of i) HNO3 ii) $C_6H_{12}O_6$ OR c). Mention the atomic mass of any four elements you are familiar wit	4
20	In 1794, Joseph Proust, a French chemist formulated the law of constant proportions from the work he did on sulfates, metal oxides and sulfides. Also, this law was favored since Dalton's atomic theory was introduced as well. The relation between them was also discovered by Jacob Berzelius, a Swedish chemist in the year 1811.  Joseph- Louis Proust	4

	a)Calculate the amount of Hydrogen and oxygen obtained when 90g water is decomposed will be equal to b)What is the ratio by mass of Carbon and Oxygen in CO_2? c)State the postulates of Dalton's atomic theory that explains Proust's law?	

ANSWER KEY CHAPTER- 3 ATOMS AND MOLECULES

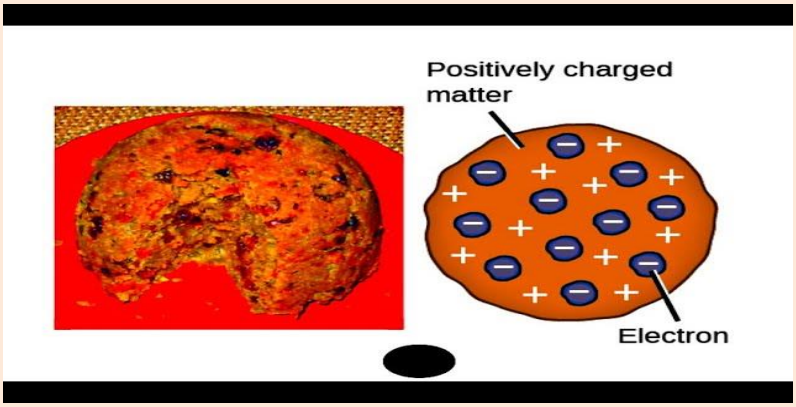
Q.NO	SECTION A	MARKS
1	a	1
2	b	1
3		1
4	b. Ozone	1
5	d.32u	1
6	d. B , D	1
7	B	1
8	C	1
	SECTION B	
9	Helium, Neon Their outer most shell is filled, valency is zero	1 1
10	Monatomic ions are charged particles with only one atom in them. a. H+ b. Cl- (or any other eg)	1 ½+½
11	NaCl Used in cooking/preserving	1 1
12	a. Aluminium phosphateb. Zinc oxide c. .Hydrogen sulphide d. Calcium tetra chloride	½ x4
13	anions cations a.Ca^{2+} OH- b.Na+ CO_3^{2-}	2
	SECTION C	
14	Atoms -Not charged -neutral ,equal number of protons and electrons, Ions -either positively or negatively charged, number of protons and electrons vary Au, Fe	2 1

15	Products areLead chloride and sodium nitrate Total mass 8.25+12.05=20.3g Law of conservation of mass states that mass can neither be created nor destroyed in a chemical reaction.	 1 1 1
16	Correct formula Crisscrossing	1/2x3 1/2x3
	SECTION D	
17	• All matter consists of indivisible particles called atoms. • Atoms of the same element are similar in shape and mass but differ from the atoms of other elements. • Atoms cannot be created or destroyed. • Atoms of different elements may combine with each other in a fixed, simple, whole number ratio to form compound atoms. • Atoms of the same element can combine in more than one ratio to form two or more compounds. • Atoms are the smallest unit of matter that can take part in a chemical reaction. (1) That atoms are indivisible and (2) that all atoms of a given element are identical in mass and properties. Discovery of electrons	5
18	Designing experiment with diagram mass of reactants and products precautions (correct mass, making the set up sealed or any other)	5
	SECTION E	
19 a.	IUPAC One atomic mass unit (1u) is a mass unit equal to one-twelfth (1/12th) the mass of one atom of carbon-12 i) 63u ii) 180u (with calculation)	4
20	(a) 1:8 ratio 10g Hydrogen and 80g Oxygen (b) 12u +32u 3:8 ratio (c) Atoms of different elements combine in fixed ratios to form compounds a.	4

CHAPTER- 4 STRUCTURE OF ATOM

Q NO	SECTION A	MARKS
1	Which among the following does not contain neutrons? (a)Helium (b) Hydrogen (c) Lithium (d)Boron	1
2	An ion of an element has 3 positive charges, 27 mass numbers and 14 neutrons. Find the number of electrons in this ion. (a)13 (b) 10 (c) 14 (d) 166	1
3	The relative mass of proton is - (a) Less than the mass of a hydrogen atom. (b) Equal to the mass of a hydrogen atom. (c) More than the mass of a hydrogen atom. (d) Equal to the mass of an oxygen atom.	1
4	Two oxygen atoms in CH_3COOH (Vinegar) have the same number of electrons .But different number of neutrons,which of the following is the correct reason for this? (a) One of the oxygen atoms have gained electrons (b) One of the oxygen atoms has gained two neutrons (c) The two oxygen atoms are isobars. (d) The two oxygen atoms are isotopes.	1
5	The number of electrons in an element "X'' is 15 & the number of neutrons is 16, which of the following is the correct presentation of the element? (a) $^{16}_{15}X$ (b) $^{31}_{15}X$ (c)$^{31}_{16}X$ (d) $^{15}_{16}X$	1
6	What will be the charge on an atomof sodium(Na) if it losses one electron (a) positive (b) negative (c) neutral (d) no Change	1
7	*Directions:* In each of the following questions, a statement of Assertion is given, and a corresponding statement of Reason is given just below it. Of the statements, given below, mark the correct answer as: (a) Both assertion and reason are true, and reason is the correct explanation of assertion. (b) Both assertion and reason are true, but reason is not the correct explanation of assertion. (c) Assertion is true, but reason is false. (d) Assertion is false, but reason is true Assertion: Na, K, Ca, Mg are metals because they can lose electrons to form positive ions. Reason: F, Cl, P, O are non-metals because they too can gain electrons	1

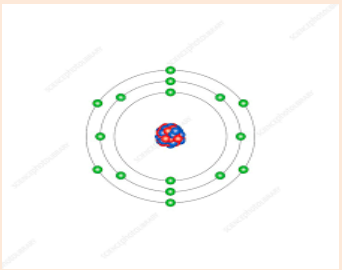
	to form positive ions.	
8	**Assertion**: Charge of one electron is 1.602×10^{-19} C. **Reason**: 6.25×10^{18} number of electrons	1
	SECTION B	
9	Two elements X and Y are having similar atomic numbers with different mass numbers. a. Mention the name given for such type of atomic species. b..Also give the names of three atomic species of hydrogen.	2
10	Alpha particles are least deviated from their path unless any heavy body strikes them. How is this characteristic property of alpha particle useful in the study of sub atomic particle?	2
11	Argon and calcium have same mass number 40 but different atomic number. a.Mention the name given to such elements. b. Calculate the number of protons, electrons and neutrons of Argon	2
12	Find the valency and number of neutrons of $^{17}_{7}N$ and $^{35}_{17}Cl$.	2
13	An atom has atomic number 12. a. Identify the element. b. Mention its electronic configuration, c. valency d. its mass number	2
	SECTION C	
14	a.Following the rules of distribution of electrons, show the formula and calculate the number of electrons that an atom can accommodatein the fifth energy level. b. An element has atomic number 8. Identify the element, its valency and valence electrons.	3
15	a.Analyse and mention the drawback of Rutherford's model of atom b. How it was explained by Neils Bohr through his postulates.	3
16	Carbon exists in nature in different forms. Estimate the number of protons, neutrons and electrons per atom in the two isotopes of carbon - atomic no: 6 and mass no: with 12 and 14	3
	SECTION D	
17	a.Categorise the subatomic particles based on their properties. b.Draw the atomic structure of an element whose atomic number is 16. c.Identify the element and write the electronic configuration.	5

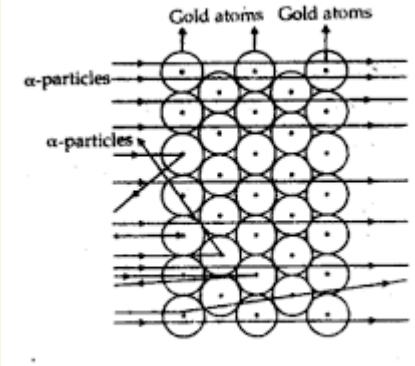
18	a.Explain Rutherford's alpha scattering experiment b.Draw the diagram if the experiment c. Mention his observations. d.On the basis of that explain the nuclear model of an atom.	5
	SECTION E	
19	Cancer is a disease in which some of the body's cells grow uncontrollably and spread to other parts of the body. Cancer can start almost anywhere in the human body, which is made up of trillions of cells. Chemicals are used in the treatment of cancer.  a. Mention an isotope used in the treatment of cancer. b. Nuclear reactors use nuclear fuel. Name the isotope that is used in nuclear reactors. c. Neeta is suffering from Goitre and she is undergoing radiation therapy. Mention the symptom of this disease and name the isotope used in its treatment.	4
20	A plum pudding with lots of dry fruits reminds us about the arrangement of subatomic particles. The discovery of subatomic particles waved off the claim that atoms are the fundamental unit of matter.  a.Plum pudding model of an atom was proposed by J J Thomson. Explain his observation. b.Atom as a whole is electrically neutral. Elaborate.	4

	c. The model of an atom that was accepted worldwide was proposed by ----------	

ANSWER KEY CHAPTER- 4 STRUCTURE OF THE ATOM

Q NO	SECTION A	MARKS
1	(b) Hydrogen	1
2	(a)13	1
3	(b) Equal to the mass of a hydrogen atom.	1
4	(d) The two oxygen atoms are isotopes	1
5	(e) (b) $^{31}_{15}X$	1
6	(a) positive	1
7		1
8	(c)Assertion is true but the Reason is false.	1
	(a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion.	
9	a.Isotope b.. Protium, Deuterium and Tritium	½ 1 1/2
10	Alpha particles are doubly charged helium ions and have a considerable amount of energy and they get deviated at 180 degree when they are hit on the positively charged heavy nucleus.	2
11	a.Isobars. Argon b.No: of protons-18 No: of neutrons-22 No: of electrons18	1/2 1/½
12	Valency of Nitrogen-3 No: of neutrons in Nitrogen-10 Valency of Chlorine-1 No: of neutrons in Chlorine-18	½ each
13	a. Magnesium b. 2,8,2 c. 2 d. 24	½ each
	SECTION C	
14	a. $2n^2$ n=5 $2 \times 5^2 = 50$ b.Element -Oxygen Valency - 2 Valence electrons-6	½ each
15	a.The revolution of the electron in a circular orbit is not expected to be stable because it would radiate and lose energy and finally	1

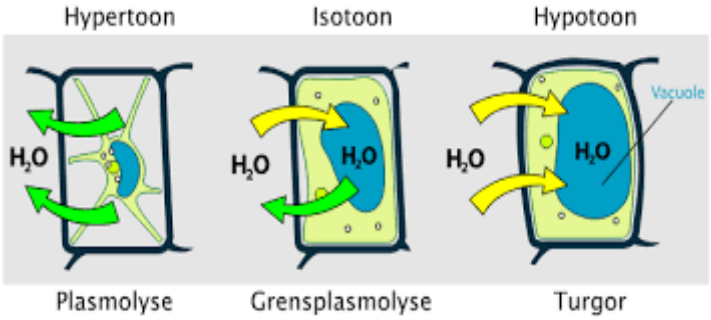
<table>
<tr><td></td><td>fall into the nucleus. If this were so, the atom should be highly unstable .
b.i.Only certain special orbits known as discrete orbits of electrons, are allowed inside the atom.
(ii) While revolving in discrete orbits the electrons do not radiate energy</td><td>2</td></tr>
<tr><td>16</td><td>Isotopes of Carbon with atomic no: 6 and mass no: with 12
No: of protons- 6
No: of neutrons-6
No: of electrons- 6
Isotopes of Carbon with atomic no: 6 and mass no: with 14
No: of protons- 6
No: of neutrons-8
No: of electrons- 6</td><td>½ each</td></tr>
<tr><td></td><td>SECTION D</td><td></td></tr>
<tr><td>17</td><td>a.
<table><tr><td>Proton</td><td>Neutron</td><td>Electron</td></tr><tr><td>They are positively charged</td><td>They are neutral</td><td>They are negatively charged</td></tr><tr><td>They are present in the nucleus of all atoms</td><td>They are present in the nucleus of all atoms except hydrogen</td><td>They are present in the outer shells within an atom.</td></tr></table>b.
 
