

Force

Group A

1. What is gravitational force? Write down its SI unit.
2. State universal law of gravitation.
3. What is gravitational constant?
4. State the factors that affect the gravitational force.
5. What is the relation between the gravitational force acting between any two bodies with their masses and the distance between their centers?
6. What is gravity? Write down its SI unit of measurement.
7. What are the factors affecting gravity?
8. Write any two effects of gravity.
9. What is acceleration due to gravity? Write its SI unit of measurement.
10. Write down the conclusion of coin and feather experiment.
11. Define mass of an object.
12. On which factors does the mass of an object depend?
13. What is weight? In which unit it is measured?
14. What is the average value of acceleration due to gravity on the surface of the earth and on the surface of the moon?
15. What is the value of acceleration due to gravity at the centre of the earth?
16. Write down the value of acceleration due to gravity at the equator and at the pole.
17. What is free fall?
18. In which condition does an object fall freely?
19. What is meant by weightlessness?
20. Write any two conditions at which a body becomes weightless.
21. At what condition the value of acceleration due to gravity is approximately zero while getting down from a parachute.
22. What is geocentric model about the position and revolution of the earth and the sun?

Group B

1. Why Newton's law of gravitation is called universal law?
2. What is gravitational constant? Write its value and SI unit.
3. It is easier to lift a small stone than a larger one, why?
4. Show the relation between acceleration due to gravity and the radius of the earth.
5. Write any two differences between free fall and weightlessness.
6. Write any two differences between acceleration due to gravity and gravity.
7. Write any two differences between acceleration due to gravity and gravitational constant.
8. Write any two differences between mass and weight.
9. If a body is dropped from the same height once in the equator and then in the polar region, in which place will it fall faster? Why?
10. The value of acceleration due to gravity 'g' varies from place to place. Why?
11. The weight of a body is slightly more in Terai and less in the Himalayan region. Why?
12. The fall of a parachute towards the earth's surface is not a free fall. Why?

OR

The fall of body on the earth's surface cannot be a complete free fall. Why?

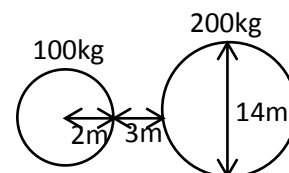
13. Astronauts feel them weightless inside spacecraft. Why?
14. When a feather and a coin are dropped towards the surface of the earth, do they reach ground together? Why?
15. Parachutists do not get hurt while jumping out of an aeroplane towards the surface of the earth. Why?

Group C

1. Mention any three consequences of gravitational force.
2. Prove that: $F = \frac{Gm_1m_2}{d^2}$
3. Prove that: $g \propto \frac{1}{R^2}$
4. What change in gravitational force occur if the distance between two bodies is doubled keeping their masses constant.
5. What change in gravitational force occurs if the mass of one of the body is doubled and the distance between the bodies is halved?
6. What is the change in the gravitational force between two bodies if the distance between their centre is halved, keeping their masses constant?
7. What change occurs in the gravitational force between two bodies when mass of each is made doubled and the distance between their centers is halved?

Numerical problems:

- Calculate the gravitational force between two objects of masses 25kg and 20kg if distance between them is 5m.
- Two bodies each of mass 1kg are kept 1 m apart. What is the gravitational force between them?
- At what condition the value of gravitational force becomes $6.67 \times 10^{-11} \text{N}$? Show calculation.
- An object with mass $6 \times 10^{24} \text{kg}$ and the other with mass $3 \times 10^{22} \text{kg}$ are at distance of $2 \times 10^{10} \text{m}$. How much gravitational force is produced between them? (Ans: $30.015 \times 10^{15} \text{N}$)
- Gravitational force between two bodies is 2N when they are kept at a distance of 2m. How much gravitational force is produced when they are kept 4m apart? (Ans: 0.5N)
- Gravitational force between two bodies is 50N when they are at the distance of 8m. How much gravitational force is produced when they are kept 4 meter apart? (Ans: 200N)
- Calculate the gravitational force between two masses 20kg and 50kg are at a distance of 500cm apart. (Ans: $2.668 \times 10^{-9} \text{N}$)
- The gravitational force between any two objects is 500N and they are at the distance of $2.5 \times 10^4 \text{km}$. Calculate the distance between them when the gravitational force is halved. (Ans: $3.53 \times 10^7 \text{m}$)
- The masses of two heavenly bodies are $2 \times 10^6 \text{kg}$ and $4 \times 10^{22} \text{kg}$ respectively and the distance between them is 30,000km, find out the gravitational force between them. (Ans: $5.92 \times 10^3 \text{N}$)
- Calculate the force of gravitation between the earth and a man of mass 80 kg, if the mass of the earth is $6 \times 10^{24} \text{kg}$ and radius of the earth is $6.38 \times 10^6 \text{m}$. (Ans: 786.5488N)
- The mass of Jupiter is $1.9 \times 10^{27} \text{kg}$ and that of the sun is $2 \times 10^{30} \text{kg}$. The distance between the sun and the Jupiter is $76.8 \times 10^7 \text{km}$. Calculate the gravitational force that exists in between them. (Ans: $4.29 \times 10^{23} \text{N}$)
- The mass of the earth is $6 \times 10^{24} \text{kg}$ and the mass of the moon is $7.1 \times 10^{22} \text{kg}$ and the gravitational force between them is $16.83 \times 10^{19} \text{N}$; find out the distance between them. (Ans: $4.11 \times 10^8 \text{m}$)
- Calculate the force with which the moon attracts every kilogram of water of Koshi River if the mass of the moon is $7 \times 10^{22} \text{kg}$ and it is supposed to be $3 \times 10^5 \text{km}$ away from the Nepal. (Ans: $5.18 \times 10^{-5} \text{N}$)
- Study the given diagram and calculate the gravitational force between these spherical masses. (Ans: $9.26 \times 10^{-9} \text{N}$)
- The weight of a body is 600N on the surface of the earth. If the mass and the radius of the earth are $6 \times 10^{24} \text{kg}$ and $6.4 \times 10^3 \text{km}$ respectively, calculate the mass of the body. (Ans: 61.409kg)
- If two bodies are kept at a distance of 400m, the gravitational force between the two bodies is $4.16875 \times 10^4 \text{N}$. The mass of one body is $2 \times 10^7 \text{kg}$, find the mass of another body. (Ans: $5 \times 10^{12} \text{kg}$)
- The mass and radius of the Jupiter is $1.9 \times 10^{27} \text{kg}$ and $71 \times 10^6 \text{m}$ respectively. Find out acceleration due to gravity at its surface. (Ans: 25.13m/s^2)
- If the mass of the moon is $7.2 \times 10^{22} \text{kg}$ and radius is $1.7 \times 10^6 \text{m}$ then find its acceleration due to gravity. Also find the weight of 50kg object at the surface of the moon. (Ans: $g = 1.66 \text{m/s}^2$ and $W = 83 \text{N}$)
- The mass of the earth is $6 \times 10^{24} \text{kg}$ and its radius is 6400km. What will be the acceleration due to gravity on its surface and at the double distance of the radius? (Ans: 9.77m/s^2 and $g' = 2.44 \text{m/s}^2$)
- The mass of the earth is $6 \times 10^{24} \text{kg}$. What is the value of acceleration due to gravity of an object which is at a distance of 19200km from centre of the earth? (Ans: 1.085m/s^2)
- The mass of the earth is $6 \times 10^{24} \text{kg}$ and its radius is 6400km, what will be the acceleration due to gravity at a distance of 3600km far from the surface of the earth? (Ans: 4m/s^2)
- Calculate the value of acceleration due to gravity on the top of the Mount Everest of height 8848m. Given that the mass of the earth is $6 \times 10^{24} \text{kg}$ and radius is 6400km. (Ans: 9.74m/s^2)
- The mass of the earth is $6 \times 10^{24} \text{kg}$ and its radius is 6400km. Calculate the height above the earth surface at which the value of acceleration due to gravity will be 4m/s^2 . (Ans: $3.6 \times 10^6 \text{m}$)
- The radius of the earth is $6.37 \times 10^3 \text{km}$ and height of Mt. Everest is 8848m from the sea level. If the value of acceleration due to gravity is 9.8m/s^2 at the surface of the earth, calculate the value of acceleration due to gravity at the top of the Mt. Everest. (Ans: 9.77m/s^2)
- The radius of the earth is 6380km. if an object is dropped from the top of Mt. Everest of height 8848m, calculate the value of acceleration due to gravity on the surface of the earth, if the acceleration due to gravity on the top of Mt. Everest is 9.77m/s^2 . (Ans: 9.8m/s^2)
- Calculate the height above the earth's surface at which the value of acceleration due to gravity reduces to half of its value on the earth's surface. The radius of the earth is $6.4 \times 10^6 \text{m}$. (Ans: $2.65 \times 10^6 \text{m}$)
- The mass of the earth is $6 \times 10^{24} \text{kg}$ and radius of the moon is $1.7 \times 10^6 \text{m}$. Calculate the acceleration due to gravity of the new earth which is formed by the compression of the earth equal to the size of the moon. (Ans: 138.47m/s^2)
- An imaginary planet has a mass 5 times and radius 3 times that of the earth. What is the acceleration due to gravity on the planet, if the acceleration due to gravity on the earth's surface is 10m/s^2 ? (Ans: 5.56m/s^2)



29. Calculate the height above the earth surface at which the value of acceleration due to gravity is 4.9m/s^2 . (The radius of the earth is 6400km and the value of acceleration due to gravity on the surface of the earth is 9.8m/s^2 . (Ans: $2.56 \times 10^6\text{m}$)
30. A stone is dropped freely from 45m height of the tower; it reaches the ground in 3 seconds. Calculate the acceleration due to gravity of that stone. (Ans: 10m/s^2)
31. When a piece of a stone is dropped from the top of a tower, it reaches the ground in 6 seconds. Calculate the height of the tower? (Ans: 176.4m)
32. A man can lift 50kg mass on the surface of the earth, how much mass can he can lift on the surface of the moon? (Ans: 293.41kg)

Pressure

Group A

1. What is pressure? Write its SI unit.
2. Name the force applied perpendicular on unit area.
3. Define one Pascal pressure.
4. On what factors liquid pressure depends?

Or

Write three factors that affect liquid pressure kept in cylindrical tank.

5. What is the relation of pressure of a liquid with its density and depth?
6. State Pascal's law.
7. Write the name of two machines based on the Pascal's law.
8. "Pressure applied on a liquid enclosed in a vessel will be transmitted equally in all directions perpendicular to the surface." Which law is explained by this statement?
9. Write the formula based on the Pascal's law.
10. On which principle does hydraulic brake base?
11. What is upthrust due to liquid?
12. State Archimedes' principle.
13. What is the relation between upthrust and the density of liquid?
14. What is density?
15. What is relative density?
16. What is the relation between upthrust and volume of displaced liquid?
17. State the law of floatation.
18. Name the instruments that are based on the law of floatation of an object.
19. "The weight of displaced liquid is equal to the weight of floating object." Which principle does this statement represent?
20. "Weight of an object decreases when immersed in water," which law does this statement represent?
21. What is atmospheric pressure?
22. For what purpose is mercury barometer used?
23. Write down the value of standard atmospheric pressure.

Group B.

1. Write any two differences between force and pressure.
2. By which properties of liquid it is used in hydraulic brakes?
3. Why does a ball try to come up when it is pressed in water?
4. What is the relationship between the density of liquid and its upthrust? Explain.
5. Write any two differences between Archimedes' principle and law of floatation.
6. It is easier to lift a heavy stone under water. Why?

Or

Lifting a stone in water is felt to be comparatively lighter, why?

7. The ice made of water floats on water, why?
8. The weight of any object decreases inside water. Give reason. How much weight will an object lose in water?
9. What will be the effect in the weight of displaced water if load is added into the ship floating in the ocean? Write with reason.
10. A ship coming from sea enters the river; will its hull sink more or less in river water? Give reason.
11. How much water, a girl weighing 450N, should displace in order to float in water? Why?
12. Although a ship is made up of iron, it can float on water, why?
13. Iron ball sinks in water but not in mercury, why?
14. What happens to balloon filled with air, when it goes very high altitude from surface of the earth? Why?
15. It is easier to swim in the sea than on the pond, why?
16. Why does a stone sink in water?
17. At what condition a body floats on liquid? The bottom of a water tank is made thick. Why?
18. A ship sinks more when extra load is added to it. Why?

19. What is the difference between an empty ship and loaded ship moving on the sea water?
20. An egg sinks in pure water but floats on solution of salt with water, why?
21. "Only the objects having density less than water float." Is this statement true? Why?
22. Write any two differences between density and relative density.
23. If a hydrometer is immersed in sugar solution and in pure water, in which condition it is immersed more? Why?
24. What is the difference in floatation of hydrometer in pure water and salty water?
25. Write two conditions for a substance to float on liquid.
26. What differences will you get from the flying of air filled balloon and the hydrogen filled balloon?
27. Write any two importance of atmospheric pressure.
28. Why is an aeroplane kept under controlled pressure?
29. Why does nose starts bleeding on High Mountain?

