

K V D R D O

Holiday Homework (Winter Break)

Class 6

Science

I. Fill in the blanks.

1. Light travels in a _____ line
2. Standard unit of length is _____.
3. _____ objects allow light to pass through them partially.
4. 1km = _____ m.
5. Changes in our surroundings that make us respond to them are called _____.

II. Answer the following.

1. What do you understand by 'measurement'?
2. Why is the hand span not considered as a reliable unit for measuring the length?
3. Why are camels surviving in the desert?
4. What is meant by terrestrial habitats?
5. Why aquatic animals cannot live on land?
6. Draw an electric circuit which consists of an electric cell, bulb and a switch.
7. What is a habitat?
8. The height of a person is 1.65 m. Express it into cm and mm.
9. How would you measure the length of a curved line?
10. Why should an electrician use rubber gloves while repairing an electric switch at your home? Explain.
11. Differentiate between conductor and insulator.

12. What is the purpose of using an electric switch?
13. List the common characteristics of living things.
14. Differentiate between biotic and abiotic components.
15. What is the SI unit of weight? The school bag of three students weigh A, B, C measures 3kg, 2800 gm and 5000gm respectively. Whose bag is the heaviest?

III. Competency based questions.

1. A deer is an animal that lives in the forest. It has strong teeth for chewing hard Plant stems. A deer needs to know about the presence of predators to run away from them. It has long ears to hear the movements of predators. The eyes on the side of its head allow it to look in all directions for danger. The speed of the deer helps them to run away from the predators.

1. Which is the strongest feature of deer which help them to survive in its habitat
(a) Colour (b) Jump (c) Speed of the deer
2. Which animal is more likely to be predator of deer
(a) Lion (b) zebra (c) yak
3. Write the various characteristics of deer which help them to survive in its habitat.

2. Electric cells are also used in alarm clocks, transistor radios, cameras and many other devices. It has a small metal cap on one side and a metal disc on the other side. The metal cap is the positive terminal of the electric cell. The metal disc is the negative terminal of electric cell. All electric cells have two terminals; a positive terminal and negative terminal. Electric cell is used as electric source of energy. In an electric cell chemical energy converts into electrical energy.

1. Which type of conversion of energy takes place in an electric cell?
2. How many terminals are there in an electric cell? Name them.
3. Name some devices in which we use an electric cell.

KENDRIYA VIDYALAYA DRDO, BENGALURU
HOLIDAY HOMEWORK-WINTER BREAK(2023-24)

CLASS – VII
SUBJECT – SC

TRANSPORTATION IN ANIMALS AND PLANTS

Answer the following questions in short:

1. Why is transport of materials necessary in a plant or in an animal? Explain.
2. What will happen if there are no platelets in the blood?
3. What are stomata? Give two functions of stomata.
4. Does transpiration serve any useful function in the plants? Explain.
5. What are the components of blood?
6. Why is blood needed by all the parts of a body?
7. What makes the blood look red?
8. Describe the function of the heart.
9. Why is it necessary to excrete waste products?
10. Draw a diagram of the human excretory system and label the various parts.

REPRODUCTION IN PLANTS

A. Answer the following questions in short:

1. Describe the different methods of asexual reproduction. Give examples.
2. Explain what do you understand by sexual reproduction.
3. State the main difference between asexual and sexual reproduction.
4. Sketch the reproductive parts of a flower.

5. Explain the difference between self-pollination and cross-pollination.
6. How does the process of fertilisation take place in flowers?
7. Describe the various ways by which seeds are dispersed.
8. What is the function of flowers in plants?
9. Coconut is a large and heavy fruit. How is it adapted for dispersal by water?

B. Fill in the blanks:

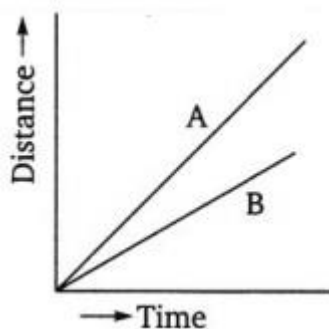
1. Production of new individuals from the vegetative part of parent is called
2. A flower may have either male or female reproductive parts. Such a flower is called

MOTION AND TIME

A. Answer the following questions in short:

1. Classify the following as motion along a straight line, circular or oscillatory motion:
(i) Motion of your hands while running.

- (ii) Motion of a horse pulling a cart on a straight road.
 - (iii) Motion of a child in a merry-go-round.
 - (iv) Motion of a child on a see-saw.
 - (v) Motion of the hammer of an electric bell.
 - (vi) Motion of a train on a straight bridge.
2. A simple pendulum takes 32 seconds to complete 20 oscillations. What is the time period of the pendulum?
 3. The distance between two stations is 240 km. A train takes 4 hours to cover this distance. Calculate the speed of the train.
 4. The odometer of a car reads 57321.0 km when the clock shows the time 08:30 AM. What is the distance moved by the car, if at 08:50 AM, the odometer reading has changed to 57336.0 km? Calculate the speed of the car in km/min during this time. Express the speed in km/h also.
 5. Salma takes 15 minutes from her house to reach her school on a bicycle. If the bicycle has a speed of 2 m/s, calculate the distance between her house and the school.
 6. Show the shape of the distance-time graph for the motion in the following cases:
 - (i) A car moving with a constant speed.
 - (ii) A car parked on a side road.
 7. Suppose the two photographs, shown in fig. 13.1 and fig. 13.2 (in NCERT textbook) had been taken at an interval of 10 seconds. If a distance of 100 metres is shown by 1 cm in these photographs, calculate the speed of the blue car.
 8. Adjoining figure shows the distance-time graph for the motion of two vehicles A and B. Which one of them is moving faster?