C. Sulphur 2,8,6</td><td>3
½
1/2</td></tr>
<tr><td>18</td><td>a.Rutherford passed beams of alpha particles through a thin gold foil and noted how the alpha particles scattered from the foil.</td><td>1
1</td></tr>
</table>

	 Scattering of α-particles by a gold foil. **Observations of Rutherford's alpha ray scattering experiment**: 1. Most of the α-particles passed straight through the gold foil without any deviation. 2. Some of the α-particles were deflected by the foil by some angles. 3. Interestingly one out of every 12,000 alpha particles appeared to rebound. Nuclear model of an atom i)There is a positively charged centre in an atom called the nucleus. Nearly all the mass of an atom resides in the nucleus. (ii) The electrons revolve around the nucleus in circular paths. (iii) The size of the nucleus is very small as compared to the size of the atom	1 ½ 1 1/2
	SECTION E	
19	a.Cobalt b. Uranium c. The person will have a swollen neck and the isotope of Iodine is used in its treatment.	1 1 2
20	a..An atom consists of a positively charged sphere and the electrons are embedded in it. (ii) The negative and positive charges are equal in magnitude. So, the atom as a whole is electrically neutral. b. An atom is electrically neutral because its overall charge is zero. c. Neil's Bohr.	2 1 1

CHAPTER – 5 THE FUNDAMENTAL UNIT OF LIFE

Q NO	SECTION A	MARKS
1	Chromosomes present in the nucleus are made up of a. DNA b. protein c. both the above option d. none of these	1
2	Which of the following cell organelles in vertebrates plays a crucial role in detoxifying many poisons and drugs. a. Endoplasmic Reticulum b. Golgi Bodies c. Lysosomes d. Mitochondria	1
3	Chlorophyll is present in a. lysosomes b. mitochondria c. chloroplast d. leucoplast	1
4	Lysosomes are also called a. suicidal bag b. digestive bag c. demolition squad d. All of the above	1
5	Name the cell organelle which is called as the powerhouse of the cell a. lysosomes b. mitochondria c. chloroplast d. leucoplast	1
6	Name the cell organelle which is called as heredity vehicles a. nucleus b. mitochondria c. chloroplast d. leucoplast	1
7	**Directions:** In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as: (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A). (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A). (c) Assertion (A) is true but reason (R) is false. (d) Assertion (A) is false but reason (R) is true. Assertion A:- Mitochondria is called the powerhouse of the cell. Reason R :- Mitochondria are semi -autonomous cell organelles.	1
8	Assertion A:- RBC burst when placed in hypotonic solution. Reason R:_ RBCs burst due to exosmosis.	1
	SECTION B	
9	**Lysosomes are known as 'suicide-bags' of a cell. Give reason**	2

10	Endocytosis found in animals only? Analyse the reason?	2
11	The cell organelle which controls most of the activities of the cell? justify.	2
12	Peroxisomes mostly found in kidney and liver cells. Why?.	2
13	Do you agree that Golgi bodies are found in large numbers in the cells which secrete digestive enzymes? If yes, explain why?.	2
	SECTION C	
14	From your surroundings find out the different plant parts in which chromoplast, chloroplast and leucoplast are present ?.	3
15	With respect to the function ,list three differences between a plasma membrane and cell wall	3
16	What would happen if the cell has no nuclear membrane?	3
	SECTION D	
17	Illustrate a plant cell as you have seen it under a microscope in your practical class. Now label any three parts which you see here that is missing in an animal cell.	5
18	a)Reetu has got cancer.Where will you find more number of ribosomes-in her body,In her cancer cells or in fat cells?. b)If you are cooking vegetable curry today, after adding salt into the vegetables,you see that it released water . Why? .	5
	SECTION E	
19	Take a small piece of an onion bulb. With the help of a pair of forceps we can peel off the skin called epidermis from the concave side that is inner layer of the onion. This layer can be put immediately in a watch glass containing water. This will prevent the peel from getting folded or getting dry. Put a drop of water on it and transfer a small piece of peel from the watch glass to the slide. Make sure that the field is perfectly flat on the slide. Add a Drop of safranin solution from this piece followed via cover slip. Take care of air bubbles while putting the cover sleeve with the help of a mounting needle. Observe the slide under the microscope. Answer the following questions i. Name the cell organelles which is observed. a. Cell wall, nucleus, cytoplasm b. Plasma membrane, nucleus, cytoplasm c. Cell wall, nucleus, protoplasm d. Plasma membrane, nucleus, cell membrane ii. Why we put the peel of onion immediately into watch glass containing water? a. To prevent it from cold. b. To prevent it from drying. c. To prevent it from microbes.	4

	d. To prevent it from other peels of onion. iii. Write the name and explain the role of the darkly coloured spherical or oval structure seen in the slide?	
20	 The cell membrane is a semipermeable membrane that separates the interior of all cells from the surrounding environment. The semipermeable membrane allows some particles, ions, or water molecules across the membrane, but blocks others. Water molecules constantly move inside and outside the cell across cell membranes. This free flow of water has the very important consequence of enabling cells to absorb water. When a cell is placed in a hypertonic solution i.e., a solution in which concentration of water molecules outside the cell is lesser than the concentration of water molecules inside the cell, the cell will lose water by the process of osmosis (exosmosis). Although water crosses the cell membrane in both directions, but more water leaves the cell than enters resulting in the shrinkage of cell cytoplasm. This phenomenon of shrinkage of cell cytoplasm when put in a hypertonic solution is called plasmolysis. If the water moving in and out of the cell is in equilibrium, the cells are said to be flaccid. a)What is plasmolysis? b)What would you predict to happen if you put the cell in a solution which is having the same amount of solute concentration as inside the cell? c)If Geetha places a plasmolysed cell in a hypotonic solution,What do you think would happen to the cell? What term can you give such a cell after the process?	4(1+1+2)

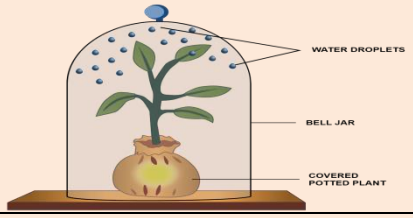
ANSWER KEY CHAPTER – 5 THE FUNDAMENTAL UNIT OF LIFE

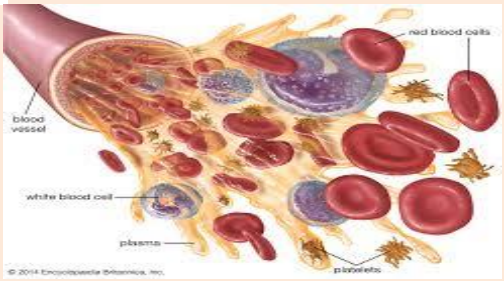
Q NO	SECTION A	MARKS
1	c	1
2	a	1
3	c	1
4	d	1

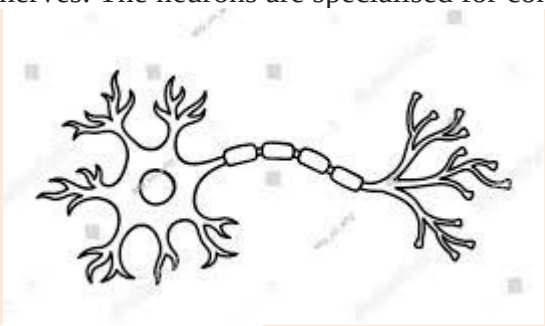
5	d	1
6	**a**	1
7	b	1
8	C	1
	SECTION B	
9	If the cell gets damaged, then one of the lysosomes bursts and release some digestive enzymes. The released enzymes then digest their own cell and ultimately the cell dies. Hence, lysosomes are called suicide bags of the cell	2
10	For endocytosis to occur, the outermost membrane should be flexible like the plasma membrane of animals. But in plant cells, cell wall is the outermost membrane which is very rigid. Hence, endocytosis occurs only in animals and not in plants.	2
11	Nucleus, also known as the brain of the cell, controls most of the activities of the cell because it contains DNA (Deoxyribonucleic acid) which contains all the information of the cell.	2
12	Peroxisomes contain various oxidative enzymes which detoxify the toxic material. Since the blood carries various toxic substances to kidney and liver, a large number of peroxisomes are present in them to oxidize the toxic material.	2
13	The main function of Golgi bodies is to release proteins or enzymes by vesicles. No other organelle has this property. Therefore, these are largely present in secreting cells.	2
	SECTION C	
14	Chromoplasts are present in flowers, fruits or any other coloured part of the plant other than green part. Chloroplasts are present in leaves and stem of plant or green part. Leucoplasts are present anywhere in plant as they are colourless and store food.	3
15	**Plasma membrane** **1.** It holds cellular contents and controls passage of materials in and out of cell.2. It is semipermeable in nature and allows entry of selected molecules into the cell.3. It is not elastic. **Cell wall** 1. It gives protection, strength and rigidity to the cell.2. It is completely permeable in nature.3. It is elastic and controls the cell's turgidity preventing its bursting.	3
16	The environment of nucleus would not be separated from that of rest of the cell. No protection of genetic material from damage. exchange of	3

	materials in and out of the nucleus would be missing.	
	SECTION D	
17	Diagram of a plant cell chloroplast, vacuole, cellwall	5
18	a) Ribosomes are found in greater number in Reetus actively dividing cells which are the cancer cells as they need more amount of proteins for the formation of new cells. b)When salt is added, a hypotonic medium is created, , the concentration of salt molecules is more outside the vegetables than inside. Due to osmosis water from the vegetables came out.	5
	SECTION E	
19	i .A ii. B iii. Nucleus. 1. The nucleus contains most of the cell's genetic material in the form of DNA, which carries the instructions for growth, development, and function. 2.The nucleus coordinates cell growth and division by replicating DNA and distributing it to daughter cells during mitosis. 3.The nucleus receives and responds to signals from the environment, influencing cellular behavior. 4.The nucleus acts as a repository for genetic information, passing it from one generation to the next.	4(1+2+1)
20	a) Plasmolysis is the process of shrinkage or contraction of the protoplasm of a plant cell as a result of loss of water from the cell b) the water moving in and out of the cell will be in equilibrium, c)When a plasmolyzed cell is placed in a hypotonic solution, (i.e., the solution having solute concentration lower than the cell sap), the water moves into the cell because of the higher concentration of water outside the cell than in the cell. The cell then swells to become turgid. We can call it a deplasmolysed cell.	4(1+1+2)

CHAPTER – 6 TISSUES

Q NO	SECTION A	MARKS
1	The tissue that is found between the skin and the muscles is (a) Adipose tissue (b) Tendons tissue (c) Ligament tissue (d) Areolar tissue	1
2	Bone cells are embedded in a hard matrix that is composed of (a)Calcium and sulfuric compounds (b) Calcium and phosphorous compounds (c) Calcium and oxygen compounds (d) Calcuim and chlorine compound	1
3	What causes the droplets of water to accumulate on the inner walls of the bell jar? (a) Photosynthesis (b) Respiration. (c) Transpiration (d) Combustion  	1
4	Raju has hurt his leg during a football match. His doctor gives him some pain killer. Which tissue it likely to be affected by the pain killer? (a) Muscular Tissues (b) Nervous Tissues (c) The bone (d) Epithelial tissue	1
5	If we want our potted plant to we dense and not grow very tall, what should he do? (a) cut the branches (b) put more fertilizers (c) put it I a dark place (d) cut the growing tip	1
6	Which of the following is not made of epithelial tissues: (a) skin (b) lining of the mouth (c) kidney tubules (d) bone	1
7	**Directions:** In each of the following questions, a statement of Assertion is given and a corresponding statement of Reason is given just below it. Of the statements, given below, mark the correct answer as: (a) Both assertion and reason are true and reason is the correct explanation of assertion. (b) Both assertion and reason are true but reason is not the correct explanation of assertion. (c) Assertion is true but reason is false. (d) Assertion is false but reason is true **Assertion:** Permanent tissue is composed of mature cells. **Reason:** Meristematic tissue is a group of actively dividing cells.	1
8	**Assertion:** Cork cells are impervious to water and gases. **Reason:** Cork has suberin deposits that are water proof.	1
	SECTION B	