Group C

1. Describe an experiment to show that atmosphere exerts pressure.
2. Prove that the hydraulic press is an effort multiplier.
3. How you would use mercury barometer to measure the atmospheric pressure? Explain.
4. How does syringe work? Explain with diagram.
5. How does air pump work? Explain with diagram.
6. Explain up stroke in water pump with diagram.
7. Explain down stroke in water pump with diagram.

Group D

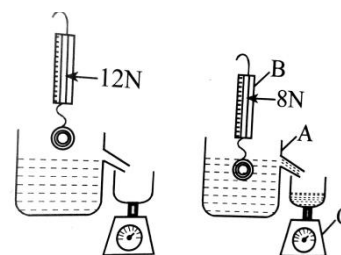
1. Study the given table and answer the following questions:

Substances	Density (in g/cm^3)
W	0.8
X	13.6
Y	1
Z	0.9

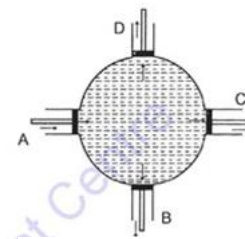
- i. If volume of all substances is equal, which substance has the greatest mass?
- ii. Among the substances in the table, which substance sinks in water, why?
- iii. Among the given substance, name the substance that gives the least upthrust. Why?
2. The weight of an object is 20N in air, the weight of that object in water is seen 12N only then:
 - i. What is the value of upthrust on the object by water?
 - ii. What is the weight of the displaced water by it?
 - iii. Calculate the mass of water displaced by it.
3. The different weights of a piece of a stone on weighing in three different media-air, pure water and sea water are shown on the table below:

Medium	Weight
A	15N
B	18N
C	16N

- i. Which media are A, B and C?
- ii. If the weight of 1kg of mass in air is 10N, find out the mass of the piece of stone. (Ans 1.8kg)
- iii. Find out the mass of water displaced by the piece of stone. (Ans 0.2kg)
- iv. Which one of the A and B has more density?
- v. What upthrust is exerted when the body is immersed in medium C? (Ans 2N)
4. Study the given diagram and answer the following questions:
 - i. What is the actual and apparent weight of the substance?
 - ii. What is the upthrust acting on the substance?
 - iii. What is the weight of displaced water?
 - iv. Name the instrument A, B and C.

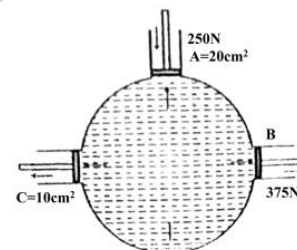


5. Study the given diagram and answer the following questions.
- When the piston 'A' is pushed inside of the spherical body, then what happens on the pistons B, C and D and why?
 - Which law is explained by the given instrument?



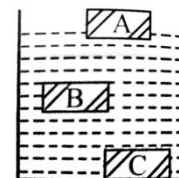
6. If pistons A, B and C of the apparatus given in the diagram are supposed to be frictionless, what is the area of the piston B? What force is exerted on the piston C?

(Ans 30cm^2 , 125N)

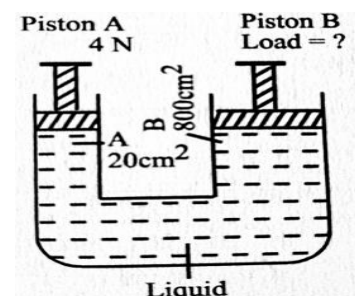


7. Three objects with different densities A, B and C are in water as shown in the figure. Now answer the following questions:

- Which object has higher density than the water?
- If the mass of object A is 1kg, how much kg of water is displaced by the object?
- Which law is applicable for object B?



8. Study the given diagram and answer the following questions;
- Name the equipment given in the diagram and write one use of it.
 - On which principle does it work?
 - Calculate pressure on the piston A and B. (Ans 2×10^3)
 - Calculate maximum load that can be lifted on the piston B if 4N force is applied on piston A. (Ans 160N)



Numerical

- If the cross sectional area of narrow cylinder, in a hydraulic machine is 40cm^2 and wider cylinder is 4m^2 , what load is necessary on the piston of large cylinder to balance 600N load kept on the piston of smaller cylinder? (Ans $6 \times 10^5\text{N}$)
- In a hydraulic press, the area of small piston is 0.005m^2 and larger piston is 0.1m^2 . What is the weight needed on the larger piston to balance the weight of 10N on the smaller piston. (Ans 200N)
- If the area of the piston A in a hydraulic machine is 0.05m^2 and that of 'B' is 0.1m^2 , what force is produced in piston B when 20N force is applied in piston A? (Ans 40N)
- A cube of wood of volume of 0.2m^3 and density 600kg/m^3 is placed in a liquid of density 800kg/m^3 . What fraction of the volume of the wood is immersed in the liquid? (Ans $3/4$)
- A piece of stone has volume 400cm^3 and density $7.8 \times 10^3\text{kg/m}^3$. It is immersed totally in water of density 1000kg/m^3 . Calculate the weight of the stone in air and the upthrust of the water. (Ans 31.2N , 4N)
- A solid weighs 227.5g in air and 212.5g when totally immersed in the liquid of density 0.9g/cm^3 . Calculate the density of the solid. (Ans 3.84g/cm^3)

Energy

Group A

1. What is meant by sources of energy?
2. What is meant by primary sources of energy?
3. Define renewable and non-renewable source of energy?
4. List any three renewable sources of energy.
5. What is solar energy? How much energy is released by the sun per second?
6. For what two natural processes is the solar energy being used?
7. Which of the following are non-renewable sources of energy: mineral oil, hydroelectricity, tidal energy and coal?
8. What amount of average solar energy does the earth surface receive per square meter?
9. What is solar cell and solar panel?
10. Name any three instruments in which solar batteries are used?
11. What is fossil fuel and mineral oil?
12. Write the process of formation of fossil fuel.
13. Name the high quality of coal.
14. What does LPG stand for?
15. What is hydroelectricity? What is hydroelectric potential in Nepal?
16. What is meant by alternative sources of energy? Give any three examples of alternative sources of energy.
17. What are the important alternative sources of energy in the context of Nepal?
18. What is bio mass and bio Fuel?
19. How can we obtain bio energy?
20. What is bio mass energy and nuclear energy?
21. What is nuclear reaction?
22. What is meant by nuclear fusion reaction?
23. What is meant by nuclear fission reaction?
24. Write the application of $E=mc^2$ formula.
25. Write the name of two radioactive elements.
26. What is deuterium and tritium?
27. What is meant by tidal energy?
28. What is wind energy?
29. What is meant by geothermal energy?
30. Write any two natural phenomena from which Geothermal energy is obtained?
31. What is energy crisis?
32. Write one major disadvantage of fossil fuel.

Group B

1. Write any two differences between renewable and non-renewable sources of energy.
2. Explain the nuclear reaction that occurs in the sun with the help of equations.
3. Write conditions required for nuclear fusion reaction in the sun.
4. What is meant by primary sources of energy? Write down its types.
5. What is meant by non-renewable source of energy? List any three examples.
6. Write any two limitations of solar energy.
7. Why are mineral oil, coal and natural gas called non-renewable sources of energy?
8. Solar energy and hydropower is considered a renewable energy as well as alternative sources of energy. Clarify it.
9. Why is it necessary to replace the use of non-renewable source of energy by renewable sources?
10. "Sun is the main sources of energy". Give two reasons to justify this statement.
11. In the context of Nepal it is better to use source of energy like solar power, justify your answer with two reasons.
12. Scientists are seen very busy to design the solar power depending equipment, why?
13. Sun can be considered as an atomic power plant, why?
14. How the consumption of non-renewable energy can be reduced in our country? Write any two methods.
15. Nuclear fusion reaction is not possible in the earth, why?
16. What is fossil fuel? Write with an example.
17. Why is mineral oil and coal considered as a fossil fuel?
18. Energy obtained from fossil fuels is the outcome of solar energy, why?

19. "Fossil fuel is responsible for the present day's environment pollution." Give reason.
20. "Nepal has high potentiality of producing hydroelectricity." Prove this statement with two reasons.
21. The hydropower is considered as better sources of energy than fossil fuel, why? Write any two reasons.
22. Hydropower is the outcome of solar energy. Justify this statement.
23. Write any two reasons that Nepal Government has given more priority for the production of hydroelectricity.
24. Justify with two reasons that the hydroelectricity is the best alternative sources of energy in the context of Nepal. Or

In the context of Nepal, hydropower should be given more priority rather than fossil fuel, why?

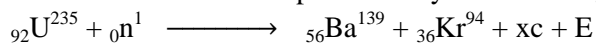
25. It is difficult to produce hydroelectricity in the context of Nepal. Give any two reasons.
26. Higher priority should be given for the production of hydroelectricity in Nepal. Why?
27. Write any two differences between bio-fuel and fossil fuel.
28. What is biogas? How is it produced?
29. Mention any two advantages of bio mass energy?
30. Write any two advantages of bio gas?
31. Write any two differences between bio gas and bio mass.
32. Mention any two advantages of nuclear energy.
33. Mention any two hazards of nuclear energy.
34. How is nuclear energy produced?
35. What is nuclear fuel? Write two examples.
36. Write any two differences between nuclear fusion reaction and nuclear fission reaction.
37. Who propounded the equation $E=mc^2$? What do E, m and c mean in this equation?
38. State the mass energy relation proposed by Albert Einstein. Also write the meaning of each term.
39. How is wind energy produced?
40. Write any two disadvantages of geothermal energy.
41. What is the present status of energy use in the world?
42. Mention any two ways, which reduces the energy crisis in Nepal.
43. Why should energy be conserved? Mention any two steps; you would take at home to conserve energy.
44. Why the development and use of alternative energy sources is necessary to increase in today's world?
45. Why is biofuel considered as alternative source of energy?
46. Nepal Government has given subsidy to the farmers for the development of bio gas plant, why? Write any two reasons.
47. Why is the present world deviating towards nuclear energy?
48. Tides occur during the full moon and new moon days. Why?
49. Which energy source is mostly used in the present world and why?
50. "There is possibility of energy crisis in the world, in near future." Justify with main two evidences.
51. The government of Nepal has been hiking the price of petroleum products from time to time. Suggest any two ways how hiking the price of petroleum products helps in pushing the problem of energy crisis further in to the future.
52. In the context of Nepal, both bio-fuel and solar energy are useful. Out of these two sources, which one will be more useful? Justify your answer with two reasons.
53. Write any two reasons that urbanization brings energy crisis.

Group C

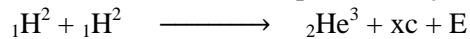
1. How is energy produced in the sun, describe briefly.
2. What is coal? Name three major types of coal.
3. Mention any three advantages of coal.
4. Mention any three advantages of fossil fuel.
5. What are the uses of fossil fuel?
6. How is hydroelectricity produced?
7. Write any three advantages of hydroelectricity.
8. Write down any three disadvantages of hydroelectricity.
9. Justify giving three reasons that the use of hydropower should be increased than that of fossil fuel energy.
10. Write any three differences between fossil fuel energy and alternative sources of energy.
11. How is electrical energy obtained from the geothermal energy? Explain.
12. Write any three causes of energy crisis.
13. Write any three ways to solve energy crisis?

Group D

1. A nuclear reaction is represented by the following equation:



- Name the process represented by this equation and describe what takes place in this reaction.
 - Identify the particle C and the number x of such particles produced in the reaction.
 - Name the installation where the above reaction is done.
 - What type of bomb is based on similar type of reactions?
2. A nuclear reaction is represented by the following equation:



- Name the process represented by the equation and describe what happens during this reaction.
- Identify the particle c and the number x of such particles produced in the reaction.
- What does E represented?
- State two conditions under which such a reaction takes place.
- What type of nuclear bomb is based on similar reactions?