9. Why are standard units used in measurements?
10. How time was measured when pendulum clocks were not available?

KV DRDO

Holiday Homework (Winter Break)

Class 8

Science

1. Fill in the blanks.

- a) Fertilization in human beings takes place in the_____.
- b) Organisms in which male and female gametes are present in the same organism are called _____.
- c) The reproductive phase of a woman lies between her _____and menopause.
- d) A human gamete has_____sex chromosome(s).
- e) The range of audible frequencies for the human ear is roughly from_____to_____Hz.
- f) Most liquids that conduct electricity are solutions of _____and_____.
- g) The passage of an electric current through a solution causes_____effects.

2. Multiple Choice Questions

1. Reproduction by budding takes place in

1. Hydra

2. Amoeba

3. Paramecium

4. Bacteria

2. Which of the following sequences is in the correct order?

1. Zygote -> Embryo -> Foetus -> Baby

2. Zygote -> Embryo -> Baby -> Foetus

3. Embryo -> Zygote -> Baby -> Foetus

4. Foetus -> Zygote -> Embryo -> Baby

3. Which of the following does not have HIV?

1. Blood
2. Sweat
3. Semen
4. Breast milk

4. Which among the following is a change seen in girls during Puberty?

1. Growth of facial hair
2. Cracking of voice
3. Breast development
4. Broad shoulders

5. During the dry weather, while combing our hair, we sometimes experience hair flying apart.

The force responsible for this is

1. force of gravity.
2. electrostatic force.
3. the force of friction.
4. magnetic force.

6. A large commercial complex has four ways to reach the main road. One of the paths has loose soil, the second is laid with polished marble, the third is laid with bricks, and the fourth has a gravel surface. It is raining heavily, and Paheli wishes to reach the main road. The path on which she is least likely to slip is

1. loose soil.
2. polished marble.
3. bricks.
4. Gravel

7. What is the full form of the LED?

1. Light Emitting Diode
2. Light Electricity Device
3. Large Emitting Device
4. Large Electricity Diode

8. Which one of the following is a good conductor of electricity?

1. copper
2. wood
3. distilled water
4. none of these

9. Which one the following acts as a medium for propagation of sound.

1. Solid
2. Gas
3. Liquid
4. All of These

10. The loudness of sound depends upon_____.

- | | |
|----------------|--------------|
| A. Amplitude | B. Frequency |
| C. Time Period | D. Speed |

11. Which one of the following will have long vocal cords?

1. Women
2. Men
3. Children
4. None of the above

12. Shrillness of a sound is determined by _____ of vibration.

1. Amplitude
2. Frequency
3. Time Period
4. Speed

13. When an electric current is passed through a conducting solution, there is a change in the colour of the solution. This shows-

1. the chemical effect of current.
2. the heating effect of current.
3. the magnetic effect of current.
4. the lightning effect of current.

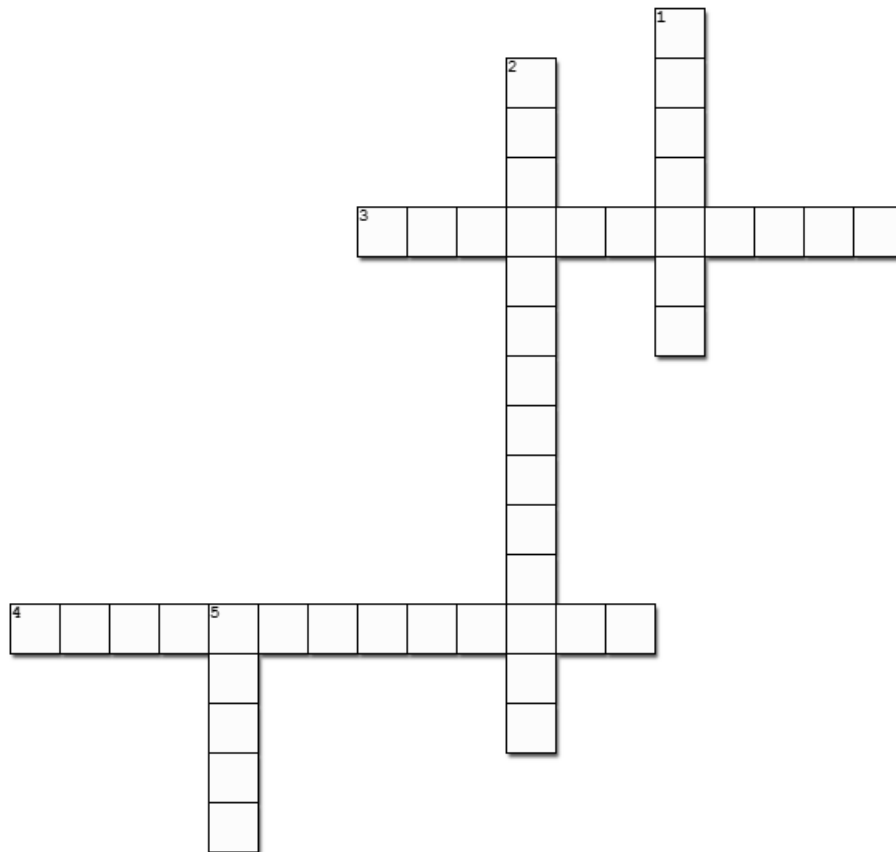
3.State whether the following statement is true or false

1. The fusion of male and female gametes is called hermaphrodites.
2. Organisms like Amoeba reproduce sexually.
3. Lack of thyroxine causes goiter.
4. The reproductive phase in females lasts till the age of 45-50 year
5. Gases exert pressure on the walls of their container.
6. Sound cannot travel in vacuum.
7. Number of oscillations per second of a vibrating object is known as its time period.
8. lower is the frequency of vibration, the higher the pitch.
9. If the amplitude of the vibrations is doubled, the loudness of the Sound will also be doubled
10. Distilled water also conducts the electric current
11. Electrode connected to positive terminal is called the Anode and negative terminal is called Cathode

4. Answer the following Questions:

1. Draw a well-labelled diagram of female reproductive organ.
2. What is the necessity of a balanced diet for adolescents?
3. We should avoid taking medicines/drugs unless prescribed by the doctor. Give reasons.
4. Explain why the voices of men, women, and children are different.
5. What are the harmful effects of noise pollution?
6. Is it safe for the electrician to do electrical repairs outdoors during heavy downpours? Explain.
7. Explain the process of electroplating with an experiment.
8. Describe the functioning of a LED.
9. Write a short note on AIDS.