9	Differentiate the following activities on the basis of voluntary (V) or involuntary (IV) muscles. (a) Jumping of frog (b) Pumping of the heart (c) Writing with hand (d) Movement of chocolate in your intestine [NCERT Exemplar]	2
10	Water hyacinth floats on water surface. Give reason [NCERT Exemplar].	2
11	Which structure protects the plant body against the invasion of parasites? [NCERT Exemplar]	2
12	An organism—plant or animal, require different types of cells in the body. Justify	2
13	If a potted plant is covered with a glass jar, water vapour appears on the wall of the glass jar. Why?	2
	SECTION C	
14	Why are xylem and phloem called complex tissues? How are they different from one other ? [NCERT Exemplar]	3
15	List the characteristics of cork. How are they formed?	3
16	A nail is inserted in the trunk of a tree at a height of 1 metre from the ground level. After 3 years, where will the nail be present? Give reason	3
	SECTION D	
17	Tissue A and tissue B constitute tissue C. A carries water while B carries food for the plants. Identify A, B, C Draw and identify different elements of A and B	5
18	Give reasons for: a. Meristematic cells have a prominent nucleus and dense cytoplasm but they lack vacuole. b. Intercellular spaces are absent in sclerenchyma tissues. c. We get a crunchy and granular feeling when we chew pear fruit. d. Branches of a tree move and bend freely in high wind velocity. e. It is difficult to pull out the husk of a coconut tree.	5
	SECTION E	
19	 Blood is a type of connective tissue. The cells of connective tissue are loosely spaced and embedded in an intercellular matrix. The matrix may be jelly like, fluid, dense or rigid. The nature of matrix differs in concordance with the function of the particular connective tissue. Blood has a fluid (liquid) matrix called plasma, in which red blood corpuscles (RBCs), white blood corpuscles (WBCs) and platelets are suspended. The plasma contains proteins, salts and hormones. Blood flows and transports gases, digested food, hormones and waste materials	4

	to different parts of the body. Bone is another example of a connective tissue. It forms the framework that supports the body. It also anchors the muscles and supports the main organs of the body. It is a strong and nonflexible tissue. Bone cells are embedded in a hard matrix that is composed of calcium and phosphorus compounds. Two bones can be connected to each other by another type of connective tissue called the ligament. This tissue is very elastic. Another type of connective tissue, cartilage, has widely spaced cells. The solid matrix is composed of proteins and sugars. Cartilage smoothens bone surfaces at joints and is also present in the nose, ear, trachea and larynx **a**. Identify the connective tissue by which two bones are connected to each other b.Give 4 examples of connective tissue c What are the function of connective tissue?	
20	The nervous tissue, which contains densely packed nerve cells, called neurons (Gk. neuro = nerve), is present in the brain, spinal cord and nerves. The neurons are specialised for conduction of nerve impulses.  a. What is a neuron? b Write the structure and functions of a neuron. c Draw and label the structure of a neuron.	4

ANSWER KEY CHAPTER - 6 TISSUES

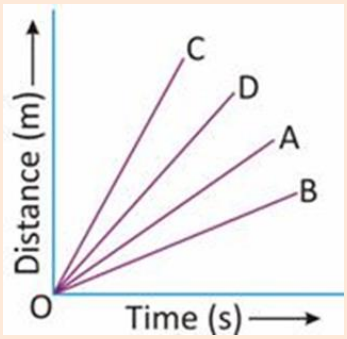
Q NO	SECTION A	MARKS
1	(d) Areolar tissue	1
2	(b) Calcium and phosphorous compounds	1
3	(c) Transpiration.	1
4	(b) Nervous Tissues	1
5	(d) cut the growing tip	1
6	(d) bone	1
7	(b) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion.	1
8	(a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion.	1

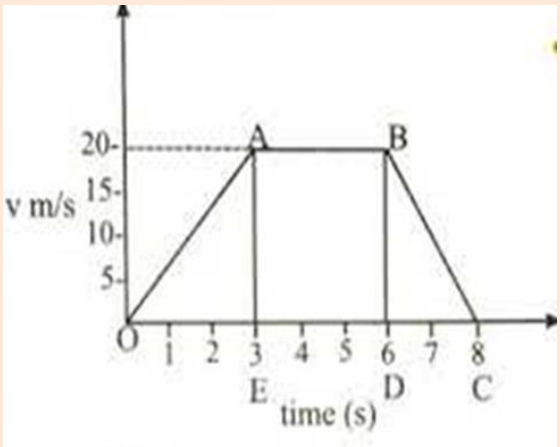
	SECTION B	
9	(a) Voiuntary (b) involuntary (c) Voluntary d) involuntary	2
10	Aerenchyma present in the swollen petiole provides buoyancy to the hyacinth. Thus, it floats on water surface.	2
11	The epidermis has thick cuticles and waxy substances to prevent the invasion of parasite	2
12	Any organism will have a wide range of cell types. This is because each cell type specialises in one particular function. And for the proper working of an organism many functions like food transport, immunity, strength, etc., are needed to be performed properly	2
13	This happens because of transpiration due to which water is released from the plant in the form of water vapour which appears on the glass jar.	2
	SECTION C	
14	Xylem and phloem are called as complex tissues as they are made up of more than one type of cells. Any two differences	3
15	The characteristics of cork (any 2) • Cells of cork are dead at maturity. • ,Compactly arranged, • do not possess intercellular space., • Cells possess a chemical substance 'suberin' in their walls. • There are several thick layers. As plants grow older, a strip of secondary meristem replaces the epidermis of the stem. Cells on the outside are cut off from this layer. This forms the several-layer thick cork or the bark of the tree.	3
16	The nail will remain at the same position even after 3 years. This is because a plant or tree grows from its tip (stem or root) not from the point at which it joins the ground. So, the tree will grow but the nail will remain at the same place on the tree trunk.	3
	SECTION D	
17	Tissue A and tissue B constitute tissue C. A carries water while B carries food for the plants. Identify A, B, C Draw and identify different elements of A and B I. Xylem B…phloem c….vascular tissue Diagram and labelling	5
18	a. Vacuoles basically serve the purpose of storing of nutrients, excess salts, etc. Meristematic cells do not need to store these nutrients. They are specialized cells. Their main role is to divide and grow. Hence, they are very active, and have dense cytoplasm, and prominent nuclei, but they lack vacuoles. b. Cells of sclerenchyma tissue have thick cell walls due to lignin. Due to	5

	the thick cell wall, intercellular spaces are absent in sclerenchyma tissue. c. In pear fruit, sclerenchyma cells are called stone cells. They are small, thick, and hard. That is why we get a crunchy and granular feeling when we chew pear fruit. d. Branches of a tree move and bend freely in high wind velocity due to the presence of a permanent tissue called collenchyma. Collenchyma provides flexibility in plants. It allows the bending of various parts of a plant. e. The husk of a coconut tree contains sclerenchyma tissue. This tissue makes the plant hard and stiff. That is why it is difficult to pull out the husk of a coconut tree.	
	SECTION E	
19	a Ligament b Blood, Bone, Ligament, cartilage c Binding together other tissues (any two) Supporting various parts of the body Forming a packing around organs	4
20	a Neurons are the structural and functional unit of the nervous system. b All neurons have three different parts – dendrites, cell body and axon. The neuron structure is specially adapted to carry messages over large distances in the body quickly in the form of electrical signals.	4

CHAPTER – 7 MOTION

Q NO	SECTION A	MARKS
1	slope of the distance vs time graph? A speed B. Displacement C velocity D acceleration	1
2	Association of a person moving with constant velocity A. Infinitive B. Positive acceleration C. Negative aceleration D. Zero	1
3	What is the definition of motion? a) Change in position over time b) Change in velocity over time c) Change in acceleration over time d) Change in distance over time	1
4	Velocity is defined as _____ per time. a) distance b) displacement c) power d) acceleration	1
5	What type of motion is exhibited by a car moving on a straight road? a) Linear motion b) Circular motion c) Rotational motion d) Oscillatory motion	1
6	Which of the following is an example of circular motion? a) A planet orbiting the sun b) A car moving on a straight road c) A person walking on a straight path d) A spinning top	1
7	ASSERTION: A passenger sitting in a moving bus is at rest with respect to his fellow passenger but he is in motion with respect to a man standing outside REASON: Motion is relative a. Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A). b. Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A). c. Assertion (A) is true but reason (R) is false.	1

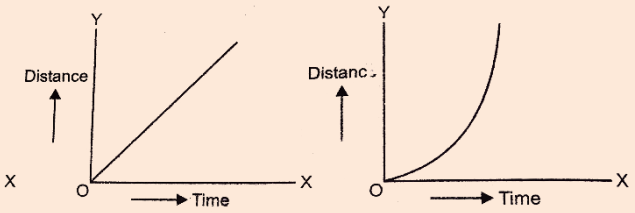
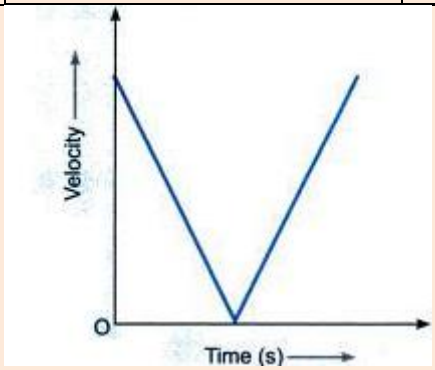
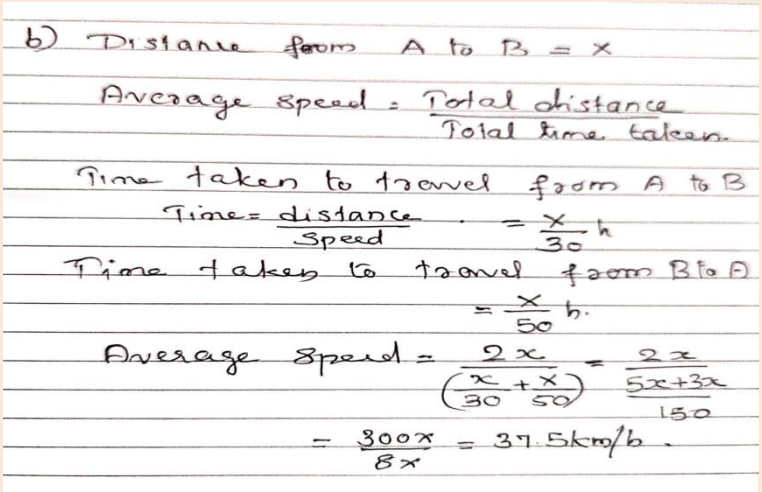
	d. Assertion (A) is false but reason (R) is true.	
8	ASSERTION: A moving object can have zero velocity REASON: velocity is speed with direction a. Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A). b. Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A). c. Assertion (A) is true but reason (R) is false. d. Assertion (A) is false but reason (R) is true.	1
	SECTION B	
9	Define uniform acceleration. What is the acceleration of a body moving with uniform velocity?	2
10	Represent uniform and nonuniform motion with the help of distance time graphs	2
11	Four cars A, B, C and D are moving on a levelled, straight road. Their distance time graphs are shown in the figure below. Which car is the fastest? Why? 	2
12	Differentiate between distance and displacement?	2
13	Draw a velocity versus time graph of a stone thrown vertically upwards and downwards after attaining the maximum height.	2
	SECTION C	
14	A car travels from stop A to stop B with a speed of 30 km/h and then returns back to A with a speed of 50 km/h. Calculate a. displacement of the car. b. average speed of the car	3