Heat

Group A

1. Define heat on the basis of kinetic energy of molecules.
2. Write SI unit and CGS unit of heat.
3. Define temperature on the basis of kinetic theory of molecules. Write SI unit of temperature.
4. What is the normal temperature of a healthy human body? Write in Degree Fahrenheit and Degree Celsius.
5. What is the effect on the molecules of matter when the temperature is increased or decreased?
6. What is the relationship between the kinetic molecules (molecular vibration) of a body and its temperature?
7. On what two factors quantity of heat depends?
8. What is thermometer?
9. On which principle does thermometer work?
10. What is thermometric liquid?
11. Name any two liquids which are commonly used as thermometric liquid.
12. Write freezing point and boiling point of mercury and alcohol at normal pressure.
13. Write the three unit of measurement of the temperature.
14. What is clinical thermometer?
15. What is the range of Celsius scale in a clinical thermometer?
16. What is the range of Fahrenheit scale in a clinical thermometer?
17. What is digital and laboratory thermometer?
18. What is the range of Celsius scale in a laboratory thermometer?
19. What is maximum and minimum thermometer?
20. Name the two liquid used in maximum and minimum thermometer.
21. What is indicated by mercury tube and alcohol tube in a maximum and minimum thermometer?
22. What is specific heat capacity of a substance?
23. On what three factors rise in the temperature of a body on heating depends?
24. Which liquid has the highest specific heat capacity?
25. The specific heat capacity of water is $4200\text{J/kg}^\circ\text{C}$. What does it mean?
26. What is heat equation?
27. On what factors quantity of heat loss or gain by a body depends?
28. Write the relationship between heat gain or heat loss by a body with its mass.
29. Write the relationship between heat gain or heat loss by a body with its temperature.
30. How can the mercury of clinical thermometer be reset in the bulb?

Group B

1. Why do we wear warm clothes in winter?
2. When a red hot iron nail is dipped in cold water, the temperature of iron nail decreases but the temperature of water increases, why?
3. During high fever, a wet clean cloth is kept on the forehead of the patient, why?
4. Give reasons for using mercury in thermometer as thermometric liquid.
5. Give reasons for using alcohol in thermometer as thermometric liquid.
6. The boiling point of water cannot be measured with alcohol thermometer, why?
7. The specific heat capacity of different substance is different, why?
8. State any two practical applications of high specific heat capacity of water.
9. Write the cause that the night of desert is very cold and day is very hot.
10. When same mass of water and oil are heated with same amount of heat then temperature of oil raises quickly, why?
11. A metal chair is colder than wooden chair if it is kept outside in winter season, why?
12. Why does the climate around sea remain constant?
13. Why is water used in hot water bag?
14. Why is water used to cool hot engines of motor cars?
15. Why do animals curl in winter?
16. Why is bulb of clinical thermometer made of thin glass?
17. Why is there constriction made nearby the bulb of clinical thermometer?
18. It is given jerk before being used again of a clinical thermometer, why?

19. Why is there vacuum above the mercury in the capillary tube of a laboratory thermometer?
20. Why does the stem cause more severe burns than boiling water?
21. Why does water in an earthen pot cool in summer?
22. Two objects A and B have equal masses. But the object A has more specific heat capacity. Now, if both of them are provided with equal quantity of heat energy. Which one has more temperature, why?
23. An iron ball and a copper ball A and B respectively having temperature 200°C of equal masses are kept on a wax block. Which one makes a deeper hole and why? (Specific heat capacity of iron is $470\text{J/kg}^{\circ}\text{C}$ and that of copper is $380\text{J/kg}^{\circ}\text{C}$).
24. During winter season, we find the air of the bedroom cold as we get up from the bed but when we stroll sometimes in open air and return into the bedroom, the air of the same room is found warm, why?
25. Write any two differences between mercury containing clinical thermometer and digital thermometer.
26. Write any two differences between clinical thermometer and laboratory thermometer.

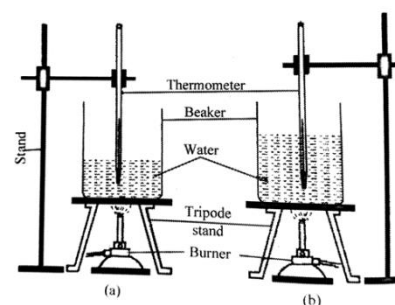
Numerical

1. A kettle contains 400gm of water at 20°C . How much heat is to be supplied in order to boil the water. Assume that the water boils at 100°C and kettle takes no heat. Specific heat capacity water is $4200\text{J/kg}^{\circ}\text{C}$. [Ans 134400J]
2. How much heat is required to raise the temperature of an aluminum kettle of mass 400gm through 90°C ? Specific heat capacity of aluminum is $899\text{J/kg}^{\circ}\text{C}$. [Ans 32364J]
3. If 600jule of heat is added to 20gm of water, what is the raise in temperature? [Ans 7.14°C]
4. Calculate the amount of heat to be taken out of a piece of hot iron block of mass 300gm to cool it from 300°C to 20°C ? Specific heat capacity of iron is $480\text{J/kg}^{\circ}\text{C}$. [Ans 40320J]
5. How much heat is required to raise the temperature of 150gm of iron from 25°C to 150°C . Specific heat capacity of iron is $480\text{J/kg}^{\circ}\text{C}$. [Ans 9000J]
6. A frying pan of 2.5 kg has a temperature of 40°C . The specific heat capacity of alloy of pan is $1000\text{J/kg}^{\circ}\text{C}$, what will be its final temperature when 4500J heat energy is supplied to it. [Ans 41.8°C]
7. Calculate the specific heat capacity of the alloy of which a pressure cooker of mass 1.5kg is made if quantity of heat necessary to raise its temperature by 60°C is 81KJ . [Ans $900\text{J/kg}^{\circ}\text{C}$]
8. Hot water of mass 10kg at 90°C is cooled for taking bath by mixing 20kg of water at 20°C . What is the final temperature of the water? [Ans 43.33°C]
9. What amount of heat energy should be supplied to increase 15°C temperature of 5kg silver having specific heat capacity $234\text{J/kg}^{\circ}\text{C}$? If the same amount of heat is supplied in 5kg steel of specific heat capacity $447\text{J/kg}^{\circ}\text{C}$ then what is the change in temperature. [Ans 7.85°C]
10. One kilogram of paraffin requires 44000J heat to raise its temperature by 20°C . Find the amount of heat energy required to raise the temperature of 5kg paraffin by 10°C . [Ans $1.1 \times 10^5\text{J}$]

Group D

1. Describe the working mechanism of maximum and minimum thermometer with diagram.
2. Specific heat capacities of three different substances are given in the table below. Answer the following questions on the basis of the table.
 - a. The specific heat capacity of substance 'C' is $470\text{J/kg}^{\circ}\text{C}$. What does it mean?
 - b. If equal heat is given to equal masses of the three substances. Which one will have the lowest temperature? Why?
 - c. Which substance will gain more temperature while heating equal mass of all three substances with equal amount of heat? Why?
 - d. Which substance will penetrate to the greatest depth if each with equal mass is put on a wax slab after heating to 100°C each? Why?
3. Study the given diagram and answer the following questions:
 - a. Which container has more temperature, if equal amount of heat is supplied to the both in equal time and why?
 - b. Which one will have more heat energy, if equal amount of water is taken separately in two test tubes from both beakers and why?
 - c. Which one has higher amount quantity of heat if both have 100°C temperatures and why?

Metals	Specific heat capacities
A	$910\text{J/kg}^{\circ}\text{C}$
B	$380\text{J/kg}^{\circ}\text{C}$
C	$470\text{J/kg}^{\circ}\text{C}$



Light

Group A

1. What is lens?
2. How many types of lens are there? What are they?
3. What is convex lens?
4. What is concave lens?
5. Define the following terms.
 - a. Centre of curvature.
 - b. Principal axis.
 - c. Optical centre.
 - d. Principal focus.
 - e. Focusing.
 - f. real image.
 - g. virtual image
6. Name the type of lens which forms a real image.
7. What is the relationship between thickness of lens and focal length?
8. What happens to the ray of light passing through the optical centre of a lens?
9. What is meant by defect of vision? Name its types.
10. What is meant by myopia or short-sightedness?
11. What is meant by hypermetropia or long-sightedness?
12. Define the power of lens.
13. What is magnification of a lens?
14. Write down the formula of the power and magnification of lens.
15. Write down the SI unit of power of lens.
16. Write any two uses of convex lens.
17. What is the relationship between power of lens and focal length?
18. What is the power of lens of one Dioptre?
19. The magnification of a lens is 1, what does it mean?
20. The magnification of a lens is less than 1, what does it mean?
21. In which point the object should be kept in front of the convex lens to have magnification 1, more than 1 and less than one?
22. What is near point?
23. What is distance of distinct vision?

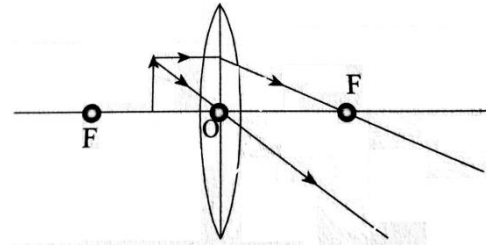
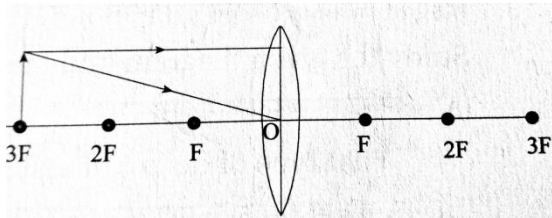
Group B

1. Write two differences between convex lens and concave lens.
2. Write two differences between real image and virtual image.
3. Write two differences between image formed by convex lens and concave lens.
4. Write two differences between myopia and hypermetropia.
5. Draw a neat diagram showing short-sightedness defect.
6. Draw a neat diagram showing long-sightedness defect.
7. Draw a neat diagram showing correction of short-sightedness defect.
8. Draw a neat diagram showing correction of long-sightedness defect.
9. Which lens is used to remove short-sightedness defect? Why?
10. Which lens is used to remove long-sightedness defect? Why?
11. Why is convex lens called a converging lens?
12. Why is concave lens called a diverging lens?
13. How does convex lens make the enlarged and erect image of an object? Show by drawing ray diagram.
14. What is the focal length of a lens having power 1 dioptre? What type of lens is it?
15. The power of a lens is +5D. What is the nature and focal length of the lens?
16. The power of a lens is -5D. What is the nature and focal length of the lens?
17. A man uses spectacles of power +3D. Calculate the focal length of the lens. What type of defect of vision is he suffering from?

Group C

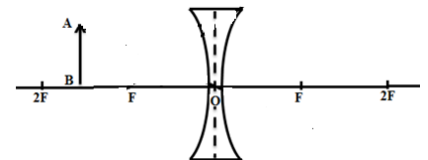
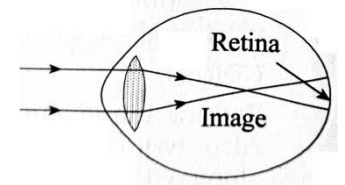
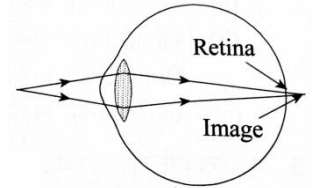
1. Draw a clear ray diagram of the image formed when an object is placed 40 cm away from a lens having focal length 20cm. Calculate the magnification.
2. A student of the last bench of a class cannot read the letters written on the board. Which type of defect of eye does s/he have? Draw a figure showing such type of vision. Write any two causes of this defect.
3. After examine the eye of a student, a doctor suggested him to use spectacles of power 1.5D.
 - a. What type of defect is there in his eye?
 - b. Draw a diagram to show the correction of this defect after using the spectacles.

4. Complete the following ray diagrams and write any three natures of the image formed by each.



Group D

- Study the given diagram and answer the following questions.
 - Name the defect of vision shown.
 - Write two causes of this defect.
 - Redraw the diagram showing its correction.
- Study the given diagram and answer the following questions.
 - Name the defect of vision shown.
 - Write two causes of this defect.
 - Redraw the diagram showing its correction.
- An object is placed at twice the distance of its focal length. If the focal length of the convex lens is 3cm then;
 - Draw a clear ray diagram to show the formation of image.
 - Write the natures of the image formed.
 - Calculate the magnification of the lens.
 - What is the power of the lens?
- A burning candle is placed at the distance of 3cm far from a convex lens having the focal length of 2cm. draw a ray diagram to show the formation of image. Write two natures of the image formed. Find the magnification of the lens and also find the power of the lens
- Study the given diagram and answer the following questions.
 - Complete the given ray diagram.
 - Write down the natures of the image formed.
 - For which defect of vision such lens is used?
 - Draw a diagram showing the correction of this defect.