5. Crossword Puzzle



Across

3. The liquids which allow an electric current to pass through them and split themselves on the passage of electric current.
4. Coating of zinc is deposited on iron to protect it from corrosion

Down

1. The electrode connected to the negative terminal of the battery
2. The process of depositing a layer of any desired metal on another material by means of electricity
5. The electrode connected to the positive terminal of the battery

1. Define uniform acceleration and plot V-T graph
2. Define retardation and write its SI units
3. Explain : uniform circular motion is an accelerated motion
4. Write equations of motion and solve 2 numerical for each
5. Plot D-T graph for an object at rest
6. State Newton's second law of motion and derive $F=ma$. Hence state its SI unit
7. State Newton's laws and cite two examples for each
8. Why a cricket player pulls his hand while catching the ball
9. A passenger standing in the moving bus falls forward when brakes applied by the driver suddenly
10. An Athlete takes a long run before he jumps explain?
11. If action is equal to reaction why don't they cancel with each other? Explain
12. Define work and cite examples for positive and negative work
13. A collie carrying suit case on his head and walking in the horizontal road what is the work done?
14. Define Kinetic Energy and derive expression for it? If mass of the body is doubled and velocity is reduced to half what will be its new KE?
15. Define power? what are its SI units
16. What is the commercial unit of energy? Convert kilo watt hour in to joules?
17. State law of conservation of energy? Explain transformation of energy in case of simple pendulum?
18. State universal law of gravitation? Write its mathematical formula?
19. Define G? Write its significance?
20. Define acceleration due to gravity? Explain why g at poles is more than g at equator
21. Differentiate between mass and weight
22. Define potential energy? Obtain the expression for it?
23. Differentiate between longitudinal & transverse waves?
24. Define frequency & amplitude? Hence derive the relation between velocity, frequency and wave length?
25. Define reverberation? What are its uses?
26. What are ultra-Sonics? Write its applications?
27. Define up thrust? Explain why a small needle sinks in water where as large boat float?

1. The Bohr model and reality

At first glance, the Bohr model looks like a two dimensional model of the atoms because it restricts the motion of the electrons to a circular orbit in a two dimensional plane. In reality the Bohr model is a one dimensional model. Only one coordinate is needed to describe the orbits in the Bohr model. But, electrons aren't particles that can be restricted to one dimensional circular orbit. They act to some extent as waves and therefore exist in three dimensional space. Actually Bohr model proposed by Neils Bohr in 1915 is a modification of the earlier Rutherford Model. The main points of the Bohr model are-

- i. Electrons orbit the nucleus in orbits that have a set size and energy.
- ii. The energy of the orbit is related to its size. The lowest energy is found in the smallest orbit.
- iii. Radiation is absorbed or emitted when an electron moves from one orbit to another.

Question 1.

Statement-“ In reality the Bohr model is a one dimensional model.”

Reason- It is because a circle can be defined by specifying only one dimension.

What is that 'one dimension' ?

Question 2.

According to Bohr's model of atom, what prevents an atom from being collapsed?

- a.) The nuclear force
- b.) Movement of electrons in discrete energy levels.
- c.) The electron-electron repulsion
- d.) All of the above

Question 3.

“In order to overcome the objection raised against Rutherford's model of the atom, Neil Bohr put forward his model of atom.”What was that 'objection'?

Question 4.

According to current theory, electrons are arranged in energy levels around the nucleus. When electrons gain or lose energy, they jump between levels as they are rotating around the nucleus.

Select the correct option

- a.) As electrons gain energy, they move to(lower/higher) level.
- b.) As electrons lose energy, they move to(lower/higher) level.

2. Standing in a hallway with mirrors

If an object is situated in front of two mirrors, you may see images in both mirrors. In addition, the image in the first mirror may act as an object for the second mirror, so the second mirror may form an image of the image. If the mirrors are placed parallel to each other and the object is placed at a point other than the midpoint between them, then this process of image-of-an-image continues without end, as you may have noticed when standing in a hallway with mirrors on each side.

1. Two plane mirrors are placed parallel to each other. an object is placed at the midpoint between them. No. Of images formed will be-
2. Does position of these plane mirrors affect the number of images formed?
3. What will happen to the no. of images if we place the two mirrors at 45 degree angle to each other. .
4. Multiple images formed in this condition will be of same or different.
5. If we want 9 images of an object what arrangements of two mirrors and object should be done.



3. WASTE WATER STORY



Wastewater effluents are major contributors to a variety of water pollution problems. Most cities of developing countries generate on the average 30–70 mm³ of wastewater per person per year. Owing to lack of or improper wastewater treatment facilities, wastewater and its effluents are often discharged into surface water sources, which are receptacles for domestic and industrial wastes, resulting to pollution. The poor quality of wastewater effluents is responsible for the degradation of the receiving surface water body. Wastewater effluent should be treated efficiently to avert adverse health risk of the user of surface water resources and the aquatic ecosystem. The release of raw and improperly treated wastewater onto water courses has both short- and long-term effects on the environment and human health. Hence, there should be proper enforcement of water and environmental laws to protect the health of inhabitants of both rural and urban communities.

1. Rivers and lakes both are-

- A. Fresh water bodies
- B. Salty water bodies
- C. Ground water bodies

D. Surface water bodies

2. The release of raw and improperly treated domestic wastewater into rivers and lakes may cause:

I. Growth of aquatic plants

II. Death of aquatic animals

III. Water borne diseases in humans

IV. Decline in BOD

A. II and III

B. I and IV

C. I , II and III

D. I , II , III and IV

3. Ground water resources are less polluted than surface water resources. Do you agree with the statement? Justify your response.