15	Arun swims in a square shaped swimming pool of 100m side. After observing the pattern of his motion Sarita made two statements. Evaluate the statements as true or false with valid reasons a. Magnitude of displacement by Arun is more than the distance traveled by him b. Displacement by Arun can never be zero	3
16 a b	A signal from a spaceship reached the ground station in 10 minutes. Calculate the distance of the spaceship from the ground station (Speed of light = 3×10^8 ms-1) What does the odometer of a car measures?	3
	SECTION D	
17 a	A train starting from rest attains a velocity of 36km/ h in 1 minute. Assuming that the acceleration is uniform, find (i) the acceleration of the train (ii) the distance travelled by the train for attaining this velocity Write any two point difference between scalar and vector quantities	5
18	a)A velocity time graph of a moving car is shown in the graph  i) Which part of the graph shows zero acceleration? ii)What is the minimum and maximum speed attained by the car?	5

<table>
<tr><td></td><td>iii)How long the car is showing uniform acceleration?
iv) What is the distance travelled by the car in last 2 seconds?</td><td></td></tr>
<tr><td></td><td>SECTION E</td><td></td></tr>
<tr><td>19</td><td>he following table gives the data about motion of a car.
<table><tr><td>Time (h)</td><td>10.00</td><td>10.30</td><td>11.00</td><td>11.30</td><td>12.00</td></tr><tr><td>Distance (km)</td><td>0</td><td>25</td><td>50</td><td>75</td><td>100</td></tr></table>a. Find the speed of the car between 11.00 hours and 11.30 hours.
b. What is the average speed of the car?
c. Identify the type of motion exhibited by the car? Justify your answer with valid reason</td><td>4</td></tr>
<tr><td>20
a.
b.
c.</td><td>Two girls A and B are sitting on a merry- go- round exactly opposite to one another, A at the right and B at the left side at a distance of 4m from one another. The merry-go-round is moving with a constant speed of 10m/s and takes 2 minutes to complete one circle.
The motion on merry-go-round is an example of which type of motion?
Calculate the maximum displacement obtained by the child B
“Uniform circular motion is accelerated “ justify the statement</td><td>4</td></tr>
</table>

ANSWER KEY CHAPTER - 7 MOTION

Q NO	SECTION A	MARKS
1	d	1
2	d	1
3	a	1
4	b	1
5	a	1
6	A	1
7	a. Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).	1
8	b. Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).	1
	SECTION B	
9 a	If an object's rate of change of velocity is uniform it is said to be under uniform acceleration. Zero	1 1

<table>
<tr><td>b</td><td></td><td></td></tr>
<tr><td>10</td><td> 
</td><td>1+1</td></tr>
<tr><td>11</td><td>Car C is fastest
It covered maximum distance in minimum time</td><td>1
1</td></tr>
<tr><td>12</td><td>Distance Displacement
<table>
<tr><td>1. The total path covered by an object.</td><td>1. The shortest distance from the final position to the initial position.</td></tr>
<tr><td>2. It is a scalar quantity.</td><td>2. It is a vector quantity.</td></tr>
<tr><td>3. It is always positive.</td><td>3. It can be positive(or) zero(or) negative.</td></tr>
</table></td><td>Any two
1+1</td></tr>
<tr><td>13</td><td> 
</td><td>2</td></tr>
<tr><td></td><td>SECTION C</td><td></td></tr>
<tr><td>14</td><td>a. 0
 
b) Distance from A to B = x
Average speed = Total distance / Total time taken.
Time taken to travel from A to B
Time = distance / Speed = x/30 h
Time taken to travel from B to A
= x/50 h.
Average Speed = 2x / (x/30 + x/50) = 2x / (5x+3x)/150
= 300x/8x = 37.5 km/h.</td><td>½
½
1
1</td></tr>
<tr><td>15</td><td>a. False . Displacement is always less than or equal to distance
b. False Displacement can zero</td><td>½+1
½+1</td></tr>
<tr><td>16
a</td><td>(Speed of light = 3×10^8 ms-1)
Time is taken by signal = 10 min
1 minute = 60 sec</td><td>2</td></tr>
</table>

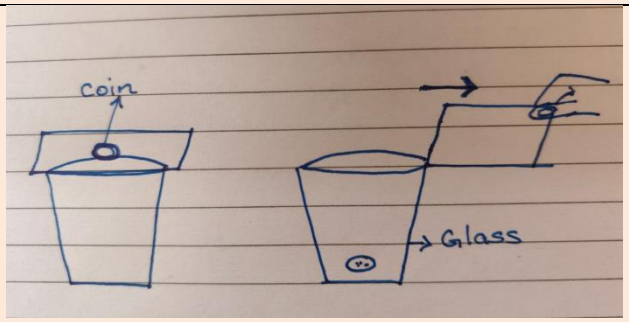
b	10min = 10 × 60 sec = 600 sec Distance of spaceship from ground station = $3 \times 10^8 \times 600 = 18 \times 10^{10}$ m speed	1
	SECTION D	
17 a b	a. Acceleration u=0 v=36km/h=10m/s $a=v-u/t=10/60=1/6 m/s^2$ b. the distance travelled by the train for attaining this velocity $s=v^2-u^2/2a$ =600/2=300m any two difference	 ½ ½ 1+1 2
18	 a. AB b. minimum speed 0 m/s maximum speed =20m/s c.3 seconds d. area of BDC=1/2bh=1/2x3x20=30m	 1 1 1 2
	SECTION E	
19 a. b c	Distance=25 km time=0.5 h speed=distance/time 25/0.5=50 km/h average speed =100/2=50km/h uniform motion .equal distance covered in equal time intervals	1 1 2
20 a. b. c.	 Circular motion 8m The velocity changes due to continuous change in the direction So, even when the body moves ta a constant speed, its velocity is not constant. As there is change in velocity it is accelerated	 1 1 2

CHAPTER – 8 FORCE AND LAWS OF MOTION

Q NO	SECTION A	MARKS
1	Swimming is possible by the a) first law of motion b) second law of motion c) third law of motion d) Newtons law of gravitation	1
2	A cricket player catches a ball of mass 0.1 kg, moving with a speed 10 m/s in 0.1 second. Force exerted by him is (N) a) 4 b) 2 c) 1 d) 10	1
3	Which of the following has the largest inertia? a) A pin b) A pen c) Your notebook d) Your trolly bag	1
4	The inertia of an object causes the object to a) decrease its speed b) Increase its speed c)resist any change in the state of its motion d)decelerate due to friction	1
5	If the mass of the body is doubled and its velocity becomes half, then the linear momentum of the body will a)become double b)remain the same c)become half d)become four times	1
6	The linear momentum of an object is 250 g cm/s. If the velocity of the object is 5 m/s, then the mass of the object is a)0.5 g b)5 kg c)0.5 mg d)5 mg	1
7	Directions: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as: (a) Both assertion (A) and reason (R) are true and reason (R) is the correct	1

	explanation of assertion (A). (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A). (c) Assertion (A) is true but reason (R) is false. (d) Assertion (A) is false but reason (R) is true. Assertion : When a bee hits a bus, each of them exerts the same force. Reason : . The bee has more mass as compared to the windshield.	
8	Assertion : A body is momentarily at rest when it reverses the direction. Reason : A body cannot have acceleration if its velocity is zero at a given instant of time.	1
	SECTION B	
9	Suppose a ball of mass m is thrown vertically upwards with an initial speed v, its speed decreases continuously till it becomes zero. Therefore, the ball begins to fall downward and attains the speed v again before striking the ground. It implies that the magnitude of initial and final momenta of the ball are the same. Yet, it is not an example of conservation of momentum. Explain why?.	2
10	List two factors on which friction depends?	2
11	A bullet fired against a glass window pane makes a hole in it, and the glass pane is not cracked. But, when a stone strikes the same glass pane, it gets shattered. Why is it so?	2
12	Neha is walking on the road. Describe her walking in terms of Newton's third law of motion. .	2
13	There are three balls made up of aluminium, steel and thermocol , of the same shape and same volume. Which of them will have the highest inertia?	2
	SECTION C	
14	You are given a pile of carrom coins. Describe in brief an activity to illustrate the property of inertia of rest?	3
15	Ram and Shyam are on roller-skates. They are standing 5 m apart facing each other. Ram throws a ball of 2 kg towards Shyam, who catches it. How will this activity affect the position of the two? Explain.	3
16	What is the relationship between mass and inertia? Explain illustrating two examples.	3

	SECTION D	
17	Using the second law of motion, derive the unit of force. A force of 5 N produces an acceleration of 8 m s^{-2} on a mass m and an acceleration of 24 m s-2 on a mass m2. What acceleration would the same force provide if both the masses are tied together?	5
18	Explain momentum? Write down its SI unit. Interpret force in terms of momentum. Represent the given situation graphically. (ncert exemplar) (a) momentum versus velocity when mass is fixed. (b) momentum versus mass when velocity is constant.	5
	SECTION E	
19	Read the given information and answer the following questions:  CASE- When one object exerts a force on another object, the second object instantaneously exerts a force back on the first. These two forces are always equal in magnitude but opposite in direction. These forces act on different objects and never on the same object. It is important to note that even though the action and reaction forces are always equal in magnitude; these forces may not produce accelerations of equal magnitudes, this is because each force acts on a different object that may have a different mass. The two opposing forces are also known as action and reaction forces 1.Complete the sentence: Action reaction forces are always---------- and ----------in direction 2.Give two examples of the third law of motion. 3. justify the statement: Even though the action and reaction forces are always equal in magnitude, these forces may not produce accelerations of equal magnitudes.	4
20		4

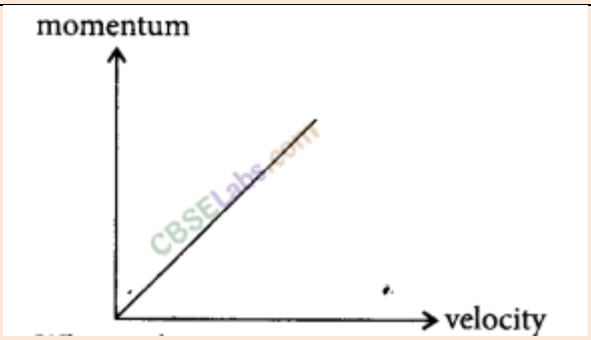
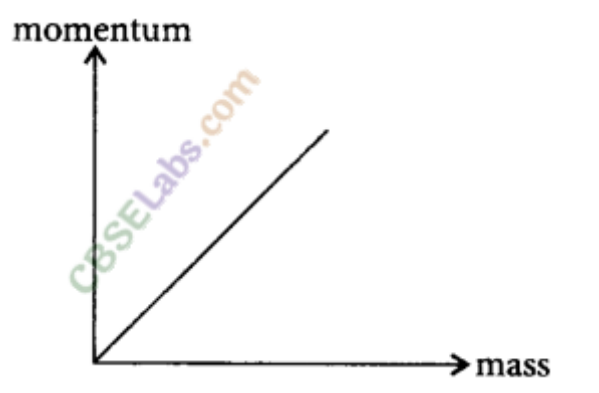
	 Take a glass tumbler and place a thick square card on its mouth. A coin is then placed above this card in the middle. flick the card hard with your fingers. The card moves away but the coin drops into the glass tumbler. Newton's first law of motion states that a body at rest will remain at rest and a body which is in motion continues to be in motion unless otherwise they are acted upon by an external force. In other words, all objects resist a change in their state of motion. In a qualitative way, the tendency of undisturbed objects to stay at rest or to keep moving with the same velocity is called inertia. This is why the first law of motion is also known as the law of inertia. 1. What happens if no external force acts on a moving object with respect to its speed and direction? 2. State Newton's first law of motion. 3. Newton's first law of motion is called the law of inertia. Justify.	