Electricity and Magnetism

Group A

1. Write a special feature of alternating current.
2. What is heating effect of current electricity?
3. What is heating element? Which material is used to make heating element?
4. Write two characteristics of nichrome wire.
5. What is filament? Which material is used as a filament?
6. What is meant by lightning effect of current electricity?
7. How much electric energy is converted into light energy by filament lamp?
8. Write one function of fluorescent powder used in fluorescent lamp.
9. Write one function of mercury vapour used in fluorescent lamp.
10. What is the full form of CFL.
11. How does the use of CFL bulbs minimize load shedding?
12. What is meant by magnetic effect of current electricity? Who discovered it?
13. What is electromagnet?
14. Write down any three characteristics of an electromagnet.
15. Define solenoid.
16. What is electromagnetic induction? Write its one application.
17. Write any two appliances which produce electricity on the basis of electromagnetic induction.
18. What is meant by magnetic flux?
19. What is generator? On which principle does it work?
20. Write a difference between the electricity generating by generator and cell.
21. What is motor effect of electricity?
22. Name two devices which are based on motor effect.
23. What is meant by electric motor? In which principle does it work?
24. Which principle is dynamo based on?
25. State the relation between induced emf and the rate of change of flux in a bicycle dynamo.
26. How does a generator produce electricity?
27. What is inverter?
28. How does inverter work?
29. What is battery charger?
30. What is solar battery?
31. What is adapter?
32. What is transformer? On which principle does it based?
33. Name the types of transformer.
34. State the uses of transformer.
35. What is step up transformer?
36. The voltage of which type of current is changed by a transformer?
37. Name the type of transformer, which is used to play a radio with 12 volts in the electric circuit of 220 volts.
38. Which coil has greater number of winding in a step up transformer?
39. What is used to laminate the core of transformer?
40. Write down the relation to calculate the number of turns and voltage in a transformer.
41. What types of transformer is used in hydropower stations and substations.

Group B

1. Write any two differences between AC and DC.
2. What are the effects of current electricity?
3. Draw a labeled diagram of filament lamp.
4. Write two differences between fluorescent lamps filament lamps.
5. Write any two differences between tungsten and nichrome.
6. What happens when oxygen gas is used in filament bulb?
7. The use of electromagnet is increasing, give two reasons.
8. Nichrome wire is used as a heating element in a heater, why?

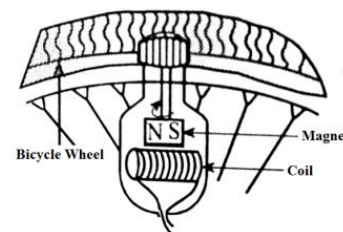
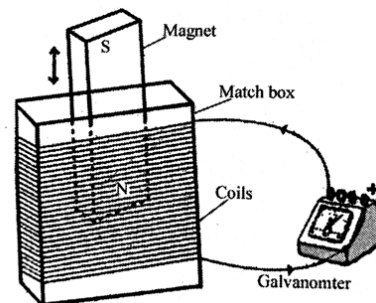
9. Why the filament in a bulb is made from the tungsten metal?
10. Generally what type of wire is used in an electric heater? Why?
11. What are the two reasons that fluorescent lamp is more useful than filament lamp although it is expensive.
12. Argon or nitrogen gas is filled in an electric bulb, why?
13. Write down one reason of not using tungsten metal wire in heater.
14. Write any two differences between generator and electric motor.
15. Write any three ways of increasing strength of an electromagnet.
16. What happens if nichrome wire in an electric heater is replaced by a copper wire of the same size?
17. Write any two reasons of using tungsten metal as a filament in electric bulb.
18. The fluorescent lamp with power 60 watt gives more brightness than the filament lamp with the same power, why?
19. When electric current is passed through a filament, it glows with brightness but it does not happen in other wires, why?
20. The tube of fluorescent lamp is filled with mercury vapour, why?
21. Can we use nichrome wire in an electric bulb? Give reason.
22. Write down three uses of an electromagnet.
23. Write any two differences between dynamo and generator.
24. Write any two differences between electric motor and dynamo.
25. Write any two functions of an adapter.
26. Write any two differences between a solar battery and an adapter?
27. Lamp is lit in the running bicycle by the help of dynamo, but it goes off when bicycle is stopped. Explain with reason.
28. Naked wire is used to make an electromagnet, why?
29. What happens when alternating current is passed into the coil of dynamo? Why?
30. What happens to the magnitude of the induced emf in an electric generator if the speed of rotation is doubled? Why?
31. A coil made of insulated copper wire is connected to a galvanometer. What will happen to the deflection of the galvanometer if this coil is moved towards a stationary bar magnet and then moved away from it? Give reason. Name the phenomenon involved.
32. What is meant by step down transformer? Draw a labeled diagram.
33. State any two differences between a step up and a step down transformer.
34. Write any two differences between step up and a step down transformer on the basis of primary and secondary coil.
35. Why is the core of transformer laminated?
36. The coil of transformer is coated with enamel, why?
37. "The use of alternating current would be limited, if transformer was not invented." Prove the statement with two clues.
38. The number of turns of primary coil and secondary coil are never made equal in a transformer. Why?
39. Which type of transformer is used in a power house before the supply of alternating current to different place? Why?
40. In step up transformer the primary coil is made of a thick wire with small number of turns, whereas the secondary coil is made of thin wires with large number of turns, why?
41. Soft iron core is used in transformer, why?
42. Transformer is not used to change the emf of dry cell or battery, why?
43. Can transformer change the voltage of direct current? Why?
44. Some electric devices like television, computer is provided with a transformer in it. Why? What may be the type of such transformer?

Group C

1. How does a bicycle dynamo work? Explain in brief with labeled diagram.
2. Draw a labeled diagram of an electric bell. How does it work explain in brief.
3. How is the electric current induced in the secondary coil of the transformer?
4. Write any three ways of increasing electricity produced from a generator or a dynamo.

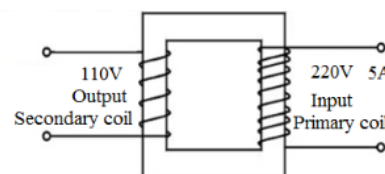
Group D

- Study the given diagram and answer the following questions:
 - What happens to the needle of the galvanometer as the magnet is moved in?
 - Does the needle deflect in the same direction as before even after the magnet is moved out?
 - Why does the needle of the galvanometer deflects as the magnet is moved in and out?
 - Name the phenomena involved?
- Study the given diagram and answer the following questions:
 - Name the devices shown in the diagram and write down its function.
 - On which principle does it work?
 - What changes in brightness occur if the speed of rotation of wheel of bicycle is decreased first and then increased?
 - Write any two methods by which we can increase the amount of current produced in it.
 - What happens if alternating current is passed into the coil of the given diagram?



Numerical problems

- A transformer is built to run a radio of 12V. What is the number of turns in secondary coil needed if the input voltage is 220V and the number of turns in primary coil is 660?
- A transformer has 220V primary voltage and 2000 turns of primary coils. How many turns of secondary coil will be needed to produce 45V secondary voltage?
- A transformer is of 220V primary voltage and 770 turns of primary coil. How many turns of secondary coil are necessary in order to produce 120 volt from that transformer?
- The number of turns in primary and secondary coil of a transformer are 1000 and 500 respectively. If the transformer is connected to 220V line, calculate the secondary voltage.
- From the given transformer, find out the value of output current? Which type of transformer is it? What will be the change in its function if input emf is supplied in place of output? [10A]
- In a transformer, the number of primary coil is three times greater than the secondary coil. If primary voltage is 220V, find out the secondary voltage. [73.33V]
- Calculate the output voltage obtained in a transformer if the number of turns in the secondary coil is 125 times more than that of primary coil. The primary voltage of the transformer is 220V. [27500V]
- The turn ratio of a transformer is 4:5. If 220V current is supplied to the transformer, calculate output voltage produced by it. [250V]
- If the ratio of primary coil and secondary coil in a transformer is 1:5, what kind of transformer is it? If the input voltage to that transformer is 110V, calculate the output voltage. [550V]
- Ten electric bulbs of 100 watt each and two electric heaters of 1000 watt each are used for 6 hours continuously. Calculate the unit of electricity consumed. [18 units]
- 10 electric bulbs of 100 watt are used for 6 hrs and 2 electric heaters of 2KW are used for 2hrs. Calculate the total consumption of electricity for a day. [14 unit]
- An electric heater draws a current of 10A from 220V supply. What is the electric cost of using the heater for 7 hours every day for one month? The rate of unit cost is 9. [Rs4158]
- An electric heater rated 220V and 2.2KW works for 3 hours. Find the energy consumed and the current drawn by it. [2.3×10^7 and 10A]



Classification of Elements

Group A

1. What is periodic table?
2. What is meant by group and period of the periodic table?
3. State Mendeleev's periodic law.
4. On what basis Mendeleev's periodic table was made?
5. In which periodic table elements are arranged on the basis of increasing atomic number?
6. Write any three importance and uses of modern periodic table.
7. State modern periodic law.
8. What is modern periodic table? Name the scientist who prepared modern periodic table.
9. On what basis elements are classified into different blocks in the modern periodic table?
10. How many groups and periods are there in the modern periodic table?
11. What is s-block element? Give an example.
12. What is meant by f- block elements?
13. In which period potassium and calcium lies in the periodic table?
14. In which group of the periodic table, halogens are placed?
15. What is meant by inert gases?
16. On which side of the periodic table will you find non-metals?
17. What is the name of those elements which divide metals and non-metals in the periodic table?
18. Name two elements that have a single electron in their outermost shells.
19. Name any two elements with completely filled outermost shells.
20. What are alkali metals?
21. What is meant by alkaline earth metals?
22. What is meant by halogens?
23. What is meant by transition element?
24. What are lanthanides? What is the position of lanthanides in the modern periodic table?
25. What are actinides? What is the position of actinides in the modern periodic table?
26. In what groups do magnesium and nitrogen belong in the modern periodic table?
27. How does the reactivity of alkali metals vary on going down in the group of the periodic table?
28. How does the reactivity of halogens vary on going down in the group of the periodic table?

Group B

1. In which periodic table elements are arranged on the basis of increasing atomic number? Write down any two characteristics of this table.
2. Mention any four demerits of Mendeleev's periodic table.
3. Why did Mendeleev leave gaps in his periodic table?
4. Name any three importance of modern periodic table.
5. Write any three characteristics of modern periodic table.
6. In what groups, noble gases, most reactive metals, most reactive non-metals and metalloids are placed?
7. Write any three differences between Mendeleev's periodic table and modern periodic table.
8. Write any two differences between p-block elements and d-block elements.
9. Modern periodic table is less defective than Mendeleev's periodic table, give two reasons.
10. Sodium is placed in the s- block of the modern periodic table, why?
11. On what factors the modern periodic table is different from that of Mendeleev's periodic table? Write any two causes.
12. In which group of the periodic table, halogens are placed and why?
13. What is meant by inert gases? Give any two examples.
14. What is chemical reactivity of elements? In which factors does it depend?
15. Write any two differences between group 1 and group 17 elements.
16. Why are group 17 elements called halogens?
17. What happens to atomic size of the elements as we move from left to right in a period of the periodic table?
18. Sodium is called metal, why?
19. Write any two reasons that hydrogen is kept in group 1 in periodic table?
20. Which is more reactive between Li and Na? Why?
21. Why do elements in a group show same valency?
22. Reactivity of metals goes on increasing while moving from top to bottom in a group. Why?
23. Reactivity of non-metals goes on decreasing while moving from top to bottom in a group. Why?
24. Which one is more reactive between fluorine and chlorine? Why?
25. Which one is more reactive between oxygen and sulphur? Why?
26. Which one is more reactive between calcium and magnesium? Why?
27. Which one is more reactive between potassium and calcium? Why?

28. Which one is more reactive between sodium and potassium? Why?
29. Mention the reasons of saying Helium and argon are inert gases.
30. Which one is more reactive between oxygen and nitrogen? Why?
31. Which one is more reactive between chlorine and nitrogen? Why?
32. d-block elements are called transition elements, why?
33. Why are lanthanides and actinides separated from the main periodic table?

Group C

1. In which group of modern periodic table, elements having atomic number 9 and 17 are belonged? Among these two elements, which is more reactive, why?
2. Reactivity of elements depends upon size of the atoms, but the reactivity of group 18 elements is not affected by their size, why?
3. Study the given table and answer the following questions;

Group A	Group B
H	F
Li	Cl
Na	Br
K	I

- a. Name the groups of the elements.
 - b. Give a reason for Li, Na and K belonging to the same group.
 - c. What is the difference in reactivity of elements moving down in both the groups? Why?
 - d. Give two reasons of placing hydrogen along with metals in this group.
 - e. Which element is the most reactive in group A among them? Give reason.
 - f. What is the number of valence electrons of each group?
 - g. What is the valency of the elements of each group?
 - h. Find whether they are metals or non-metals. Why?
4. A part of periodic table is shown in the given table. Study the table and answer the following questions;

Li	Be	B	C	N	O	F	Ne
Na	Mg	Al	Si	P	S	Cl	Ar

- a. On what basis, elements are arranged in this table?
 - b. Among sodium and aluminium, which one has a small size? And why?
 - c. Which one is more reactive in between Li and Na, and why?
 - d. Write down the group name of the first two and last two column of the table.
 - e. Write the chemical equation of the reaction between the most reactive metal and the most reactive non-metal given in the table.
 - f. Write the electronic configuration of the elements Mg and Cl.
5. Electronic configurations of two elements are given below. Give answers to the following questions;

Elements	Electronic configuration
A	$1s^2, 2s^2, 2p^5$
B	$1s^2, 2s^2, 2p^6, 3s^1$
C	$1s^2, 2s^2, 2p^6, 3s^2, 3p^5$
D	$1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^1$

- a. Write the name of the elements indicated by A, B, C and D.
- b. Write the blocks of the elements given in the table.
- c. Write the groups of the elements given in the table.
- d. Write the valency of each of the elements.
- e. Which element is more reactive between A and C? And why?
- f. Which element is more reactive between B and D? Why?
- g. Write the balanced chemical equation between B and C.
- h. Which of the elements are metals and non-metals? Classify them.