4. Waste Water contaminated by organic waste can be treated by microorganisms naturally and in this process-

A. DO increases and BOD decreases

B. DO decreases and BOD Increases

C. DO increases and BOD increases

D. DO decreases and BOD decreases

5. Suggest any two methods to control water pollution due to Domestic Sewage.

6. Can release of waste water contaminated by toxic materials in open land area away from the water body suggested to control the water pollution?

7. Water pollution occurs by-

I. Waste water from home

II. Waste water from industry

III. Waste from agriculture

IV. Hot water from thermal power plant

A. All I to IV

B. I to III only

C. I and II only

D. III and IV only

4. Industrially, a by-product of the burning of coal, sulfur dioxide gas, may combine with water vapor in the air to eventually produce sulfuric acid, which falls as acid rain. People residents of nearby area observe corrosion in the buildings due to the smoke released from the industry. To prevent the sulphur dioxide from being released, a device is used that gleans the gas from smoke stacks. This device first blows calcium carbonate into the combustion chamber where it decomposes into calcium oxide (lime) and carbon dioxide. This lime then reacts with the sulphur dioxide produced forming calcium sulphate. A suspension of lime is then injected into the mixture to produce a slurry, which removes the calcium sulphate.

Corrosion of the buildings in nearby area is due to-

- A. Sulphuric acid in rain water
- B. sulphur dioxide in industrial exhaust
- C. Carbon in Smoke
- D. Heat released in the process

A device which gleans the gas from smoke stacks is known as -

- A. Electrostatic precipitator
- B. scrubber
- C. Catalytic converter
- D. Smoke filter

The substance which form calcium sulfite in chemical reaction with lime is-

- A. Sulphur
- B. Sulphur dioxide
- C. Hydrogen sulphide
- D. Sulphuric acid

Lime then reacts with the gas produced forming calcium sulfite. In this reaction-

i. Neutralization of toxic gas occurs by lime.

ii. A salt is formed at the end of reaction.

iii. Heat is absorbed in the process.

iv. Exothermic reaction takes place.

- A. i and iv are correct
- B. i and iii are correct
- C. i, ii and iii are correct
- D. i, ii and iv are correct

Process of treatment of industrial exhaust as used here, the similar process is used when-

- A. Slaked lime (calcium hydroxide) is used into soil that is too acidic for plant growth.
- B. We treat wasp stings with vinegar.
- C. We use Toothpaste that neutralise the acid that our mouth creates from bacteria.
- D. All of these

Lime water turns-

- A. Blue litmus into red
- B. Red litmus into blue
- C. No effect on red and blue litmus
- D. Red and blue litmus colourless

5. In the following question, a statement of assertion followed by statement of reason is given. Choose the correct answer out of the following choices

- a) Both Assertion and Reason are true and the reason is the correct explanation of the assertion.
- b) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion.
- c) Assertion is true but Reason is false.
- d) Assertion is false and Reason is true..

a. **ASSERTION**-The outermost layer of cells in plant is, called epidermis.

REASON- The epidermis aids in protection against loss of water, mechanical support

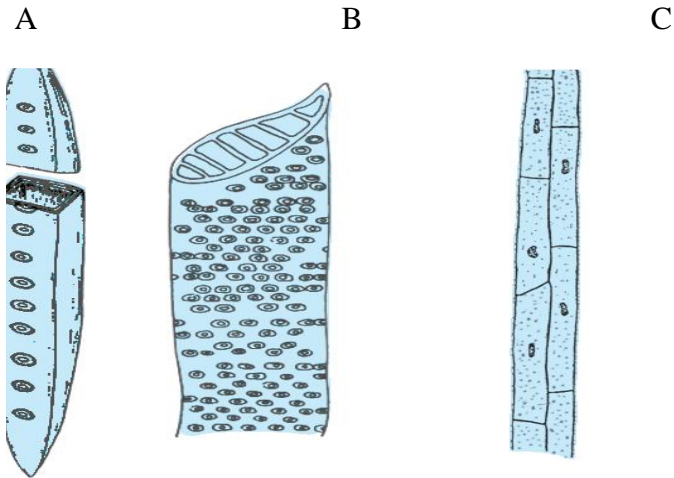
b. **ASSERTION**- The epidermis of the leaf consists of pores are called stomata .

REASON. - Stomata are necessary for exchanging gases with the atmosphere..

c. **ASSERTION**- Transpiration (loss of water in the form of water vapour) takes place through stomata.

REASON- Epidermal cells of the root involve in water absorption bear long hair-like parts that greatly increase the total absorptive surface area.

6. Identify the following components of complex plant tissue.



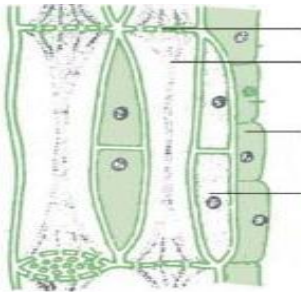
5.write the components of xylem &phloem

6. Complex tissues are made of more than one type of cells. –yes/no

7. Xylem and phloem are complex tissues.- yes/no

8. Tracheids and vessels are tubular structures which allows them to transport water and minerals vertically.
Justify

9. Identify the given complex permanent tissue and label all the parts.



a. ASSERTION-.. The covering or protective tissues in the animal body are epithelial tissues

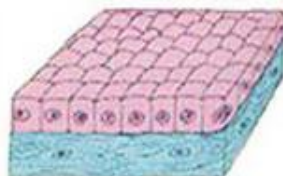
REASON - Epithelium covers most organs and cavities within the body.