ANSWER KEY CHAPTER - 8 FORCE AND LAWS OF MOTION

Q NO	SECTION A	MARKS
1	c	1
2	d	1
3	d	1
4	c	1
5	b	1
6	a	1
7	c	1
8	c	1
	SECTION B	

9	Law of conservation of momentum is applicable to isolated systems (no external force is applied). In this case, the change in velocity is due to the gravitational force of earth.	2
10	The force of friction is directly proportional to the weight of the body sliding over the surface. The force of friction also depends on the nature of the surfaces in contact..	2
11	When the bullet strikes the glass pane, the part of the glass pane which comes in contact with the bullet shares the large velocity of the bullet and makes a hole, while the remaining part of the glass remains at rest and is therefore not shattered due to inertia of rest. But when a slow moving stone strikes the same glass pane, the various parts of the glass pane get enough time to share the velocity of the stone, and the glass is shattered.	2
12	When Neha walks on the road, her foot pushes the ground backward (action) and the ground pushes her foot forward (reaction). Thus, the forward reaction exerted by the ground on her foot makes her walk forward.	2
13	Steel has the highest inertia. As the mass is a measure of inertia, the ball of the same shape and size, having more mass than other balls, will have the highest inertia. Steel has the greatest density and greatest mass, therefore, it has highest inertia.	2
	SECTION C	
14	• Make a pile of similar carom coins on a table. • Attempt a sharp horizontal hit at the bottom of the pile using another carrom coin or the striker. If the hit is strong enough, the bottom coin moves out quickly. Once the lowest coin is removed, the inertia of the other coins makes them 'fall' vertically on the table. • The inertia of coins tries to maintain its state of rest even when one of the coin moves out.	3
15	Separation between Ram and Shyam will increase. Initially the momentum of both of them are zero as they are at rest. In order to conserve the momentum Ram who throws the ball would move backward. Shyam will experience a net force after catching the ball and therefore will move backwards that is in the direction of the force.	3
16	The mass of a body is a measure of its inertia. It means larger the mass of a body, larger will be the inertia offered by the body to change its state of motion. examples to clarify it: 1.When we kick a football, it flies a long way but at the same time if we kick a stone of the same size, it hardly moves, as the stone resists a change in its motion better than the	3

	football because of its more mass. 2. We can increase the velocity of our bicycle by pedaling harder, i.e., by applying more force. But the same force will produce a negligible change in the motion of a motorcycle, because in comparison to the bicycle, a motorcycle has more tendency to oppose the change in its state of motion because of its larger mass	
	SECTION D	
17	Using the relationship, $F = ma$ If m is measured in kg and a is measured in m s^{-1} Then the unit of force is kg m s^{-2} 1 kg m s^{-2} = 1 N $F = 5$ N, $a_1 = 8$ m s^{-2}, $a_2 = 24$ m s^{-2} $\therefore m_1 = \frac{F}{a_1} = \frac{5}{8}$ kg and $m_2 = \frac{F}{a_2} = \frac{5}{24}$ kg Now, total mass when both the masses are tied together, $m = m_1 + m_2 = \left(\frac{5}{8} + \frac{5}{24}\right)$ kg $= \left(\frac{15+5}{24}\right)$ kg $= \frac{20}{24}$ kg $= \frac{5}{6}$ kg $\therefore$ Acceleration, $a = \frac{F}{m} = \frac{5}{5/6} = 6$ m s^{-2}	5
18	Momentum is a property of a moving body by the virtue of both its mass and velocity. It is equal to the product of mass and velocity. p = m × v Its SI unit is kg ms^{-1} As momentum = mass x velocity Force= rate of change of momentum (a) When mass is fixed When m is constant momentum is directly proportional to velocity. momentum α velocity	5

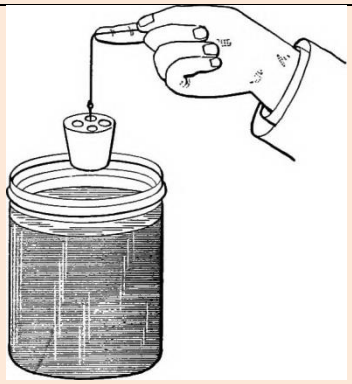
	 (b) When velocity is constant, momentum will be directly proportional to mass momentum α mass 	
	SECTION E	
19	1. equal and opposite 2.Any 2 examples(Swimming or rowing a boat. •Static friction while pushing an object.•Walking. •Standing on the ground or sitting on a chair.) 3.These action reaction forces are acting on two different objects having different masses that's why they produce acceleration with different magnitude.	4(1+2+1)
20	1.Continue to move with same speed in same direction 2.Newton's first law of motion states that a body at rest will remain at rest position only and a body which is in motion continues to be in motion unless otherwise they are acted upon by an external force. 3. All objects resist a change in their state of motion. In a qualitative way, the tendency of undisturbed objects to stay at rest or to keep moving with the same velocity is called inertia. So the first law of motion is also known as the law of inertia.	4(1+1+2)

CHAPTER- 9 GRAVITATION

Q NO	SECTION A	MARKS
1	Which of the following is true of two objects of different masses falling freely near the surface of the moon? a. They both have different accelerations. b. They have the same velocities at any instant c. They experience forces of the same magnitude d. They change their inertia	1
2	Which of the following statements is true of the value of acceleration due to gravity? a. The value is the same on the equator and poles b. The value is least on poles c. The value is almost negligible on the equator d. The value increases from pole to equator	1
3	. Which of the following is true when a Mango falls from a Mango Tree? a. Only the Earth attracts the Mango. b. Only the Mango attracts the Earth. c. Both Mango and Earth attract each other d. Both Mango and Earth repel each other	1
4	. The Earth's atmosphere is held by the a. Wind b. Clouds c. Earth's magnetic field d. Gravity	1
5	. The weight of an object on the Moon's surface is a. 1/3 rd of the weight on Earth b. 1/5 rd of the weight on Earth c. 1/6th of the weight on Earth d. 1/2 nd of the weight on Earth	1
6	A body of mass 1kg is attracted by the earth with a force which is equal to a. 9.8N b. 6.67x 10^{11}	1

	c. 1 N d.9.8m/s	
7	**Directions:** In each of the following questions, a statement of Assertion is given, and a corresponding statement of Reason is given just below it. Of the statements, given below, mark the correct answer as: (a) Both assertion and reason are true and reason is the correct explanation of assertion. (b) Both assertion and reason are true but reason is not the correct explanation of assertion. (c) Assertion is true but reason is false. (d) Assertion is false and Reason are true. **Assertion :** Universal gravitational constant G is a scalar quantity. **Reason :** The value of G is same throughout the universe	1
8	**Assertion :** When distance between two bodies is doubled and also mass of each body is doubled, then the gravitational force between them remains the same. **Reason :** According to Newton's law of gravitation, force is directly proportional to them as of bodies and inversely proportional to square of the distance between them.	1
	SECTION B	
9	If the small and big stones are dropped from the roof of a house simultaneously, they will reach the ground at the same time. Why?	2
10	Mention any four phenomena that the universal law of gravitation was able to explain	2
11	Why does a body reach the ground quicker at poles than at the equator when dropped from the same height?	2
12	A force of 20 N acts upon a body whose weight is 9.8 N. What is the mass of the body and how much is its acceleration? Take g = 9.8 m/s^2.	2
13	It difficult to hold a school bag having a strap made of a thin and strong string…Why?	2
	SECTION C	
14	Why does an object float or sink when placed on the surface of water?	3
15	A stone dropped from the roof of a building takes 4s to reach the ground. Calculate the height of the building.	3
16	A stone is dropped from a height of 10 m on an unknown planet having g = 20 m/s2. Calculate the speed of the stone when it hits the surface of the	3

	planet. Also, calculate the time it takes to fall through this height.	
	SECTION D	
17	(a) Define pressure. State its SI unit. (b) The dimensions of a metallic cuboid are 30 cm × 20cm × 15 cm, and its mass is 30 kg. If the acceleration due to gravity is 10 m/s 2, calculate the pressure exerted by the cuboid when it rests on the face with sides 20 cm × 15 cm on the table. (c) In which of the following situations do we exert more pressure on the ground? Whether standing on the foot or standing on both feet? Justify the answer.	5
18	**(**a) A metallic bar has a 200 g mass at poles. Does it change when it is taken to the equator? (b) Is there any weight change when brought to the equator? (c) What would happen when there is no acceleration due to gravity? (d) Differentiate between acceleration due to gravity and universal gravitational constant (e) Derive a relation between G and g.	5
	SECTION E	
19	We know that the earth attracts every object with a certain force and this force depends on the mass (*m*) of the object and the acceleration due to the gravity (*g*). The weight of an object is the force with which it is attracted towards the earth. Mathematically W = m x g Where, W= weight of object m= mass of object g= acceleration due to the gravitational force As the weight of an object is the force with which it is attracted towards the earth, the SI unit of weight is the same as that of force, that is, Newton (N). The weight is a force acting vertically downwards; it has both magnitude and direction. We have learnt that the value of g is constant at a given place. Therefore, at a given place, the weight of an object is directly proportional to the mass, say m, of the object, that is, W αm. It is due to this reason that at a given place, we can use the weight of an object as a measure of its mass.	4

	Answer the following questions. a) Whether weight is scalar quantity or vector quantity? Justify your answer. b) Differentiate between mass and weight c) Unit of acceleration due to the gravity (g) is……	
20	 Archimedes' principle, stated as follows: When a body is immersed fully or partially in a fluid, it experiences an upward force that is equal to the weight of the fluid displaced by it. The upward force is known as up thrust or buoyant force. In fact, all objects experience a force of buoyancy when they are immersed in a fluid. The magnitude of this buoyant force depends on the density of the fluid . Objects having density less than that of the liquid in which they are immersed float on the surface of the liquid. If the density of the object is more than the density of the liquid in which it is immersed then it sinks in the liquid. Hence the body will float or sink depending upon the difference between density of body and fluid. a) State Archimedes' principle. b) Why does a cube of plastic released deep down under the water come up to the surface of water? c) Name the force experienced on a body which is immersed in liquid	4

ANSWER KEY CHAPTER- 9 GRAVITATION

Q NO	SECTION A	MARKS
1	**b**	1
2	**b**	1

3	**c**	1
4	**d**	1
5	**c**	1
6	**a**	1
7	**a**	1
8	a	1
	SECTION B	
9	The acceleration due to gravity does not depend upon the mass of the stone or body. Both the bodies fall with the same acceleration towards the surface of the earth. Thus a big stone will fall with the same acceleration as a small stone. So, both the stones will reach the ground at the same time when dropped simultaneously.	2
10	The universal law of gravitation was able to explain successfully • the force that binds us to the earth. • the motion of the moon around the earth. • the motion of planets around the sun. • the tides due to the moon and the sun	2
11	The acceleration due to gravity is more at the poles than at the equator. The time taken for a body is less if the acceleration due to gravity is more when the initial velocities and the distance travelled are the same . So, when dropped from the same height a body reaches the ground quicker at the poles than at the equator.	2
12	:Weight, W = mg, m = W/g, m = 9.8/9.8 = 1 kg So, acceleration = Force / Mass =20/1 = 20 m/s^2	2
13	A bag with a small string is difficult to hold. This is because the thin strap has a small surface area. Pressure is inversely proportional to the area on which the force acts. It can be said that these thin strings exert greater pressure on the student's shoulder who is holding the bag	2
	SECTION C	
14	Two forces act on the object's surface when placed on the water surface . These are weight and upthrust. The weight acts vertically downwards and the upthrust works vertically upwards. Based on these two forces, the object will either float or sink. If the weight is greater, the object will sink. The object will float on the water's surface if the upthrust is more than the weight.	3
15	Here, initial velocity, u = 0 Time taken to reach the ground, t = 4 s	3