Chemical Reaction

Group A

1. What is a chemical reaction?
2. Define formula equation or chemical equation?
3. What is a balanced chemical equation?
4. What is a catalyst?
5. How many types of catalyst are there? What are they?
6. Define positive catalyst with one example?
7. Define negative catalyst with one example?
8. Give an example of chemical reaction which takes place in presence of heat, with the help of chemical equation.
9. Give an example of chemical reaction which takes place in presence of light, with the help of chemical equation.
10. Give an example of chemical reaction which takes place in presence of pressure, with the help of chemical equation.
11. Give an example of chemical reaction which takes place in presence of catalyst, with the help of chemical equation.
12. Give an example of chemical reaction which takes place in presence of solution, with the help of chemical equation.
13. Give an example of chemical reaction which takes place by the passage of electricity, with the help of chemical equation.
14. Define exothermic reaction with an example.
15. Define endothermic reaction with one example.
16. Define decomposition reaction.
17. What is displacement reaction?
18. What is acid base reaction?
19. What is meant by the rate of chemical reaction?
20. Write any two factors which affect the rate of chemical reaction.

Group B

1. Write any two differences between reactants and products.
2. Write any two differences between positive catalyst and negative catalyst.
3. Acid base reaction is also called neutralization reaction, why?
4. Give an example of combination reaction.
5. Give an example of decomposition reaction.
6. Give an example of displacement reaction.
7. Give an example of acid- base reaction.
8. Give an example of exothermic reaction.
9. Give an example of endothermic reaction.
10. Write a chemical reaction which is carried out by heat.
11. Write a chemical reaction which is carried out by light.
12. Write a chemical reaction which is carried out by catalyst.
13. Write a balanced chemical equation of combination reaction which is carried out by heat.
14. Write a balanced chemical equation of decomposition reaction which is carried out by light.
15. Write a balanced chemical equation of decomposition reaction which is carried out by electricity.
16. Write a balanced chemical equation of decomposition reaction which is carried out by catalyst.
17. Write a balanced chemical equation of decomposition reaction which is carried out by heat.
18. Write the chemical equation and the type of chemical reaction when a solution of sodium chloride is mixed with a solution of silver nitrate and a white precipitate of silver chloride is formed.
19. Why does the rate of chemical reaction increase on increasing the temperature of reactants?
20. Why does the rate of chemical reaction increase on increasing the concentration of reactants?
21. Why does the rate of chemical reaction increase on increasing the surface area of reactants?
22. How does the concentration of sodium thiosulphate affect the rate of reaction in between the hydrochloric acid and sodium thiosulphate?

23. Change the following word equations into balanced formula equations and also mention the type of reactions.
- Potassium chlorate \longrightarrow potassium chloride + oxygen
 - Sodium + chlorine \longrightarrow sodium chloride
 - Silver nitrate + calcium chloride \longrightarrow silver chloride + calcium nitrate
 - Sodium chloride \longrightarrow sodium + chlorine
 - Hydrogen peroxide \longrightarrow water + oxygen
 - Zinc + sulphuric acid \longrightarrow zinc sulphate + hydrogen
 - Hydrochloric acid + sodium hydroxide \longrightarrow sodium chloride + water
 - Sulphuric acid + calcium hydroxide \longrightarrow sodium nitrate + water
 - Nitric acid + sodium hydroxide \longrightarrow sodium nitrate + water
 - Calcium + oxygen \longrightarrow calcium oxide

Group C

- Two chemical substances A and B when mixed at room temperature react very slowly. Suggest two different ways of increasing the rate of this reaction.
- It is observed that the rates of reactions of equal weights of marble pieces (CaCO_3) and powdered marble with dil. Hydrochloric acid are not same. Which reaction takes place faster? Give reasons for the difference in the two rates of reaction.
- What happens when, write with balanced chemical equation.
 - Magnesium is burnt in air.
 - Sodium hydroxide is kept in a beaker containing sulphuric acid.
 - Calcium carbonate is reacted with hydrochloric acid.

Group D

- Explain with example the rate of chemical reaction increases with increase the concentration of reactants.
- Explain with example the more reactive element displaces less reactive element during chemical reaction.
- Explain with example the rate of chemical reaction increases with increase the surface area of reactants.
- Explain with example the rate of chemical reaction increases with increase the temperature of reactants.

Acid, Base and Salt

Group A

1. Define acid. Write any one example.
2. What is strong acid? Write one example.
3. How organic acid differs from inorganic acid.
4. Name any one acid, which is used to manufacture chemical fertilizer.
5. Write the name of acids found in lime and tomato.
6. Write the name of acids found in sour milk and grapes.
7. Write any two uses of acids in our daily life.
8. What is meant by inorganic acid? Give two examples.
9. Write one use of each of following; a. carbonic acid b. acetic acid
10. Write two examples of two strong acids.
11. Which acids are used in soft drinks like soda water, Coca-Cola, etc?
12. Which ions are produced when sulphuric acid is mixed with water? Write with chemical equation.
13. Define base with an example.
14. Write any two methods to test alkali.
15. Write the ions formed in aqueous sodium hydroxide.
16. Write down a name of alkali which is used to balance the p^H of human stomach.
17. What is neutralization reaction?
18. Write two examples of weak bases.
19. Write two examples of strong bases.
20. Write any two bases which are used in our daily life.
21. Write one use of each of the following; a. calcium hydroxide b. ammonium hydroxide
22. What is salt? Give an example.
23. Write one use of each of the following salts; a. copper sulphate b. common salt
24. Write the name and molecular formula of a neutral salt.
25. Which salt is used in manufacture of chemical fertilizer?
26. What is meant by acidic salt? Give an example.
27. What is meant by basic salt? Give an example.
28. Which salt is used in manufacture of soap?

Group B

1. Write any two differences between organic acids and inorganic acids.
2. The taste of acids is sour, why?
3. Hydrochloric acid is kept in plastic of glass bottle but not in metallic, why?
4. Sulphuric acid is also called king of chemicals, why?
5. HCl is called acid, why?
6. Explain why water can be considered as an acid as well as base?
7. Why can't pickles be stored in metal vessels?
8. Write any two differences between acids and bases.
9. Acetic acid is a weak acid, why?
10. Write any two properties of acids.
11. Name the compound which gives hydrogen and sulphate ions in solution. Write down the balanced chemical equation of the chemical reaction occurred when above compound is treated with sodium hydroxide.
12. What happens when;
 - a. Hydrochloric acid reacts with sodium carbonate.
 - b. Sulphuric acid reacts with magnesium.
 - c. Hydrochloric acid reacts with potassium hydroxide.
 - d. Calcium hydroxide reacts with carbon dioxide.
 - e. Calcium hydroxide reacts with ammonium chloride.
13. All alkalis are bases but all the bases are not alkalis. Justify it.
14. Write any two properties of bases.
15. Ammonium hydroxide solution is called weak alkali. Give reason.
16. How is alkali made from magnesium ribbon? Write with balanced chemical equation.
17. Write the product of the reaction between acid and base with suitable example.
18. Write two application of neutralization reaction.
19. Sodium carbonate is basic salt, why?
20. NaCl is a neutral salt. Justify your answer.
21. NaHSO₄ is an acidic salt. Give reason.

Group C

1. Give the balanced chemical equation of the reaction between strong base and weak acid, and also mention the type of salt obtained in the reaction.
2. What type of salt is formed when strong acid reacts with weak base? Write molecular formula of any such salt.
3. How is neutral salt formed? Write with chemical equation.
4. Write any three chemical properties of base.
5. Write any three properties of acids.

Group D

1. A compound gives hydrogen ion and chlorine ion in the solution state,
 - a. Write down the name and molecular formula of the compound.
 - b. In what colour is methyl orange and phenolphthalein changed when treated with above compound?
 - c. Write down the name of salt formed by the chemical reaction of the compound with Ca(OH)_2 . Write with chemical equation.

Some Gases

Group A

1. Name the chemicals required for the preparation of carbon dioxide gas in the laboratory.
2. What is dry ice?
3. Write any two uses of dry ice.
4. What is carbogene? Write one of it.
5. Name the product of the reaction between carbon and burning magnesium.
6. Name the chemical used in the laboratory preparation to obtain dry ammonia.
7. Ammonia turns red litmus to blue. What does it show?
8. The mixture of carbon dioxide gas and water is sour in taste. What does it show?
9. Which gas is obtained when the mixture of ammonium chloride and calcium hydroxide is heated?
10. Which gas is used to turn blue print?
11. Name the two chemicals that are required to prepare ammonia gas in the laboratory.

Group B

1. Carbon dioxide gas is not collected over water, why?
2. Write any two physical properties of carbon dioxide gas.
3. Write any two chemical properties of carbon dioxide gas.
4. Write any two uses of carbon dioxide gas.
5. Write any two physical properties of ammonia gas.
6. Write any two chemical properties of ammonia gas.
7. Write any two uses of ammonia gas.
8. Carbon dioxide gas is collected by upward displacement of air, why?
9. The mixture of water and carbon dioxide is sour, why?
10. Why is carbon dioxide mostly found in deep wells, caves and mines?
11. Sulphuric acid is not used in the laboratory preparation of carbon dioxide from calcium carbonate, why?
12. Why is ammonia not collected by downward displacement of air?
13. How will you prepare carbon dioxide gas on industrial scale?

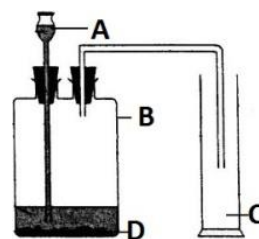
Group C

1. How does carbon dioxide gas act as a fire extinguisher? Write.
2. How will you prepare ammonia on a large scale?
3. Write the conditions required for the formation of ammonia gas by Haber's process.
4. What happens when, write with chemical equations.
 - a. Ammonium hydroxide is treated with dilute sulphuric acid?
 - b. A glass rod dipped in hydrochloric acid is introduced in a jar containing ammonia gas?
 - c. Ammonia dissolves in water.
 - d. Ammonia reacts with sulphuric acid.
 - e. Ammonia reacts with nitric acid.
 - f. Ammonia reacts with carbon dioxide at high temperature and low pressure.
 - g. Limestone is treated with hydrochloric acid.
 - h. Quicklime dissolves in water?
 - i. Methane is burnt in air.
 - j. Carbon dioxide dissolves in water.
 - k. Calcium bicarbonate is heated.
 - l. Carbon dioxide gas is passed through lime water for short time.
 - m. Carbon dioxide gas is passed through lime water for long time.
 - n. Charcoal burns in air.
 - o. Red hot coke is reacted with carbon dioxide at 900°C .

Group D

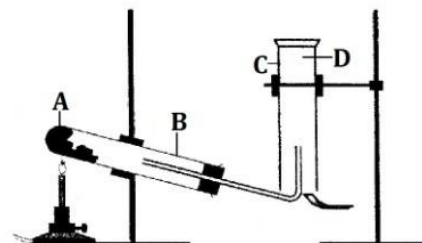
1. Answer the following questions with the help of the given diagram.

- Which gas preparation does the given diagram show?
- Write down the balanced chemical equation involved in it.
- Name the chemical compound formed, when the gas is dissolved in water. Write the balanced chemical equation of it.
- What happens when the gas is passed through lime water for short time? Also write the balanced chemical equation.
- Why this gas cannot be collected by downward displacement of water?
- What happens when a burning magnesium ribbon is inserted in to the jar containing this gas?
- What happens when dilute sulphuric acid is used instead of dilute hydrochloric acid in the experiment? Why?
- How do you find out whether the gas jar is full of not?
- What happens when the end of delivery tube is dipped into the liquid in woulf's bottle?



2. Study the adjoining figure and answer the following questions;

- Which gas preparation does the given diagram show?
- What type of odour does it have?
- Write down the balanced chemical equation involved in it.
- Name the chemical compound formed, when the gas is dissolved in water. Write the balanced chemical equation of it.
- Why is this gas not collected over water?
- How do you find out whether the gas jar is full of not?
- The mouth of hard glass test tube is inclined downward during the preparation of the gas, why?