1. All epithelium is usually separated from the underlying tissue by an extracellular fibrous basement membrane. TRUE/FALSE
2. Identify the following epithelial tissue

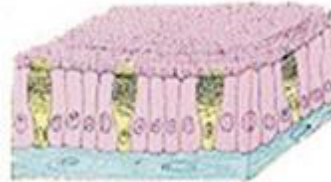
A



B



C



3. Simple squamous epithelial cells are extremely thin and flat and form a delicate lining. TRUE/FALSE
4. The oesophagus and the lining of the mouth are also covered with squamous epithelium. TRUE/FALSE

7.READ THE FOLLOWING AND ANSWER THE QUESTIONS.

Where absorption and secretion occur, as in the inner lining of the intestine, tall epithelial cells are present. This columnar (meaning 'pillar-like') epithelium facilitates movement across the epithelial barrier. In the respiratory tract, the columnar epithelial tissue also has cilia, which are hair-like projections on the outer surfaces of epithelial cells. These cilia can move, and their movement pushes the mucus forward to clear it. This type of epithelium is thus ciliated columnar epithelium.

- i) some epithelium are named as ciliated epithelium.why?
- ii) Where do you find it?
- iii)mention the function performed by them.

7.Explain why particles of a colloidal solution do not settle down when left undisturbed, while in the case of a suspension, they do.

8.Smoke and fog are both aerosols. In what way are they different?

9.Why does the temperature of a substance remain constant during its melting point or boiling point?

10.You want to wear your favourite shirt to a party, but the problem is that it is still wet after a wash. What steps would you take to dry it faster?

11.Alka was making tea in a kettle. Suddenly she felt intense heat from the puff of steam gushing out of the spout of the kettle. She wondered whether the temperature of the steam was higher than that of the water boiling in the kettle. Comment.

Class IX -AI Holiday Homework

AI

Sl.No	Question
1.	What is intelligence? Explain the 9 types of intelligence?
2.	What are the different stages of AI Project Cycle
3.	What do you mean by Problem Statement Template
4.	Who are stakeholders?
5.	Explain the 4W framework.
6.	What is data acquisition? What are the different ways to acquire data?
7.	What are the different visualisation techniques that are used in data exploration stage?
8.	What do you mean by data features?
9.	Differentiate between : a) training data and testing data b) Unlabelled and Labelled data c) Supervised learning and unsupervised learning d) Classification and Regression
10.	Explain Neural Network with a neatly labelled diagram . Write 4 features of the neural network

Python

11.	Write a Python Program to print the area of a rectangle
12.	Write a Python Program to print the perimeter of an equilateral triangle
13.	Write a Python Program to print the average of 3 numbers
14.	Write a Python Program to print the area of a circle by taking radius from user. Take pi as 3.14
15.	Write a Python Program to take your name from user and print “hello” and name Eg: Input Name: Samhita Expected Output : Hello Samhita

WINTER BREAK HOLIDAY HOMEWORK 2023

SUB: ARTIFICIAL INTELLIGENCE

QUESTION PAPER 1

SECTION A

Q. 1 Answer any 4 out of the given 6 questions on Employability Skills (1 x 4 = 4 marks)		
I.	Sara could not prepare for her exams for many reasons such as first her grandfather passed away and then she met with an accident. Now exams are very near and she is having the symptoms like aches, shallow breathing, cold hands and feet. All these symptoms are because of _____ (a) Bad stress (b) Good stress (c) Ailment (d) All of these	1
II.	Which one of the following is an example of Operating System? (a) Microsoft Word (b) Microsoft Windows (c) Microsoft Excel (d) Microsoft Access	1
III.	Statement 1: Self-motivation teaches us self-discipline and hard work to achieve our goals. Statement 2: Individuals experience increased anxiety and boredom when they motivate themselves. (a) Both Statement 1 and Statement 2 are correct. (b) Both Statement 1 and Statement 2 are incorrect. (c) Statement 1 is correct but Statement 2 is incorrect. (d) Statement 1 is incorrect but Statement 2 is correct	1
IV	An _____ is a person who is self – employed, is willing to take a calculated risk, and brings in a new idea to start a business. (a) Software Engineer (b) Entrepreneur (c) Civil Engineer (d) Mechanical Engineer	1
V	Which of these are examples of negative feedback? (a) I hate to tell you this but your drawing skill is poor. (b) You can surely improve your drawing (c) These are good drawings but you can do better. (d) None of the above	1
VI	_____ is the term to denote proper management of the natural resource to prevent its exploitation, destruction or degradation. (a) Conservation (b) Reduction (c) Reforestation (d) Green Economy	1
Q2	Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)	
I.	In _____ input to machines can be images, videos or pictures from thermal or infrared sensors, indicators and different resources. (a) Data Science (b) Computer Vision (c) NLP (d) Algorithm	1
II.	Which of this is not a type of intelligence for humans? (a) Linguistic Intelligence (b) Spatial Visual Intelligence (c) Machine Intelligence (d) Kinaesthetic Intelligence	1