	Acceleration, a = g = 9.8 m/s^2 Height of the building, h = ? h=ut+1/2 gt x t =0+1/2gtxt =1/2x9.8x4x4 =78.4 m	
16	h = 10m, g = 20 m/s2 V2 = u2 + 2 v2 = 0 + 2 × 20 × 10 =400 v = 20 m/s v = u + g t 20 = 0 + 20t t = 20/20 =1 sec	3
	SECTION D	
17	(a) The pressure is the thrust per unit area of a surface. The SI unit of pressure is pascal. (b) It is given that mass = M = 30kg Acceleration due to gravity = 10 m/s2 Area = A = 20 cm × 15 cm = 0.2 × 0.15 m = 0.03 m2 Thrust = M × g = 30 kg × 10 m/s2 = 300 N Pressure = Thrust / Area = 300/0.03 = 104 Pascal (c) When we stand on the ground, we exert pressure. This pressure is exerted more when we stand on one foot as all the weight is exerted on the area of one foot only, so the pressure increases because the pre	5 1+2+2
18	a) Even when the metallic bar is taken to the equator, there will be no change in mass, and it will remain constant everywhere .(b) When the bar is brought to the equator, its weight will decrease. This is due to lower value of ‘g’ at the equator as compared to the poles.	5

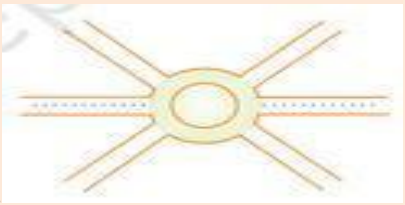
	(c) All objects will move in a straight line with uniform velocity if there is no acceleration due to gravity (d) The universal gravitational constant 'G' equals the force between the two unit masses separated by unit distance. Its value of 6.67 × 10 -11 N m2/kg2 is constant at every point. It has a minimal value. Acceleration due to gravity 'g' is equal to the acceleration experienced by a body of any mass. It has a large magnitude which changes from point to point. (e)Derivation.(refer NCERT text book)	
	SECTION E	
19	a) Weight is vector quantity as it has magnitude as well as direction which is always towards centre of a earth. b) Difference between mass and weight (any 2) c) m/s^2	4 2+1+1
20	**a)** Archimedes' principle, stated as follows: When a body is immersed fully or partially in a fluid, it experiences an upward force that is equal to the weight of the fluid displaced by it. b) because it has less density than that of water also it experiences upward buoyancy force on it due to liquid. **c)** buoyant force.	4 2+1+1

CHAPTER: 10 **WORK & ENERGY**

Q.No	**SECTION A**	Marks
1	 If the displacement in this image is 10 M and force applied is 5 N . Select the work done : a) 10J (b) 100 J (c) 50 N.M (d) 100 N.M	1
2	If the car of mass 100 gm is moving with a speed of 2 m/s m/s.calculate the work done against gravity by the girl. (a) 10J (b) 20 J (c) 200J (d) ZERO	1
3	If a brick hits another brick of the same mass after 2 sec. How much of the work will be done by the first brick on the second? (a) Zero (b) 10J (c) 100J (d) 20 N.M	1
4	Raju was playing with a ball of 100gm. He threw that towards the sky with a velocity of 2m/s. When the ball reaches to its maximum height its kinetic energy is : (a) Maximum (b) minimum (c) remains constant (d) can not calculated	1
5	In case of no work is done then the angle between the direction of force applied and the displacement is: (a) 0° (b) 45° (c) 90° (d) 180°	1
6	Which of the following is / are unit of work ; (i) $Kg.M^3.S^2$ (ii) N / M (iii) N .M (iv) $Kg.M^2/S^2$ (a) (I) and (iii) (b) (ii) and (iii) (c) (iii) and (iv) (d) (I) and (iii)	1
	ASSERTION /REASON	
7	Assertion : an object moving faster can do more work than an identical object moving relatively slowly. Reason : velocity affects energy more as compared to mass.	1
8	Assertion: a fraction of kinetic energy of a falling object converts into heat energy. Reason: kinetic energy always remains constant.	1
	SECTION B	
9	A pair of bullocks exerts a force of 200 N on a plough. The field being ploughed is 10 m long. How much work is done in ploughing the length of the field? Express it in Joules and Kilo Joules.	2
10	An object of mass 20kg is moving with a uniform velocity of 5 m s^{-1}. What is the kinetic energy possessed by the object?	2
11	Mass of the car is 2000 kg? Calculate the work to be done to increase the velocity of the car from 18 km h^{-1} to 72km h^{-1}.	2
12	1.Can any object have mechanical energy even if its momentum is zero? justify. 2.Can any object have momentum even if its mechanical energy is zero? justify.	2
13	Define the following 1. joule 2. watt	2
	SECTIION C	
14	Derive the expression for calculating kinetic energy of an object of mass m moving with velocity v	3

<table>
<tr><td>15</td><td>1.Derive the formula for calculating potential energy for an object of mass m kept at a height of h.
2. Also prove that the work done by gravity depends on the difference in vertical heights of the initial and final positions of the object and not on the path along which the object is moved</td><td>3</td></tr>
<tr><td>16</td><td>Consider two objects X and Y , with same momentum. Object X is lighter and object Y is heavier . . Which one has a larger kinetic energy X or Y?. Find out the ratio of their kinetic energies</td><td>3</td></tr>
<tr><td></td><td>SECTION D</td><td></td></tr>
<tr><td>17</td><td>State law of conservation of energy. Illustrate with proof</td><td>5</td></tr>
<tr><td>18</td><td>1.Four men lift a 250 kg box to a height of 1 m and hold it without raising or lowering it.
(a) How much work is done by the men in lifting the box?
(b) How much work do they do in just holding it?
(c) Why do they get tired while holding it? (g = 10 m s–2)
2. A rocket is moving up with a velocity v. If the velocity of this rocket is suddenly tripled, what will be the ratio of two kinetic energies?</td><td>5</td></tr>
<tr><td></td><td>SECTION E</td><td></td></tr>
<tr><td>19</td><td>1. Look at the activities listed below. Reason out whether or not work is done in the light of your understanding of the term ‘work’.
a. A green plant is carrying out photosynthesis.
b. An engine is pulling a train.

0. Name the SI units of work and power

3. 

The figure shows a round about of radius 100m on a road .

A man is moving on a straight road against a frictional force of 5 N. After travelling a distance of 2 km he got confused and forgot the correct path at the round about to move . However, he moves on the circular path for one and half cycle and then he moves forward up to 3.0 km. Calculate the work done by him.</td><td>4</td></tr>
<tr><td>20</td><td>1. An object of mass 20 kg is dropped from a height of 4 m. Fill in the blanks in the following table by computing the potential energy and kinetic energy in each case.(For simplifying the calculations, take the value of g as 10 m s^{-2} .)

<table><tr><td></td><td>Potential</td><td>Kinetic</td><td>Total mechanical energy</td></tr></table></td><td>4</td></tr>
</table>

	energy(mgh)	energy((½mv^2)	energy(mgh)+ (½mv^2)
4			
3			
2			
1			
Just touching ground			

2 Interpret the trend in the changes in case of potential energy, kinetic energy and total mechanical energy

3 .Which law can be explained based on this data and state the law

ANSWER KEY CHAPTER:10 WORK & ENERGY

Q.No	SECTION A	Marks
1	c	1
2	d)	1
3	b)	1
4	b)	1
5	c)	1
6	c)	1
7	a, both A and R are correct and R is the correct explanation of A	1
8	c	1
	SECTION B	
9	F = 200N s = 10 m W = F xx s = 200N x 10 m = 2000J = 2kJ	2
10	m = 20 kg v = 5 m/s KE = ½ mv2 = ½ x 20 x 5 x 5 = 250J	2
11	Mass of car ,m = 2000kg Initial velocity ,u = 18km/h = 18x5/18 = 5 m/s Initial kinetic energy , = ½ mu2 = ½ x 2000 x 5 x 5 = 25000J (½) Final velocity , v = 72km/h = 72 x 5/18 = 20m/s Final kinetic energy = ½ mv2 = ½ x 2000 x 20 x 20 = 400000J (½) Work done to change velocity from 18km/h to72km/h = change in kinetic energy	2

	Change in kinetic energy = Final kinetic energy – initial kinetic energy = ½ mv^2 - ½ mu^2 (½) = 400000-25000 = 375000J = 375kJ (½)	
12	1.Yes, mechanical energy comprises both potential energy and kinetic energy. Momentum is zero which means velocity is zero. Hence, there is no kinetic energy but the object may possess potential energy. 2.No. Since mechanical energy is zero, there is no potential energy and no kinetic energy. Kinetic energy being zero, velocity is zero. Hence, there will be no momentum	2
13	1.One joule is the amount of work done on an object when a force of 1 N displaces it by 1 m along the line of action of the force (1) 2. 1 watt is the power of an agent, which does work at the rate of 1 joule per second (1)	2
	SECTIION C	
14	Consider an object of mass, m moving with a uniform velocity, u. Let it now be displaced through a distance s when a constant force, F acts on it in the direction of its displacement. The work done, W is F s. (½) The work done on the object will cause a change in its velocity. Let its velocity change from u to v. Let a be the acceleration produced. . The relation connecting the initial velocity (u) and final velocity (v) of an object moving with a uniform acceleration a, and the displacement, s is $v^2 - u^2 = 2a\,s$ (½) This gives $s = v^2 - u^2 /2a$ we know F = m a. (½) Thus, using we can write the work done by the force, F as m x a $W = m\,a \times (v^2 - u^2) /2a$ Ie W = ½ x m x $(v^2 - u^2)$ (½) If the object is starting from its stationary position, that is, u = 0, then W = ½ x m v^2 (½) The work done is equal to the change in the kinetic energy of an object. If u = 0, the work done will be ½ m v^2 . Thus, the kinetic energy possessed by an object of mass, m and moving with a uniform velocity, v is **KE = ½ m v^2 .** (½)	3
15	1.Consider an object of mass, m. Let it be raised through a height, h from the ground. The minimum force required to raise the object is equal to the weight of the object, **mg.** (½) The object gains energy equal to the work done on it. Let the work done on the object against gravity be W.	3

That is, work done,
W = force × displacement = **mg × h = mgh** (½)
Since work done on the object is equal to mgh, an energy equal to mgh units is gained by the object.
This is the potential energy (PE) of the object. **PE = mgh** (½)

1. 

Figure shows a case where a block is raised from position A to B by taking two different paths.
if the height AB = h.
In both the situations the work done on the object **is mgh.**

The work done by gravity depends on the difference in vertical heights of the initial and final positions of the object and not on the path along which the object is moved

16

OBJECT X	OBJECT Y
Momentum = p_x	Momentum = p_Y
Mass = m_x (lighter object)	Mass = m_Y (heavier object)
$p_x = p_Y$,ie $m_xv_x = m_Yv_Y$, therefore $m_x < m_Y$ ie $v_x > v_Y$	
$KE_x = ½ m_xv_x^2 = ½ m_xv_x \times v_x$	$KE_Y = ½ m_Yv_Y^2 = ½ m_Yv_Y \times v_Y$
$= ½ (m_xv_x) \times v_x$	$= ½ (m_Yv_Y) \times v_Y$
$= ½ p_x \times v_x$ $(m_xv_x = p_x)$	$= ½ p_Y \times v_Y$ $(m_Yv_Y = p_Y)$
ie $KE_x / KE_Y = ½ p_x \times v_x / ½ p_Y \times v_Y$	
ie $KE_x / KE_Y = v_x / v_Y$	
Since $v_x > v_Y$, then $KE_x > KE_Y$	

3

SECTION D

17

1 Law of conservation of energy states that , energy can only be converted from one form to another; it can neither be created or destroyed. The total energy before and after the transformation remains the same. The law of conservation of energy is valid in all situations and for all kinds of transformations. (1)

Proof:
Let an object of mass, m be made to fall freely from a height, h.