Metals

Group A

1. What is metal?
2. Define mineral and ores.
3. Write the symbol, atomic number, atomic weight, electronic configuration and valency of iron.
4. In what group, period and block iron lies in the periodic table.
5. Write the names of ores of iron.
6. Write the symbol, atomic number, atomic weight, electronic configuration and valency of aluminium.
7. In what group, period and block aluminium is placed in the periodic table.
8. Write the main important ores of aluminium.
9. By which properties of aluminium it is used to make electric cable.
10. Write the symbol, atomic number, atomic weight, electronic configuration and valency of copper.
11. In what group, period and block copper is placed in periodic table.
12. Write the name of important ores of copper.
13. State any two properties of copper that makes it suitable for making pots and pans.
14. Write the symbol, atomic number, atomic weight, electronic configuration and valency of silver.
15. In what group, period and block silver is placed in periodic table.
16. Write two important ores of silver.
17. Write the symbol, atomic number, atomic weight, electronic configuration and valency of gold.
18. In what group, period and block gold is placed in periodic table.
19. Write two important ores of gold.
20. What is an alloy?
21. From what metals brass is made up of?
22. Write two uses of brass.
23. Write two uses of german silver.
24. Write two uses of bronze.
25. Write two uses of gun metal.
26. Which metals are extracted from the following ores;
Haematite, Copper pyrite (chalcopyrite), magnetite, alluvial soil, feldspar, Calaverite, iron pyrite, siderite, Bauxite, cryolite, kaolin, silver copper glance, copper glance (chalcocite), cuprite, Silver glance (argentite), horn silver, and quartz veins (reef gold).

Group B

1. Why are metals electropositive?
2. Arrange iron, gold, silver, copper, and aluminium in the increasing order of their melting points.
3. Iron is not found in free state, why?
4. Aluminium is widely used for making cooking vessels, like pressure cookers. Give reasons.
5. External cover of the aeroplane is made from aluminium instead of iron. Give two reasons.
6. Gold is found in native state (free state), why?

Group C

1. Write any three physical properties of iron.
2. Write any three physical properties of aluminium.
3. Write any three physical properties of copper.
4. Write any three physical properties of silver.
5. Write any three physical properties of gold.
6. Write any three uses of iron.
7. Write any three uses of aluminium.
8. Write any three uses of copper.
9. Write any three uses of silver.
10. Write any three uses of gold.

Hydrocarbon and Its Compounds

Group A

1. What is hydrocarbon? Give two examples.
2. What is the general name given to all compounds containing only carbon and hydrogen?
3. What is homologous series?
4. What is functional group?
5. Define isomers and isomerism.
6. What does IUPAC stand for?
7. How many types of hydrocarbons are there? Name them.
8. What are alkanes or saturated hydrocarbon?
9. What is unsaturated hydrocarbon?
10. Write down the molecular formula, condensed formula and structural formula of:
Methane, Ethane, Propane, Ethene, Propene, Butene, Acetylene, Propyne, Methyl alcohol, Ethyl alcohol, Glycerol.
11. Write the IUPAC name of the propylene and acetylene.
12. Write the full form of LPG.
13. What are alcohols?
14. What is alkene? Give two examples.
15. What is alkyne? Give two examples.
16. Define monohydric, dihydric and trihydric alcohol with suitable example.
17. What is alkyl radical?
18. What is IUPAC name methyl and ethyl alcohol?
19. What is glycerol? Write the molecular formula of it.
20. Write the IUPAC name of glycerol.
21. What is glucose?
22. Write the full form of ATP.
23. Write the general formula of alkane, alkene and alkyne.

Group B

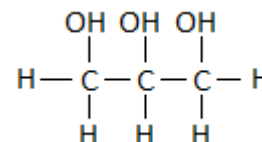
1. Write any two characteristics of homologous series.
2. Why is alkane also called paraffin?
3. Why is propane called saturated hydrocarbon?
4. Why is ethylene called unsaturated hydrocarbon?
5. Alkene is also called olefins, why?
6. Methane is also called marshy gas, why?
7. Write any two physical properties of methane.
8. Write any two physical properties of ethane.
9. Write any two physical properties of propane.
10. Write any two physical properties of butane.
11. Write any two uses of methane.
12. Write any two uses of ethane.
13. Write any two uses of propane.
14. Write any two uses of butane.
15. Write any two importance of glucose in human body.
16. Why is glucose also called dextrose?
17. Write an effect seen due to increasing or decreasing of glucose in human body.
18. Write two properties of isomers compound.
19. Write down the structural formula of n-butane and iso-butane.
20. Why is the bond between carbon and carbon weak in acetylene?
21. Write any three differences between saturated and unsaturated hydrocarbon.
22. Write three examples of different hydrocarbons having two carbon atoms with their name and structural formulae.
23. Write the name and structural formula of three hydrocarbons which has three carbon atoms.
24. Write down the structural formula and one use of an alkane which has three carbon atoms.
25. Write down the structural formula and one use of an alkane which has four carbon atoms.
26. Write down the structural formula and one use of an alkane which has a carbon atom.

27. Write down the structural formula and one use of an alkane which has two carbon atoms.
28. Write down the structural formula and one use of an monohydric alcohol which has two carbon atoms.
29. Write down the structural formula and one use of a monohydric alcohol which has one carbon atom.
30. Write down the structural formula and one use of a hydrocarbon compound formed by replacement of all the hydroxyl groups of glycerol by hydrogen atoms.
31. Write down the structural formula and one use of hydrocarbon compound formed by reaction of plenty of hydrogen with acetylene.
32. Write down the structural formula and one use of hydrocarbon compound formed by reaction of plenty of hydrogen with propene.
33. Write down the structural formula and one use of trihydric alcohol.

Group C

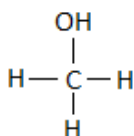
1. Study the given structural formula and answer the following questions.

- a. Name the compound and its two uses.
- b. Which compound is formed if all 'OH' groups are replaced by 'H'?
- c. Give the molecular formula and a use of the compound thus formed.

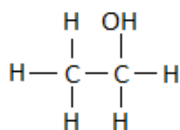


2. Write the name of compound and its structural formula which is formed by the displacement of three hydrogen atoms with three hydroxide radicals from propane through various chemical reactions. write any two uses of it.
3. Name the given organic compounds and mention any two uses of each.

a.

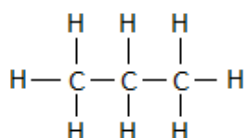


b.



4. What are the compounds of the following structural formula? Write the type of hydrocarbon on the basis of the bond. Write the general formula of each.

a.



b.



Materials Used In Daily Life

Group A

1. What is cement?
2. Write the name of compounds found in cement?
3. What are the raw materials required for the preparation of cement?
4. What is mortar?
5. What PCC (Plain Cement Concrete)?
6. What is RCC? Write its full form also.
7. Define cement clinker and slurry.
8. Write the importance of gypsum in cement.
9. What is glass?
10. What is quartz glass and borosilicate glass?
11. How is coloured glass prepared?
12. What happens when a little amount of lead monoxide is added before heating the ingredients of soda glass (ordinary glass)?
13. What happens when a little amount of boric oxide is added before heating the ingredients of ordinary glass?
14. How is quartz glass prepared?
15. How is water glass prepared?
16. How is ordinary glass prepared?
17. How is hard glass prepared?
18. How is borosilicate glass prepared?
19. How is lead crystal glass prepared?
20. Write any two uses of silica glass.
21. Write any two uses of soft glass.
22. Write any two uses of potash lime glass.
23. Write any two uses of Pyrex glass.
24. Write any two uses of flint glass.
25. How is glass made in blue colour?
26. How is glass made in black colour?
27. How is glass made in purple colour?
28. How is glass made in red colour?
29. How is glass made in yellow colour?
30. What is ceramics?
31. What is to be done to remove the pores present in the newly prepared ceramics materials?
32. What is kaolin?
33. What is glazing?
34. Why is fine salt powder sprayed over hot ceramics?
35. What is plastic?
36. Define polymer and monomer?
37. What is polymerization?
38. What is Bakelite?
39. Name two chemicals used in the preparation of Bakelite.
40. What are the types of plastics?
41. What is thermoplastic?
42. What is thermosetting plastic?
43. Give two examples of thermosetting plastics.
44. Give two examples of thermoplastic.
45. Write any two uses of polythene.
46. What is soap?
47. Give two examples of soap with chemical formulae.
48. What are the raw materials used to prepare soap?
49. What is saponification?
50. What is detergent?

51. Give any two examples of detergent?
52. What are fertilizers?
53. What is chemical fertilizer?
54. Name any two fertilizers that contain nitrogen, phosphorous and potassium.
55. What is organic fertilizer?
56. What is NPK fertilizer?
57. What are single fertilizer and mixed fertilizer?
58. What are insecticides?
59. What are the types of insecticides?
60. Give two examples of organic-chlorine insecticides.
61. Give two examples of organic-phosphate insecticides.
62. Give two examples of carbamate insecticides.
63. Name the industrial chemicals formed by the following mixture.
 - a. Silica and sodium carbonate.
 - b. Fatty acid and caustic soda.
 - c. Limestone and special type of clay
 - d. Silica, lead oxide and potassium carbonate.
64. Why are the following chemicals added to make following materials:
 - a. Gypsum in cement.
 - b. Lead monoxide in ordinary glass.
 - c. Boric oxide in ordinary glass.
 - d. Cupric oxide in ordinary glass.
 - e. Metallic oxide in ordinary glass.
 - f. Salt in hot ceramics.
65. The names of some chemicals of daily use are given below. Write for what purpose these chemicals are used.
Ammonium nitrate, sodium silicate, polythene, sodium lauryl sulphate and sodium stearate.
66. What is chemical pollution?
67. What is solid waste?
68. What is biodegradable solid waste?
69. What is non-biodegradable solid waste?
70. What is incineration?

Group B

1. Write any two properties of ceramics?
2. Why is glass called super cooled liquid?
3. Why is sodium silicate glass often called water glass?
4. Write any two properties of glass.
5. Ordinary glass is also called soft glass, why?
6. Accurate volume measuring devices are generally made from borosilicate glass. Why?
7. Lens, prism and glass slab are made up of lead crystal glass. Why?
8. Give reason why laboratory equipment is usually made from borosilicate glass.
9. Why is hard glass often called potash lime glass?
10. Write any two advantages of use of plastics.
11. Write any two disadvantages of use of plastics.
12. Why are plastic considered as the major cause of chemical pollution? Give two reasons.
13. Why can thermoplastics be remoulded?
14. Write two characteristics of Bakelite.
15. Write any two reasons for the widely use of plastics in today's world.
16. Pouches of milk and biscuits are made from plastics. Give two reasons.
17. Write any two differences between thermoplastics and thermosetting plastics.
18. Write any two differences between PVC and Bakelite.
19. Why detergents are better than soap? Write two reasons.
20. Write two differences between soap and detergent.
21. Why is detergent called soapless soap?

22. Write two importance of nitrogen to the plants.
23. Write two importance of phosphorous to the plants.
24. Write two importance of potassium to the plants.
25. Write any two effects seen due to deficiency of nitrogen to the plants.
26. Write any two effects seen due to deficiency of phosphorous to the plants.
27. Write any two effects seen due to deficiency of potassium to the plants.
28. Write two differences between organic fertilizers and chemical fertilizers.
29. Write any two reasons to justify that the compost fertilizer is better than chemical fertilizer.

Group C

1. Write any three uses of ceramics.
2. Which glass is formed if the mixture of silica and sodium carbonate is heated? Write its one special property and one use.
3. How is water glass prepared? Write with chemical equation.
4. Which glass is formed if the mixture of silica and potassium carbonate is heated? Write its one special property and two uses.
5. The government of Nepal encourages farmers to use compost manure rather than chemical fertilizers. Write any three reasons.
6. Write any three ways to get rid of chemical pollution.

Group D

1. How is cement prepared? Write with chemical equation.
2. How is soap prepared? Write with chemical equation.
3. How does environment get polluted from different chemicals used in our daily life? Write any four of them.
4. How can the solid waste be managed?

Invertebrates

Group A

1. How many types of honey bees are there in beehive? Name them.
2. Name the types of honey bee found in Nepal.
3. What is the rearing of honey bee called?
4. What is the major function of queen bee?
5. What is the major function of Drone bee?
6. Write any two functions of worker bee.
7. Write two major characteristics of Queen bee.
8. Write any two characteristics of Drone bee.
9. Write any two characteristics of worker bee.
10. Name the stages of life cycle of honey bee.
11. Where does a queen bee lay eggs?
12. Where do queen and drone bee perform the matting?
13. How many days do the eggs of honey bee need to hatch out larvae?
14. What is meant by nuptial or matting flight?
15. Write any one characteristics of the pupa stage of honey bee.
16. Which types of honey bees have stingers?
17. What is the average life span of queen bee, drone bee and worker bee?
18. In which stage of life cycle, honey bee does not take food?
19. Which stage of the life cycle of honey bee is called an inactive stage?
20. What type of bee is developed when the larval stage of bee is fed only with nutritious substances called royal jelly?

Group B

21. Write any three importance of honey bee.
22. Write any three uses or advantages of honey.
23. Why is honey bee called social insect?
24. Honey bee is a very useful insect to human beings, why?
25. Write any two differences between drone bee and worker bee.
26. Why is pupa stage of honey bee called an inactive stage?
27. Honey bees play a vital role in pollination, how?