III	A well-known news channel broadcasts information on a wide range of topics, including politics, government, foreign affairs, sports and the latest movie and television news. Reporters are in charge of gathering, evaluating and transmitting information about current events. Furthermore, the news channel permits people to submit breaking news, which is subject to verification by the channel's reporters. However, it may be difficult to distinguish between real news and fake news, which can lead to confusion among readers and threaten a news organization's reputation. Which of the following domains is used to detect fake news so that the audience has a high level of trust in the news channel? (i) Computer Vision (ii) Matrices (iii) Natural Language Processing (iv) Data Science	1
IV.	Where does the processing in an ANN occur? (a)Output Layer (b) Hidden Layer (c) Input Layer (d) Data Layer	1
V	_____helps to summarise all the key points into one single outline so that in future, whenever there is need to look back at the basis of the problem we can take a look at it and understand the key elements of it. (a)4W Problem canvas (b) Problem Statement Template (c) Data Acquisition (d)Algorithm	1
VI	From where does the basic structure of a decision tree start? (a) Root (b) Branch (c) Leaves (d) Stem	1
Q3.	Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)	
I	_____ data is difficult to process for AI applications.	1
II	Precision means when the model predict yes. (True/False)	1
III	_____ is defined as the percentage of correct predictions out of all the observations.	1
IV	_____ is the process of dividing a block of sentence into individual sentences	1
V	The resolution of most images we use is measured in (a)RGB (b) Pixels (c) Grayscale (d) HSV	1
VI	Which of these is not an application of computer vision (a)Face unlock of users (b) Text Chatbot (c) Self-driving Cars (d) Google Lens	1
Q4.	Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)	
I	Automatic categorization of news into different categories is an example of text classification(True/False)	1
II	What metric calculated as $TP/(TP+FP)$? (a)Accuracy (b) Precision (c) Recall (d) F-score	1
III	What do we call the process of dividing a string into component words? (a)Regression (b) Word Tokenization (c) classification (d) Clustering	1
IV	Through which of the following does machine learning understand data? (a)Developer (b) Set of Codes (c) Ethics (d) Pattern	1
V	If there are 10 correct predictions in a data set of 50 what is the accuracy? (a)50% (b) 10% (c) 20% (d) 25%	1
VI	Earlier, use of unstructured data required heavy computational power (True/False).	1
Q5.	Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)	
I	What is the science of collecting data, analyzing it and interpreting it using data visualization techniques? (a) Qualitative analysis (b) Quantitative analysis (c) Descriptive analysis (d) Inference analysis	1
II	Which python packages are not used to for data science. (a)Numpy (b) NLTK (3) Pandas (d) Matplotlib	1
III	When for an AI Model ,Predicted and Actual Values are negative, it is known as a) TN b) FP c) FN d) TP	1
IV	The higher the value, the more important the word in the document –this is true of which model? (a)Bag of Words (b) TF-IDF (c) YOLO (d) SSD	1
V	Which library is used for extracting features from images? (a) CV NET (b) OpenCV (c) New CV (d) Fresh CV	1
VI	_____refers to a system that is capable of predicting the future preference of a set of items for a user, and recommending the top items. (a)Targeted Advertising (b) Recommender System (c) Route Planner (d) Digital Advertising	1

SECTION B: SUBJECTIVE TYPE QUESTION

Answer any 3 out of the given 5 questions on Employability Skills(2X3=6 marks)

Answer each question 20-30 words.

Q.6	Write the 7'C Effective Communication.	2
Q.7	What is stress? Why stress management is important?	2
Q.8	Write about the function of Operating System.	2
Q.9	State any two benefits of Entrepreneurship to society?	2
Q.10	Write about any two SDG goals.	2

Answer any 4 out of the given 6 questions in 20-30 words each (2X4=8 marks)

Q11	What are the different Applications of Artificial Intelligence?	2
Q12	What is the difference between Training Data & Testing Data?	2
Q13	What is Recall in AI? Write its Formula.	2
Q14	What is Sentence Segmentation in AI?	2
Q15	What is Computer Vision?	2
Q16	What is the purpose of Data Science in AI?	2

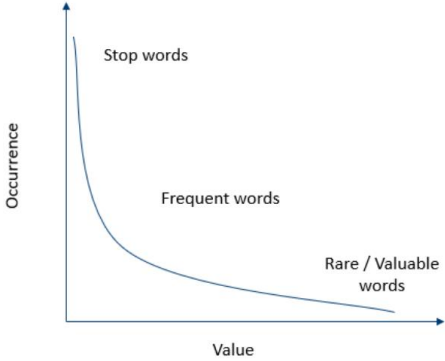
Answer any 3 out of the given 5 questions in 50-80 words each (4x3=12 marks)

Q17	Automated trade industry has developed an AI model which predicts the selling and purchasing of automobiles. During testing, the AI model came up with the following predictions.		4									
	Confusion Matrix	<table border="1"> <thead> <tr> <th></th> <th>Reality yes</th> <th>Reality No</th> </tr> </thead> <tbody> <tr> <th>Predicted yes</th> <td align="center">60</td> <td align="center">25</td> </tr> <tr> <th>Predicted No</th> <td align="center">5</td> <td align="center">10</td> </tr> </tbody> </table>			Reality yes	Reality No	Predicted yes	60	25	Predicted No	5	10
		Reality yes		Reality No								
	Predicted yes	60		25								
Predicted No	5	10										
(1) How many total tests have been performed in the above scenario? (2) Calculate precision, recall and F1 Score.												
Q18	Write the steps of Text normalisation? Explain.	4										
Q19	What is 4Ws Problem Canvas?	4										
Q20	Define the following terms (a) Data Exploration (b) Data Acquisition (c) Supervised Learning (d) Unsupervised learning	4										
Q21	Aman is amazed to learn about his sister Rani who is multi-talented and has excelled in academics, music, dancing and painting. He was quite curious when Rani told him that he too possessed all these intelligences like every human being does, but only at different levels. He wondered which intelligence she was talking about. Can you help Aman in learning about different types of intelligences by naming and explaining any four types of intelligences?	4										