At the start, the potential energy is mgh and kinetic energy is zero.

5

	Kinetic energy is zero because its velocity is zero. The total energy of the object is thus **mgh.** (1) As it falls, its potential energy will change into kinetic energy. If v is the velocity of the object at a given instant, the kinetic energy would be **½mv²**. (1) As the fall of the object continues, the potential energy would decrease while the kinetic energy would increase. When the object is about to reach the ground, h = 0 and v will be the highest. Therefore, the kinetic energy would be the largest and potential energy the least. However, the sum of the potential energy and kinetic energy of the object would be the same at all points. That is, **potential energy + kinetic energy** = **constant** (1) **mgh + ½ mv² = constant** The sum of kinetic energy and potential energy of an object is its total mechanical energy. We find that during the free fall of the object, the decrease in potential energy, at any point in its path, appears as an equal amount of increase in kinetic energy. There is thus a continual transformation of gravitational potential energy into kinetic energy. (1)	
18	1 (a)F = m x g m= 250 kg g =10 m s^{-2} F= 250x 10 = 2500N (1) s = 1 m W = F.s = 2500 N x 1 m = 2500 J (1) b.zero; as the box does not move at all, while holding it. (1) c.In order to hold the box, men are applying a force which is opposite and equal to the gravitational force acting on the box. While applying the force, muscular effort is involved. So they feel tired. (1) 2.Initial velocity of rocket= v Initial kinetic energy = ½ mv^2 Velocity tripled, Final velocity = 3v Final kinetic energy= ½ x m x $(3v)^2$ = 9 x ½ mv^2 (½) Therefore kinetic energy increases 9 times (½)	5
	SECTION E	
19	1.a. no work is done since force and displacement are not involved(½) b. Work is done since force and displacement are involved(½) 0. Si unit of work- joule (J) (½) SI unit of power: watt (w) (½)	4

3.F = 5 N

s = (2 km + 100m+3 km) = (2000m+100m+3000m)=5100m
(Man takes one and a half round , but displacement is 100m only) (1)
W = F x s
= 5 N x 5100 =25500J = 25.5kJ (1)

20

	Potential energy(mgh)	Kinetic energy((½mv²)	Total mechanical energy energy(mgh)+ (½mv²)
4	800	0	800
3	600	200	800
2	400	400	800
1	200	600	800
Just touching ground	0	800	800

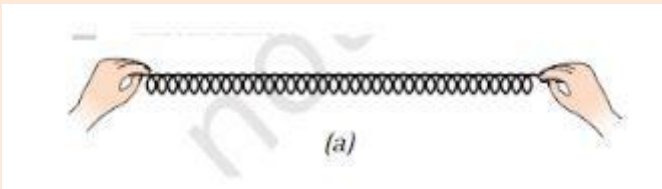
(completing table 1 mark)
2.Potential energy decreases with the decrease in height
Kinetic energy increases with the increase in distance travelled
Total mechanical energy remains same (1)
3.Law of conservation of energy : According to the law of conservation of energy, energy can only be transformed from one form to another; it can neither be created nor destroyed. The total energy before and after the transformation always remains constant. (1+!)

4

CHAPTER-11 : SOUND

Q.No	SECTION A	Marks
1	Sound can travel in 1. Solid 2. Liquid 3. Gas 4. Vaccum Choose the correct option: - 1. i and ii 2. i, ii and iii 3. i and iii 4. ii, iii and iv	1
2	Compression is a region of 1. high pressure 2. medium pressure 3. low pressure 4. none of the above	1
3	The loudness or softness of sound is determined by 1. wavelength 2. amplitude 3. pitch 4. none of the above	1
4	The magnitude of the maximum disturbance in the medium on either side of the mean value is called…. 1. wavelength 2. amplitude 3. pitch 4. none of the above	1
5	The sound of the thunder and the flash of light is seen 1. together seen 2. first flash of light is seen than the sound of thunder 3. first sound of the thunder heard than the flash of the light 4. both are not seen	1
6	Sonu wants to observe the speed of sound in different objects. He performed experiments and found that the speed of sound is maximum in 1. iron 2. water 3. air 4. vacuum	1
	Question number 7 and 8 consists of two statements, namely, Assertion (A) and Reason (R). Select the correct answer from the following	

	(a) Both Assertion (A) and Reason (R) are the true and Reason (R) is a correct explanation of Assertion (A). (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not a correct explanation of Assertion (A). (c) Assertion (A) is true and Reason (R) is false. (d) Assertion (A) is false and Reason (R) is true	
7	Assertion A:- Nocturnal animals like bat can freely move at night. Reason R:- Bats send ultrasound while moving.	1
8	Assertion A:- Sound of aeroplane is not heard during landing and taking off. Reason R:- Sound is produced by vibration.	1
	SECTION B	
9	Illustrate how ultrasound can be used to detect flaws in metallic blocks.	2
10	Shanu , a class 9 boy, is scared of Thunder. Once, Shanu and his grandfather were alone at home , he heard a Sound produced by a thunderstorm ,10 s after the lightning was seen. Grandfather told him the thunder had not happened in the nearby area . Calculate the approximate distance of the thunder cloud. (Given speed of sound = 340 m s–1.)	2
11	Define the term Amplitude and Frequency Represent graphically the following case : “Two sound waves having the same amplitude but different frequencies”?	2
12	Compare male voice and female voice based on their frequency and amplitude. Represent graphically the following case “Two sound waves having the same frequency but different amplitudes”.	2
13	Write an expression to relate speed, frequency and wavelength of sound . Represent graphically the following case “Two sound waves having different amplitudes and also different wavelengths”.	2
	SECTIION C	
14	List three applications of ultrasonic sounds In the following fields .Research laboratories i.In industries	3

15	A rectangular park , on one side is bordered with a road and the opposite side with a wall of a building. A sound is produced by a cracker on the road. Is it possible for a child sitting at a point 5 m away from each side of the park. The Dimensions of the park is 10mx 10m.Justify your answer.	3
16	i)Explain how sound is produced by your school bell. ii)Why are sound waves called mechanical waves? iii)Suppose you and your friend are on the moon. Will you be able to hear any sound produced by your friend?	3
	SECTION D	
17	Establish the relationship between speed of sound, its wavelength and frequency. If velocity of sound in air is 340 m s^{-1}, calculate .wavelength when frequency is 512 Hz. (ii) frequency when wavelength is 1.7 m	5
18	Draw a curve showing density or pressure variations with respect to distance for a disturbance produced by sound. Mark the position of compression and rarefaction on this curve. Also define wavelengths and time period using this curve	5
	SECTION E	
19	 Take a slinky as shown in the figure. Ask your friend to hold one end. You hold the other end. Now stretch the slinky . Then give it a sharp push towards your friend. What do you notice? If you move your hand pushing and pulling the slinky alternatively, what will you observe? If you mark a dot on the slinky, you will observe that the dot on the slinky will move back and forth parallel to the direction of the propagation of the disturbance. 1. Redraw the diagram of slinky to illustrate the observations and name the portion of slinky which come closer and the portion of slinky	4

	which are set apart. 2. Relate the direction of propagation of a sound wave with the disturbances. 3. Differentiate between longitudinal wave and transverse wave	
20	Ultrasound uses high-frequency sound waves to view internal organs and soft tissues. For this procedure, the doctors uses a transducer, which transmits high-frequency sound waves. A handheld transducer is placed on the skin and a doctor moves it around to allow the sound waves to bounce off the soft tissues. An attached machine records the echoing waves, and translates them into pictures on a screen. 1.Out of the four investigative factors given, list a pair of characters ,one which can be detected and other which cannot be detected by ultrasound examination of foetus: foetal sex determination, Foetal eye colour , Foetal body size, number of developing foetus. 2. Though X-rays can also be used to take the images of a developing fetus , doctors advise expectant mothers to avoid exposure to X-rays. Why abdominal X-rays are not recommended for pregnant women . Give two reasons? 3.. The ultrasound waves travel through tissues at a speed of 1530 m/s . To form an image the ultrasound scanner should estimate the distance of the tissue from the probe. What measurement must the ultrasound machine make to calculate the distance .Justify your answer.	4

CHAPTER: SOUND ANSWER KEY

Q.No	SECTION A	Marks
1	b	1
2	a	1
3	b	1
4	b	1
5	b	1
6	a	1
7	a	1
8	b	1
	SECTION B	

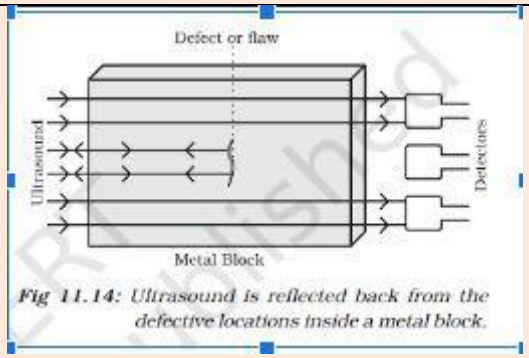
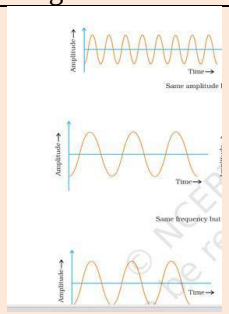
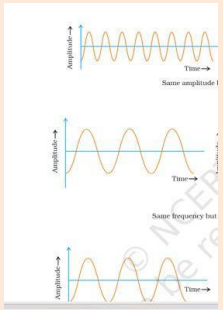
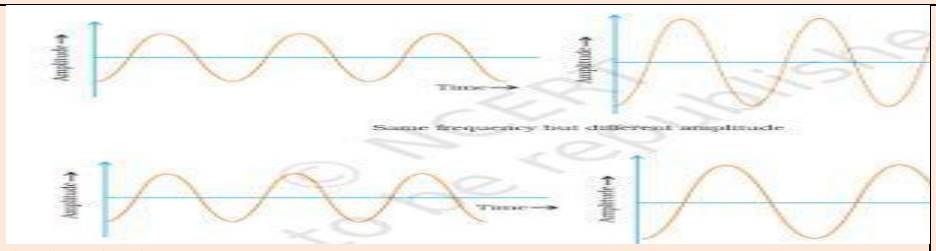
<table>
<tr><td>9</td><td> 

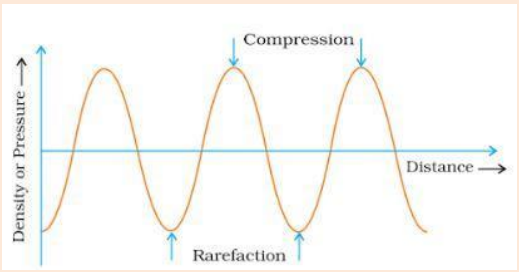
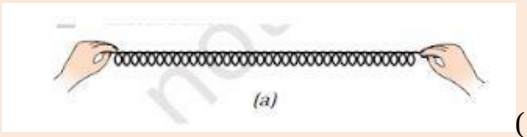
Fig 11.14: Ultrasound is reflected back from the defective locations inside a metal block.