Group C

28. Describe the body structure of Drone bee with diagram.
29. Describe the body structure of worker bee with diagram.
30. Describe the body structure of queen bee with diagram.
31. Describe the life cycle of honey bee with diagram.

Silkworm

Group A

1. Name the type of silkworms cultivated in Nepal?
2. What is the food for silkworm?
3. Name the silkworm that is fed on mulberry leaves.
4. What is sericulture?
5. In normal condition, how many days it takes to complete the life cycle of silkworm?
6. Name the stages of lifecycle of silkworm.
7. Where does a silkworm lay eggs?
8. Where do silkworms perform the matting?
9. How many days do the eggs of silkworm need to hatch out larvae?
10. Write any two characteristics found in larval stage of silkworm?
11. What does silkworm larva feed on?
12. What is the larva of silkworm called?
13. How many times does the silkworm larva moult?
14. At which stage of the life cycle of silkworm, it produces silk fibers?
15. At which stages of the larva are the silk fibers produced?
16. Write any two characteristics of the pupal stage of a silkworm.
17. What is metamorphosis?
18. What is cocoon?
19. In which stage of the life cycle of silkworm, it does not take food?
20. What is the covering of pupa called?

Group B

21. State any three importance of silkworm.
22. Write any three characteristics of silk thread.
23. How is cocoon formed? Explain in brief.
24. Which stage of the life cycle of silkworm is called an inactive stage? Why?
25. Why is silkworm called useful insect?
26. Why are the eggs of silkworm kept in a cool place for many days?
27. How is silk extracted from cocoon? Explain in brief.
28. Why are silk cloths popular?
29. Why are the cocoons of silkworm kept in hot water or in hot air during the extraction of silk fiber? Give reason.
30. Why is pupa of silkworm killed inside the cocoon?
31. Why are the eggs of silkworm kept below 18°C during winter?
32. Sericulture is not possible in winter season. Why?
33. A silk is called queen of fiber. Why?
34. Which stage of the life cycle of silkworm will be affected immediately if the mulberry bush dies suddenly? Justify your answer with reason.

Group C

35. Describe the body structure of silkworm with diagram.
36. Draw a labeled diagram of life cycle of silkworm.
37. Study the diagram and answer the following questions;
 - a. Which stage of the life cycle of silkworm is shown in the diagram?
 - b. What is the food for this stage?
 - c. How many times does it moult?
 - d. What is its next name?



Humane Nervous and Glandular System

Group A

1. What is nervous system?
2. What are the major parts of human nervous system?
3. What are the two parts of central nervous system?
4. What are the two parts of peripheral nervous system?
5. What are the two parts of autonomic nervous system?
6. What is brain? What is its average weight?
7. Name the three layers of membranes that cover the brain.
8. What are the three major parts of human brain?
9. What is cerebrospinal fluid?
10. Write an advantage of more surface area of cerebrum to us.
11. What do we call the state in a human body if cerebrum does not function well?
12. Which part of the brain is affected by consuming alcohol?
13. What is the reason behind a drunkard having stagger body?
14. What is spinal cord?
15. What happens when spinal cord is injured?
16. What is nerve?
17. How many types of nerves are there?
18. Define cranial and spinal nerves.
19. What are nerve fibres made of?
20. Write the name of three types of nerve fibres.
21. What are afferent or sensory nerves?
22. What are motor or efferent nerves?
23. What is the junction point of two neurons called?
24. What is synapse?
25. What is ganglion?
26. What is gland?
27. How many types of glands are there? Write their names.
28. What are hormones?
29. What are endocrine glands?
30. Mention the names of endocrine glands.
31. What is goiter?
32. Why is goiter seen?
33. What are gonads?
34. What is the chief function glands in human body?
35. What happens when thyroid gland does not function well?
36. Name the hormone which is released in excess quantity during excitement?
37. Name the glands of hormones which give following functions/ symptoms due to its deficiency in our body.
 - a. Dwarfness, retardation of physical and mental development.
 - b. Delay of recovery of wounds, decrease in body weight and increase in sugar level in the urine.
 - c. Low blood pressure, vomiting and unconsciousness.
 - d. Skin becomes thick and rough and goiter appears.
 - e. The gland that controls the activity of other gland in our body.
 - f. The gland that increase calcium level in the blood.
 - g. The gland that prepares body ready for various works.
 - h. The glands that regulates the development of sexual characteristics in male and female.
 - i. The gland that increases the rate of metabolism.
 - j. The gland that helps in development of breast in females.
 - k. The gland which is exocrine as well as endocrine in nature.
 - l. The hormone which helps in secretion of milk and contraction of uterine muscle.

Group B

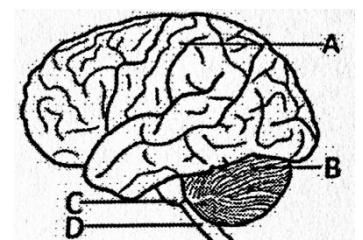
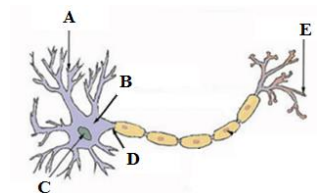
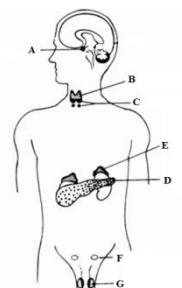
1. Write any two important functions of nervous system.
2. Write any two important functions of brain.
3. Write two functions of cerebrospinal fluid.
4. Write two functions of cerebrum, cerebellum and medulla oblongata of each.
5. Write the two major functions of sympathetic and parasympathetic nervous systems.
6. Write any two differences between axon and dendrites.
7. Write any two differences between sensory and motor nerve.
8. Write any two differences between spinal and cranial nerves.
9. Write any two importances of hormones.
10. Why are hormones called chemical messengers? Write with two examples.
11. Write the effects of over secretion or under secretion of the pituitary gland.
12. Write the effects of over secretion or under secretion of the thyroid gland.
13. Write the effects of over secretion or under secretion of the parathyroid gland.
14. Write the effects of over secretion or under secretion of the pancreas gland.
15. Write the effects of over secretion or under secretion of the adrenal gland.
16. Which hormone is deficient in the body of a person who can not control blood sugar and which organ produces that hormone?
17. Pituitary gland is also called master gland, why?
18. Pancreas is also called mixed gland, why?
19. Adrenal gland is called emergency gland, why?
20. Write any two differences between thyroid and parathyroid gland.
21. Write any two differences between exocrine and endocrine gland.
22. Write any two differences between hormone and enzyme.
23. What will happen if:
 - a. Cerebellum is injured.
 - b. Adrenal gland is removed.
 - c. Cerebrum is injured.

Group C

1. Write the location of pituitary gland and name the hormones secreted by it and mention their functions.
2. Write the location of thyroid gland and name the hormones secreted by it and mention their functions.
3. Write the location of parathyroid gland and name the hormones secreted by it and mention their functions.
4. Write the location of adrenal gland and name the hormones secreted by it and mention their functions.

Group D

1. Draw a diagram of human brain and label its different parts.
2. Describe about the structure and function of cerebrum with diagram.
3. Name the gland A, B, C, D, E and F as shown in the diagram. Also name the hormone produced by each of them.
4. Study the given diagram and answer the following questions:
 - a. Name cell given in the diagram and label the parts A, B, C, D and E.
 - b. Write one function of the parts A and B of each.
 - c.
5. Study the given diagram and answer the following questions:
 - a. Label the parts A, B, C and D.
 - b. Write one function of the parts A, B and C of each.
 - c. The part A has many folds, write its advantage.



Blood Circulation in Human Body

Group A

1. What is circulatory system?
2. What is blood?
3. What is plasma?
4. Which type of blood cells are in shortage in the blood of a person suffering from HIV/AIDS?
5. Where are red blood cells formed?
6. Write one function of white blood cells.
7. Write one function of red blood cells.
8. What is the function of platelets?
9. Write one function of plasma of blood.
10. Write the name of disease caused by excess of WBC in the blood.
11. Write one function of fibrinogen.
12. Where are red blood cells destroyed?
13. What is anemia?
14. What happens if RBC count is low?
15. Where are platelets destroyed?
16. Write any two differences between blood cell and plasma.
17. How long RBC and WBC tentatively survive?
18. What happens when the hemoglobin is very low in the RBC of a person?
19. Write any two differences between RBC and WBC.
20. Write any four functions of blood.
21. State two ways by which blood provides protection to our body.
22. What is oxyhemoglobin?
23. In which part of the blood hemoglobin is found and what is its function?
24. Write an effect due to the lack of fibrinogen in the blood.
25. What is pericardial fluid?
26. Write the function of pericardial fluid.
27. Which chamber of heart collects deoxygenated blood from the body?
28. Write the name of blood vessels which supply pure blood from lungs to heart.
29. Write the name of blood vessels which supply impure blood from right ventricle to lungs.
30. Write one function of each of the following parts;
 - a. Superior venacava
 - b. Inferior venacava
 - c. Aorta
 - d. Pulmonary artery
 - e. Pulmonary vein
31. What is systematic circulation?
32. What is pulmonary circulation?
33. What is systolic pressure?
34. If a person has blood pressure 140/100 mmHg, what does it mean?
35. What is diabetes?
36. Write the causes of diabetes.
37. What is uric acid?
38. Write an organ which produces uric acid in a human body.
39. Write the name of chemicals found in cherry to reduce high uric acid.

Group B

1. A man suffering from anemia feels tired in a short walk, why?
2. Blood is red in colour, why?
3. Blood clots outside the body at the site of injury, why?
4. The wall of left ventricle of a human heart is thicker than that of the right ventricle, why?
5. Right auricle is bigger than left auricle, why?
6. The muscles of ventricle of the heart is thicker than those of auricle, why?
7. Valves are present in vein not in arteries, why?

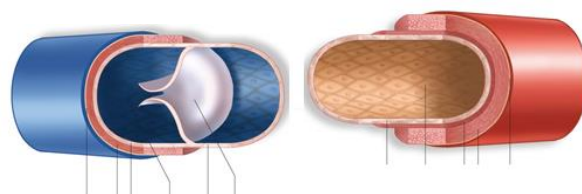
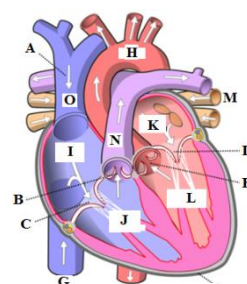
8. Arteries are more muscular than veins, why?
9. Bleeding from arteries is dangerous, why?
10. The blood flowing through the artery is high red in colour, while flowing through vein is light red in colour, why?
11. Blood is drawn from vein, not from the artery during blood donation, why?
12. Write two differences between auricles and ventricles.
13. Write any two differences between artery and vein.
14. Write any two differences between pulmonary artery and pulmonary vein.
15. Write any two differences between pulmonary circulation and systemic circulation.
16. What foods should not be consumed by a person suffering from high uric acid?
17. Write two functions of uric acid in a human body.

Group C

1. Write any three functions of blood.
2. Write any three functions of plasma.
3. Write any three control measures of high blood pressure.
4. Write any three control measures of diabetes.
5. Write any three effects seen due to excess amount of uric acid in a human blood.
6. Write any three control measures of high uric acid in the blood.
7. Write any three causes of high blood pressure.
8. Write any two effects of high blood pressure?
9. Write any three symptoms of diabetes.
Or write any three effects seen due to high blood sugar level in a human body.
10. Write any three effects seen due to excess amount of uric acid in human body.
11. Write any three control measures of uric acid in the blood.

Group D

1. The figure given below shows the composition of human blood. Give answer to the following questions:
 - a. Name the parts A, B, C and D.
 - b. Write one function of each A, B, C and D.
 - c. Write the number of A, B, C and D in one cubic millimeter of blood.
 - d. Write the average life span of each component.
 - e. Write one effect seen in human body due to less number of A.
 - f. Give one structural difference between B and C.
2. Study the given diagram and answer the following questions:
 - a. Name the parts A, B, C, D,.....O.
 - b. What type of blood does H and N carries?
 - c. Mention the structural differences between G and H.
 - d. Write one function each of C, M, N and H.
 - e. From where do the parts numbered A and C receive blood.
3. Given below are the diagrammatic sketches of blood vessels.
 - a. Identify the blood vessels.
 - b. Name the parts A, B, C and D.