QUESTION PAPER 2

SECTION A - OBJECTIVE TYPE QUESTIONS

Q.1	Answer any 4 out of the given 6 questions on Employability Skills (1 x 4 = 4 marks)	
I.	<p><i>“Mr E Shreedharan, Former Managing Director, Delhi Metro Rail Corporation Ltd, was a hardworking and energetic person. With his dedication and respect for others, he motivated his team to work hard and achieve results.”</i></p> <p>Which self-management skill is clearly visible in the given statement?</p>	1
II.	<p>What does this CTRL+a do ?</p> <p>a) Cut b) Copy c) Paste d) Select all</p>	1
III.	<p>Assertion (A): There are many entrepreneurs in the market. The entrepreneur has to remain in a competitive market.</p> <p>Reason (R) : The statement given above is for Enter Stage of Entrepreneur Career Process</p> <p>a) Both A and R are correct and R is the correct explanation of A b) Both A and R are correct but R is NOT the correct explanation of A c) A is correct but R is not correct d) A is not correct but R is correct</p>	1
IV.	<p>Which organisation has made the Sustainable Development Goals.</p> <p>a) United Nations b) League of Nations c) UNICEF d) World Health Organisation</p>	1
V.	<p>Sanvika works in a banking firm. Her boss always finds a reason to reprimand her. Due to this she is unable to discuss the issues she is facing in her day-to-day job, to her boss. This is an example of _____.</p> <p>a) Interpersonal barrier b) Physical barrier c) Linguistic barrier d) Organisational barrier</p>	1
VI.	<p>What does ‘M’ stand for in ‘SMART’ goals?</p>	1
Q.2	Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)	
I.	<p>Assertion(A) : A bot that can automate the surroundings is not an example of AI Reason(R) : The bot is not trained on data and cannot be considered as an AI device</p> <p>a) Both A and R are correct and R is the correct explanation of A b) Both A and R are correct but R is not the correct explanation of A c) A is correct but R is not correct d) A is not correct but R is correct.</p>	1
II.	<p>A gap has emerged between people who can afford AI enabled devices and people who cannot afford AI enabled devices and it gets widened with the rapid advancement of technology.</p> <p>Which terminology can be used to describe the above scenario?</p> <p>a) AI Ethics b) Data Privacy c) AI Bias d) AI Access</p>	1

III.	<p>Statement 1 : Neural Networks are capable of extracting data features automatically. Statement 2: Neural Networks tend to perform better with larger dataset.</p> <p>a) Both Statement1 and Statement2 are correct b) Both Statement1 and Statement2 are incorrect c) Statement1 is correct but Statement2 is incorrect d) Statement2 is correct but Statement1 is incorrect</p>	1
IV.	<p>_____ layers are the layers of a Neural Network in which the whole processing occurs.</p>	1
V.	<p>A _____ is a computer program which is used for accounting and recording data using rows and columns into which information can be entered.</p> <p>a) CSV b) SQL c) JPG d) EXCEL</p>	1
VI.	 <p>Which of the following statements are correct with respect to the above-mentioned graph?</p> <p>a) The stop words are most valuable in a corpus b) Rare words are most valued in a corpus c) Stop words occur rarely in corpus d) The more the words the more the value</p>	1
Q.3	<p style="text-align: center;">Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)</p>	
I.	<p>Choose the incorrect statement:</p> <p>a) All ML applications are AI b) All DL applications are AI c) All ML applications are DL d) All DL applications are ML</p>	1
II.	<p>A supervised learning algorithm works on _____ (labelled/unlabelled) dataset.</p>	1
III.	<p>Which of the following sources of data is used for online data collection:</p> <p>a) Sensors b) Surveys c) Kaggle d) Observations</p>	1
IV.	<p>_____ is the process of detecting instances of the objects, giving them a category and then giving each pixel a label on the basis of that.</p> <p>a) Image segmentation b) Object detection c) Classification</p>	1

	d) Instance segmentation	
V.	Identify the given Chat bot type: These types of bots are deployed in the customer care section of various companies. Their job is to answer some basic queries that they are coded for and connect them to human executives once they are unable to handle the conversation.	1
VI.	Which terminology can be used to describe the scenario where reality and prediction matches and the model predicts a Yes. a) True Positive b) False Positive c) False Negative d) True Negative	1
Q. 4	Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)	
I.	Which Ethical issue does the following scenario depict? If you search on Google for salons, the first few searches are mostly for female salons. This is based on the assumption that if a person is searching for a salon, in all probability it would be a female.	1
II.	Statement1: Accuracy is defined as the percentage of wrong predictions out of all the observations Statement2: Precision is defined as the percentage of true positive cases versus all the cases where the prediction is true a) Both Statement1 and Statement2 are correct b) Both Statement1 and Statement2 are incorrect c) Statement1 is correct but Statement2 is incorrect d) Statement2 is correct but Statement1 is incorrect	1
III.	The number of pixels in an image is sometimes called the _____.	1
IV.	Companies use Natural Language Processing applications, such as _____, to identify opinions to help them understand what customers think about their products and services. a) Automatic Summarization b) Sentiment Analysis c) Text classification d) Virtual Assistants	1
V.	Name the condition that will result in the inability of the model to learn the training data effectively resulting in poor performance both on the training and testing data.	1
VI.	Sadhana is collecting data for a shape classification application. The data she collects is in the form of unlabelled data. Which of the statement is correct for the model Sadhana plans to develop? a) Sadhana should use Supervised Classification based algorithm to develop the model. b) Sadhana should use Supervised Regression based algorithm to develop the model. c) Sadhana should use clustering techniques to develop the model d) None of the above	1
5	Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)	

I.	Select an example where Recall can be used to evaluate the model. a) Drug testing b) forest fire c) Mining d) spam filter	1
II.	Janani is planning to create an AI system that will predict the percentage of class X board exam students. She trained the software with lots of data sets catering to all difficulty levels. Identify the domain of AI in the given scenario. a) Computer Vision b) Data Science c) Natural Language Processing d) None of these	1
III.	Select the statement that is correct with respect to tokenisation a) In this step the entire corpus is broken down to sentence b) In this step the stop words are removed c) In this step the sentences are split into tokens d) In this step the words are changed to their root form	1
IV.	Which colour will be displayed in a coloured image when R=G=B=255? a) Red b) Blue c) White d) Black	1
V.	Which algorithms result in two things, a vocabulary of words and frequency of the words in the corpus? a) Sentence segmentation b) Tokenisation c) Bag of words d) Text normalisation	1
VI.	Which is an ideal value for F1 Score?	1
<u>SECTION B: SUBJECTIVE TYPE QUESTIONS</u>		
Answer any 3 out of the given 5 questions on Employability Skills (2 x 3 = 6 marks) Answer each question in 20 – 30 words.		
Q.6	What are the different types of feedback in a communication cycle?	2
7	What is the difference between Interests and Abilities? What should be done if your interest does not match your ability?	2
Q.8	Explain the different threats to a computer system?	2
Q.9	List the ways in which an entrepreneur affects a society	2
Q.10	Mention any 2 major problems related to sustainable development	2
Answer any 4 out of the given 6 questions in 20 – 30 words each (2 x 4 = 8 marks)		