Or description</td><td>2</td></tr>
<tr><td>10</td><td>Light travels faster than sound (½)
Time taken to reach the sound of thunder= 10s
Speed of sound= 340m/s
Distance = speed x time
= 10s x 340m/s = 3400m = 3.4km (½) + (½)

Thunder happened 3.4 km away froShanu’s place.
Judgement of Grandfather was correct (½)</td><td>2</td></tr>
<tr><td>11</td><td> 
(½) + (½)
Amplitude: Maximum distance to which a wave moves from its mean position (½)
Frequency: Number of oscillations per second (½)</td><td>2</td></tr>
<tr><td>12</td><td> 
(½) + (½)

<table><tr><td></td><td>Frequency</td><td>Amplitude</td></tr><tr><td>Male voice</td><td>low</td><td>high</td></tr><tr><td>Female voice</td><td>high</td><td>low</td></tr></table>
(½) + (½)</td><td>2</td></tr>
<tr><td>13</td><td></td><td>2</td></tr>
</table>

	 (½) + (½) $v = \lambda \nu$ That is, speed = wavelength × frequency (1)	
	SECTIION C	
14	Ultrasound is generally used to clean parts located in hard-to-reach places, for example, spiral tube, odd shaped parts, electronic components, etc. (½) Objects to be cleaned are placed in a cleaning solution and ultrasonic waves are sent into the solution. (½) Due to the high frequency, the particles of dust, grease and dirt get detached and drop out. The objects thus get thoroughly cleaned(½) ii) Ultrasounds can be used to detect cracks and flaws in metal blocks in construction of big structures like buildings, bridges, machines and also scientific equipment.(½) Ultrasonic waves are allowed to pass through the metal block and detectors are used to detect the transmitted waves. (½) If there is even a small defect, the ultrasound gets reflected back indicating the presence of the flaw or defect(½)	3
15	Echo is produced when sound travels 34 m (from the point of origin to reflecting surface and back the listener) within 0.1 s time gap. (1) Speed of sound = 340m/s Distance travelled by sound in 0.1 s = 340m/s x 0.1s = 34 m (1) The minimum distance travelled by the reflected sound wave for the distinctly listening the echo = 34/2 = 17 m Dimension of the park = 10m x 10m Since the distance of the child from the wall is 5 m , much smaller than the required distance to make a clear echo, No echo will be (1)formed.	3
16	i)When an object or school bell vibrates, it sets the particles of the medium around it vibrating. A particle of the medium in contact with the vibrating object is first displaced from its equilibrium position. It then exerts a force on the adjacent particle. As a result of which the adjacent particle gets displaced from its position of rest. After displacing the adjacent particle, the first particle comes back to its original position. This process continues in the medium till the sound reaches your ear. (½)+ (½)+ (½) ii) Sound waves are characterised by the motion of particles in the medium and are called mechanical waves (1) iii. No, as there is no medium sound is not propagated on moon's surface ((½)	3
	SECTION D	
17	Derivation of formula $v = f\lambda$.	5

	The speed of sound is defined as the distance which a point on a wave, such as a compression or a rarefaction, travels per unit time. speed, v = distance / time = λ /T Here λ is the wavelength of the sound wave. It is the distance travelled by the sound wave in one time period (T) of the wave. Thus, v = λ f (I/ T= f) or v = λ f That is, speed = wavelength × frequency. . V= 340 m/s f = 512Hz λ =? V= f x λ λ = v/f = 340 /512 λ = 0.66 m. ii. v= 340m/s f = ? λ = 1.7m V= f x λ f = v/ λ = 340 / 1.7 = 200Hz	
18	 (labelling compressio1 mark, rarefaction 1 mark, diagram 1 mark) Wavelength is the distance between two consecutive compressions or two consecutive rarefactions. (1) Time period is the time taken to travel the distance between any two consecutive compressions or rarefactions from a fixed point. (1)	5
	SECTION E	
19	1.  (1) 2. The direction of propagation of distance is parallel to the direction of propagation of wave (1) 3. a longitudinal wave is the wave in which the individual particles of the medium move parallel to the direction of wave propagation (1) a transverse wave is the wave in which the individual particles of the medium move about their mean positions in a direction perpendicular to the direction of wave propagation (1)	4
20	1.a pair of characters ,one which can be detected - foetal sex determination,/ , Foetal	4

	body size,/ number of developing foetus (½) which cannot be detected by ultrasound examination of foetus: , Foetal eye colour (½) 2. foetus may get harmful effect/ genetic change/ birth or developmental defect (½) + (½) 3. The ultrasound machine should measure the time to travel from probe or transducer to the tissue and reflect to reach the probe . (1) The ultrasound machine will be able to produce the image if distance is measured. Distance = Speed X time (1)	

CHAPTER- 12 IMPROVEMENTS OF FOOD RESOURCES

Q NO	SECTION A	MARKS
1	Which of the following plants can be grown for as a source of protein? (i)Lentil (ii) Sunflower (iii) Cauliflower (iv) Hibiscus (a)(i) and (ii) (b) (ii) and (iii) (c) (i) and (iv) (d) (ii) and (iv)	1
2	Identify the source of protein from given choices. (i) Rice (ii) Millets (iii) Sorghum (iv) Gram (a) (i) and (ii) (b) (ii) and (iii) (c) (i) and (iv) (d) only (iv)	1
3	Which of the following can help in solving the food problem of India? (i) Increase in population (ii) increasing land area for cultivation (iii) giving free food to all (iv) employing scientific methods and advanced technology. (a) (i) and (ii) (b) (ii) and (iii) (c) (ii) and (iv) (d) only (iv)	1
4	Find out the correct statement from the following (i) White revolution is meant for increase in milk production (ii) Blue revolution is meant for increase in fish production (iii) Increasing food production without compromising with environmental quality is called as sustainable agriculture (iv) None of the above (a) (i) and (ii) (b) (ii) and (iii) (c) (i), (ii) and (iii) (d) only (iv)	1
5	An Italian bee variety A. mellifera has been introduced in India for honey production. Which of the following are the correct reasons for this? (i)They stings more (ii)Their honey collection capacity is maximum. (iii)It stays in a single beehive for a less period of time (iv)Its breeding capacity is high. (a) (i) and (ii) (b) (ii) and (iv) (c) (i), (ii) and (iii) (d) only (iv)	1
6	the need of poultry farming is for the following purpose: (i)production of milk (ii)production of egg (iii)farm work (iv) production of meat (a) (i) and (ii) (b) (ii) and (iv) (c) (i), (ii) and (iii) (d) only (iv)	1
7	Assertion :- wheat, rice and maize are energy yielding crops. Reason : wheat, rice and maize are staple foods for the majority of people in India. a. Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A). b. Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A) c. Assertion (A) is true but reason (R) is false. d. Assertion (A) is false but reason (R) is true..	

8	Assertion :- hybridisation helps in plants' disease resistivity. Reason : Crossing between genetically different organisms to produce desired characteristics in the offspring is known as hybridization. a. Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A). b. Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A). c. Assertion (A) is true but reason (R) is false. d. Assertion (A) is false but reason (R) is true.	1
	SECTION B	
9	Some of the nutrients are required by the crop in very small amounts. Identify the type of nutrient and give two examples	2
10	Evaluate how animal husbandry supports Indian economy	2
11	Manpreet bought an agricultural land which is elevated .Suggest any two methods by which he can prevent soil erosion?	2
12	What is Weeding ? Mention any two methods to perform weeding.	2
13	Differentiate between milch and draught animals with one example	2
	SECTION C	
14	Compare the Use of Manure and Fertilizers in maintaining fertility of soil	3
15	List the desirable agronomic characteristics favoring Crop Improvements?	3
16	Increasing grain production alone solves the problem of malnutrition and hunger. Evaluate the statement giving valid reasons?	3
	SECTION D	
17	Suresh wants to follow composite fish farming in his pond. What things should he keep in mind while selecting fish varieties for his farm? List any two advantages of composite fish farming	5
18	Explain different cropping patterns by evaluating their advantages	5
	SECTION E	
19	Beekeeping has been practiced for centuries and honey has been	4

a. b. c.	considered as a valuable and precious commodity that is used as medicine for traditional rituals, or as food. Beekeeping can be practiced effortlessly as an additional source of income for farmers in rural areas and has been successfully implemented in poverty-alleviating projects. Scientific name of rock bee is_____ Why is pasturage important? List any two desirable characteristics of bee varieties which make them suitable for Honey Production?	
20 a b c	Grain storage facilities storage and handling of variety of agricultural products, such as corn, soybeans, wheat, barley, rice, canola, flax, etc Use of traditional grain storage facilities such as cribs, improved rhombus, and brick bins are ineffective against many microbes already present in the grain before storage. While plastic bins reduce insect pests‘ infestation, Purdue Improved crop storage bags and wooden silo were proved to be a viable management tool for preventing aflatoxin accumulation in storage and moisture migration. What are silos? Amitastored wheat in her storage box before proper drying and the grains got spoiled Evaluate possible reason behind this Proper storage is as important as crop protection. Analyze any two factors which may be Responsible for the loss of grains during storage?	4

ANSWER KEY CHAPTER- 12 IMPROVEMENT OF FOOD RESOURCES

Q NO	SECTION A	MARKS
1	A	1
2	D	1
3	C	1
4	c	1
5	b	1
6	B	1
7	b	
8	A	1
	SECTION B	
9	Micro nutrients Iron, cobalt, chromium, iodine, copper, zinc, molybdenum(any two)	1 1
10	It provides employment to a large number of farmer and thereby increases their living standards	1+1

<table>
<tr><td></td><td>It helps in developing high yielding breeds of animals by cross breeding
(or any other relevant point)</td><td></td></tr>
<tr><td>11</td><td>Terrace planting ,planting more hedges (or any other)</td><td>1+1</td></tr>
<tr><td>12</td><td>Weeding is the removal of weeds
Manual weeding, using weedicide</td><td>1
1</td></tr>
<tr><td>13</td><td>Milch breeds are milk–yielding animals eg cow
draught breeds are working animals eg ox</td><td>1
1</td></tr>
<tr><td></td><td>SECTION C</td><td></td></tr>
<tr><td>14</td><td><table><tr><th></th><th>Manures</th><th>Fertilisers</th></tr><tr><td>(i)</td><td>They are not soluble in water. So they are not easily absorbed by the roots of the plants.</td><td>They are soluble in water and are absorbed by the plants easily.</td></tr><tr><td>(ii)</td><td>These are inorganic substances.</td><td>These are organic substances.</td></tr><tr><td>(iii)</td><td>Excessive use does not harm the soil texture, they provide humus to the soil.</td><td>Excessive use can change the chemical composition of the soil and also pollutes water.</td></tr><tr><td>(iv)</td><td>They restore the soil texture and help in water retention.</td><td>They may damage the soil texture.</td></tr><tr><td>(v)</td><td>These are nutrient specific.</td><td>These are not nutrient specific.</td></tr></table>
https://images.app.goo.gl/PCmYQD6E3XUjnH3g6</td><td>3</td></tr>
<tr><td>15</td><td>High Nutritional Content. ...
Disease and Pest Resistance. ...
High Crop Yield. ...
Tallness and Profuse Branching for Fodder Crops. ...
Dwarfness in Cereals. ...
Response to Fertilizers. ...
Adaptability to Varied Environmental Conditions.(any six)</td><td>3</td></tr>
<tr><td>16</td><td>No,
increasing grain production only for storage in warehouses cannot solve the problem of malnutrition and hunger
Food security depends on both on availability and accessibility of food
Free grains must be distributed to poor maintaining quality
Grains only cannot solve the problem of malnutrition as it doesn’t contain all nutrients in correct amount</td><td>1
1
1</td></tr>
<tr><td></td><td>SECTION D</td><td></td></tr>
<tr><td>17</td><td>composition of fish culture is the method of growing five or six different types of fish species together in a single fish pond.
Catla -suface feeders,
Rohu-middle zone feeders,
Silver carp- phytoplankton
Mrigal, Common carp-bottom feeders
and Grass carp-weeds
This system increases the fish yield</td><td>1
2</td></tr>
</table>

	fish species that have different food habitats do not compete for food among themselves.	1 1
18	1) mixed cropping- growing of two crops on a single piece of land. for 2) intercropping- growing of two crops in a definite pattern. 3) crop rotation- growing of different crops on a single piece of land. (any two advantages of each)	21/2 21/2
	SECTION E	
19 a. b. c.	 Apisdorsata It decides quality of honey More honey, sting less, stay in hive for long, disease resistant (any two)	1 1 2
20 a b c	 used to store grains. Moisture attracts microbes like bacteria,fungi.etc biotic factors: Insects, rats, birds abiotic factors: moisture humidity, temperature	 1 1 1+1