Chromosome and Sex Determination

Group A

1. What is chromatin reticulum?
2. What is chromosome? From which substance chromosome is made up of?
3. What is gene? From what substance gene is made up of?
4. Write two functions of chromosome.
5. What is meant by homologous chromosomes?
6. What is the function of gene?
7. What is sex linked disease? Give an example of such disease.
8. What is haemophilia?
9. What is chromatid?
10. What is centromere?
11. What is somatic cell? How many chromosomes are found in a somatic cell?
12. How many chromosomes are present in the cell of following organisms:
Solanum, pine, sugarcane, yeast, gorilla, human beings, frog, onion, potato, pea, housefly.
13. How many types of chromosomes are there, on the basis of their function?
14. What are the sex chromosomes found in sperm and ovum?
15. What is meant by sex determination?
16. A sperm carrying 'X' chromosome fertilizes with the ovum carrying 'X' chromosome. What will be the sex of the fetus?
17. Write the full form of DNA.
18. What is chromosomal disorder?
19. What is aneuploidy?
20. What is Down's syndrome?
21. What is Klinefelter's syndrome?
22. What is Turner's syndrome?

Group B

1. Write any two differences between metacentric centromere and sub-metacentric chromosome.
2. Write any two differences between acrocentric chromosome and telocentric chromosome.
3. Write any four symptoms of Down's syndrome.
4. Write any four symptoms of Klinefelter's syndrome.
5. Write any four symptoms of Turner's syndrome.
6. Write any two differences between autosomes and sex-chromosomes.

Group C

1. Does the sex of a child depend on the father of it is just a matter of chance? Explain.
2. Half of the world population is roughly male and half is female. Why?
3. How is sex of a child determined, show it with cross chart.

Reproduction

Group A

1. What is asexual reproduction?
2. What is fission?
3. What is binary fission? Give two organisms that reproduce by this process?
4. What is multiple fission? Give two organisms that reproduce by this process?
5. What is budding? Give two organisms that reproduce by this process?
6. What is meant by fragmentation? Give two organisms that reproduce by this process?
7. "Hydra reproduces by the process of regeneration" what does it mean?
8. What is meant by sporulation? Give two organisms that reproduce by this process?
9. What do you mean by vegetative propagation?
10. Give two organisms that reproduce by vegetative propagation through roots.
11. Give two organisms that reproduce by vegetative propagation through stem.
12. Give two organisms that reproduce by vegetative propagation through leaf.
13. Name the process of reproduction carried by the following organisms.
Amoeba, yeast, planaria, frogs, hydra, bacteria, plasmodium, starfish, sponge, moss, spirogyra, diatoms, onion, bryophyllum, ginger, euglena, fern, garlic, begonia, sugarcane, potato, chlamydomonas, marchantia.
14. Define layering.
15. How is simple layering done?
16. How is compound layering done?
17. How is tip layering done?
18. How is mound layering done?
19. How is air layering done?
20. Define grafting.
21. Define whip grafting.
22. Define tongue grafting.
23. Define cleft grafting.
24. What is tissue culture?
25. What is callus?
26. What is the role of auxin and cytokinin to the plant?
27. Define sexual reproduction.
28. How is zygote formed?
29. Which part of the flower contains the pollen grains?
30. Which part of flower changes into seed and fruit after fertilization?

Group B

1. Mention any two characteristics of asexual reproduction.
2. Mention any two characteristics of sexual reproduction.
3. Write any two importance of tissue culture.
4. Write any two differences between sperm and ovum.
5. Write any two differences between gamete and zygote.
6. Write any two differences between self-pollination and cross- pollination.
7. Write any two differences between pollination and fertilization.
8. Write any two differences between external and internal fertilization.
9. Write any two differences between asexual reproduction and sexual reproduction.
10. Write any two importance of asexual reproduction.
11. Write any two importance of sexual reproduction.
12. What are the number of chromosomes found in the ovum and zygote?
13. The number of chromosomes is double in zygote than that of the gamete, why?
14. Give two reasons that potato is planted by cutting its tuber.

Group C

1. 'Vegetative propagation is beneficial to the farmers'. Give three reasons.
2. Sugarcane is planted by cutting into pieces. What type of reproduction is it? Give three reasons of applying this method in sugarcane.
3. Explain the process of tissue culture in plant.
4. Buds are formed in the leaf of a plant and those buds are developed into new plant. Name a plant in which reproduction takes place by this method. Justify this reproduction is asexual.

Heredity

Group A

1. Define heredity?
2. What is hereditary character? Give two examples of hereditary character.
3. What is genetics?
4. Define the following terms;
Hybrid, hybridization, phenotype, genotype, recessive character, dominant character.
5. What is monohybrid cross?
6. What is dihybrid cross?
7. State the law of dominance.
8. State the law of purity of gamete.
9. What is variation?
10. What is mutation?
11. What are the factors that cause continuous variation?
12. What are the factors that cause mutation?

Group B

1. Why is Mendel called as father of genetics?
2. Why did Mendel select pea plant for his experiment?
3. Write any two probable causes that Mendel did not do his experiment on frog instead of pea.
4. Can we apply Mendel's law in human beings too? State any two difficulties that Mendel would have faced if he had carried his experiment on human instead of pea plant.
5. Write any two differences between dominant and recessive characters.
6. Write any two differences between continuous variation and discontinuous variation.
7. Write any two differences between hereditary variation and environmental variation?
8. Write down any four dominant and recessive characters found in human beings.
9. Write any two importance of variation.

Group C

1. Explain the law of dominance with an example.
2. Explain the law of purity of gamete with an example.
3. When pure black mice and pure white mice are crossed, what will be the ratio of white and black mice in second filial generation? Show with cross chart diagram.
4. Show the monohybrid cross chart between pure tall and pure dwarf pea plant and write down the phenotypic and genotypic ratio.
5. Pea plant with red flower and white flower are cross pollinated first and then self- pollinated. What will be the colour of flower in first and second generation of that pea plant and why?
6. A hybrid black dog is crossed with pure white dog. What types of characters are seen in the offspring? Show with cross chart.
7. Both parents have brown eyes but the son has blue eyes. Is having blue eyes a dominant character or recessive character? Show with a chart.
8. Show in a chart of the result of crossing between long wing drosophila and short wing drosophila up to second filial generation.

Group D

1. Result obtained by crossing tall and dwarf pea plant is shown in the given table. With the help of the table answer the following ;
 - a. Which filial generation does the result belong?
 - b. What is the ratio of phenotype and genotype character?
 - c. Which one is pure tall plant?
 - d. Which law is explained by this table? State the law also.

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History of the Earth

Group A

1. What is the approximate age of the earth?
2. What is geological time scale?
3. In how many parts the geological time scale is divided? Name them also.
4. What are the largest and smallest units of geological time scale?
5. What is era? Write the name of the four eras.
6. Write the time period of Precambrian and Paleozoic eras.
7. Write the time period of Mesozoic and Cenozoic eras.
8. On what basis scientists have said animals and plants were developed in Paleozoic era?
9. On what basis scientist have said that human being and earth were not came in to existence at the same time?
10. In which era different types of hills and mountain were formed?
11. In which era mineral rocks like gneiss and granite formed?
12. What is the evidence that there were dinosaurs on the earth in the past history?
13. In which era the origin and extinction of dinosaurs took place?
14. In which era the evolution of development of the following organism took place?
First aquatic animal, birds, owl, bacteria, fish, flowering plant, sharp toothed tiger, elephant, moss, wings bearing insects, amphibians, fern plant, dinosaurs, whale, human beings, monkey, tortoise.
15. What is fossil?
16. What is paleontology?
17. What is fossil fuel?
18. What is coal?
19. What is carbonization?
20. What is mineral oil?
21. What is petroleum?
22. What is crude oil?
23. Name the process by which petroleum is extracted from crude oil?
24. Write the name of the best type of coal.
25. Write one use of the following petroleum substances;
Petroleum gas, paraffin wax, bitumen, petroleum ether, asphalt, Vaseline, petroleum coke, kerosene, petrol.

Group B

1. Describe the hypothesis propounded by Jeans and Jeffery regarding the origion of the earth.
2. Describe the hypothesis propounded by George Wofan regarding the origin of the earth.
3. Describe the hypothesis propounded by Cant and Laplace regarding the origin of the earth.
4. Write any two major events that occurred in Paleozoic era.
5. Write any two major events that occurred in Mesozoic era.
6. Write any two major events that occurred in Cenozoic era.
7. Which era is known as the age of the reptiles? Why?
8. Why did dinosaurs evolve earlier than man?
9. Write any two differences between Mesozoic era and Cenozoic era.
10. Fossils are found only in sedimentary rocks, why?
11. Why is coal called fossil fuel?
12. Write any two importance of fossil.
13. Write any two importance of coal.

Group C

1. How is fossil formed?
2. How is coal formed?
3. How is mineral oil formed?
4. How are fossils identified?
5. Living beings were evolved millions of year after the earth was created, why? Explain.

The earth in the universe

Group A

1. What is universe?
2. What is solar system?
3. What is the sun?
4. In which direction do all the planets revolve round the sun?
5. What is the average surface temperature of the sun?
6. What is the temperature of the sun in its core?
7. What is solar wind? What is its speed?
8. What factors determine the age of the sun?
9. What do you mean by outer and inner planet?
10. Name outer planets and outer planets.
11. Name the planet which has the largest number of satellite?
12. Name the two planets which do not have satellite or moon.
13. Write the distance of the earth from the sun.
14. How far does the sun lie from the centre of the Milky Way galaxy?
15. What is meant by planet?
16. What is a comet?
17. How is the tail of comet formed?
18. Name the two examples of comet.
19. What are three parts of a comet?
20. Write down the revolution period of the Halley's Comet, Temple-Tuttle comet and Enke comet round the sun.
21. What is coma?
22. What are meteors and meteorites?
23. What are meteoroids?
24. What is Hoba?
25. Define constellation.
26. What is Orion?
27. What is galaxy?
28. What are satellites?
29. What is meant by geo-stationary orbit?
30. Give the name of the following:
 - a. Smallest planet.
 - b. Nearest planet to the earth.
 - c. Red planet.
 - d. Nearest planet to the sun.
 - e. Farthest planet from the sun
 - f. Hottest planet
 - g. The planet that can float on water.
 - h. Largest planet.
 - i. Fastest revolving planet.
 - j. Fastest rotating planet.
 - k. Second fastest rotating planet
 - l. Coldest planet
 - m. Evening or morning star
 - n. Dwarf planet.
 - bb. Time required for the moon to make one complete revolution around the earth
 - cc. Time required for the moon to move around the earth in its orbit from one new moon to another new moon
31. Distinguish the following as asteroids, constellation, comet, natural satellite, galaxy, artificial satellite, star and planet:
Milky Way, Neptune, Apollo, Andromeda, Sputnik, Titan, Triton, Charon, Ursamajor, Tucna, Enke, Ceres, Phobos, Taurus.
32. Name the heavenly bodies given in the figure:

Group B

1. Write any two importance of the sun in the solar system.
2. Life is not possible on the surface of the mars. Why?
3. Give the two reasons for the low possibility of finding of living beings on the planets.
4. How can Venus be identified in the sky?
5. Neptune takes the longest time to revolve round the sun?
6. Water, oxygen and carbon dioxide are present on Venus, even though life is not possible there. Why?
7. Mars is called red planet, why?
8. A comet is not actually a star. Give two reasons.
9. The tail of a comet seems longer when it comes nearer to the sun and it seems shorter when it goes far away. Why?
10. How many types of meteorites are there? Also write their names.
11. Write down the composition of stony meteorites, irony meteorites and stony-irony meteorites.
12. Write any two differences between meteor and comet.
13. Write any two differences between stars and shooting stars.
14. The surface temperature of the Mercury reaches very high (about 427°C) at day time but very low (-170°C) at night. Why?
15. Write any two differences between planets and stars.
16. Give any two differences between galaxy and constellation.
17. Why are some stars seen much brighter in a clear sky?
18. Write two characters of the planet Mars which help to identify it when observed through telescope.
19. Write the two reasons that the Pluto is not considered as a planet.
20. Write any two differences between natural satellite and artificial satellite.
21. A comet is seen only after a long period, why?
22. Some comets disappear forever. Why?
23. The direction of the tail of a comet is opposite to the sun, why?
24. A constellation seen in summer season cannot be seen in winter season, why?

Group C/D

1. Write four purposes of launching of artificial satellites.
2. Study the given questions below, identify them and answer them:
 - a. This planet is red in colour and has two white polar caps. Why is it seen so?
 - b. Although it does not have light of its own, it is the brightest in the sky. Why is its same part always faces towards the earth?
 - c. This is an ice ball that orbits the sun and looks like a broom when it approaches the sun. Why is its shape seen so?
3. Write any three importance of constellation in our daily life.
4. Write any four superstitions of Zodiac signs.
5. Answer the following questions of the basis of the table given below:

Name of planet	Revolution time	Temperature
A	87 days	427°C to -170°C
B	365 days	15°C
C	84 years	-216°C

- a. Which planet is farthest from the sun?
- b. Why is there vast difference in maximum and minimum temperature in planet A?
- c. What is the reason for the lowest temperature in the planet C?
- d. In which planet there is possibility of living beings?