11	Explain Data Privacy issues in AI ethics.	2													
Q.12	What are system maps? In which stage of AI project cycle do we use system maps?	2													
Q.13	What is the difference between Rule based system and Learning based systems. Also mention 2 disadvantages of Rule based systems.	2													
Q.14	Define Pixel. What is the range of a pixel value in the case of Grayscale Images?	2													
Q.15	What is the difference between Stemming and Lemmatization. Explain it with the help of a suitable example.	2													
Q.16	Draw the confusion matrix for the following data : <ul style="list-style-type: none"> • The number of true positive = 70 • The number of true negative =37 • The number of false positive = 52 • The number of false negative = 150 	2													
Answer any 3 out of the given 5 questions in 50– 80 words each (4 x 3 = 12 marks)															
Q.17	Ranjit is trying to learn about the different stages of AI Project cycle. Help him in understanding the different stages in the correct order of occurrence. Briefly write the various activities performed in each stage.	4													
Q.18	What are the different ways in which we can acquire data? Why should we be careful while acquiring data from internet?	4													
Q.19	Explain ANN with a suitable diagram. Mention any 2 features of ANN.	4													
Q.20	Differentiate between script bot and smart bot . Mention at least 4 differences	4													
Q.21	<p>Sang Avi Ltd made the following AI based application for Face recognition. The confusion matrix for the system is as below :</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2" rowspan="2">Confusion Matrix</th> <th colspan="2">Reality</th> </tr> <tr> <th>Yes</th> <th>No</th> </tr> </thead> <tbody> <tr> <th rowspan="2">Prediction</th> <th>Yes</th> <td style="text-align: center;">60</td> <td style="text-align: center;">20</td> </tr> <tr> <th>No</th> <td style="text-align: center;">15</td> <td style="text-align: center;">40</td> </tr> </tbody> </table> <p>(i) Identify the total number of wrong predictions made by the model. (ii) Calculate precision, recall and F1 Score.</p>	Confusion Matrix		Reality		Yes	No	Prediction	Yes	60	20	No	15	40	4
Confusion Matrix				Reality											
		Yes	No												
Prediction	Yes	60	20												
	No	15	40												

**KV DRDO
CLASS 10th
SCIENCE
WINTER BREAK HHW**

- 1. Revise the syllabus for PB2 Exam**
- 2. Solve the following two sample papers in your notebooks.**

- ❖ This question paper contains 10 printed pages.
- ❖ This question paper contains 39 questions.
- ❖ Write down the question number before attempting.
- ❖ An additional reading time of 15 minutes will be given.

General Instructions

- i. This question paper consists of 39 questions in 5 sections.*
- ii. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.*
- iii. Section A consists of 20 objective type questions*

**SAMPLE PAPER
Class-10 SET-1
Science (086)**

Time Allowed: 3 hours

Maximum Marks:80

Roll No.:

Date: --/--/----

SECTION – A

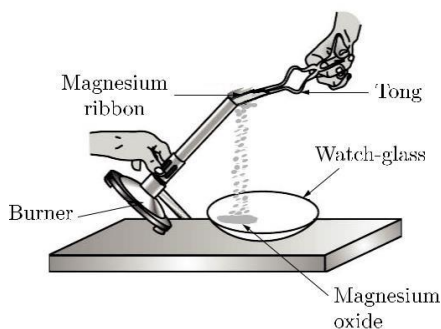
20 x 1 = 20

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

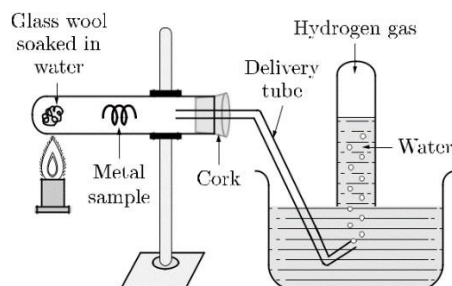
1. Which of the following is/are correct for diluting acid?
 - 1) Water by stirring.
 - 2) Water to acid by stirring.
 - (a) Only 1
 - (b) Only 2
 - (c) Both 1 and 2
 - (d) Neither 1 nor
2. Which of the following statements is correct about an aqueous solution of an acid and of base?
 - i) Higher the pH, stronger the acid
 - ii) Higher the pH, weaker the acid

- iii) Lower the pH, stronger the base
- iv) Lower the pH, weaker the base
- a) 1 and 3
- b) 2 and 3
- c) 1 and
- d) d) 2 and 4

3. In the double displacement reaction between aqueous potassium iodide and aqueous lead nitrate, a yellow precipitate of lead iodide is formed. While performing the activity if lead nitrate is not available, which of the following can be used in place of lead nitrate?
- a) Lead sulphate (insoluble)
 - b) Lead acetate
 - c) Ammonium nitrate
 - d) Sulphate
4. Magnesium ribbon is rubbed with sand paper before making it to burn. The reason of rubbing the ribbon is to:



- (a) Remove moisture condensed over the surface of ribbon.
 - (b) Generate heat due to exothermic reaction.
 - (c) Remove magnesium oxide formed over the surface of magnesium.
 - (d) Mix silicon from sand paper (silicon dioxide) with magnesium for lowering ignition temperature of the ribbon.
5. Which one the following properties is not generally exhibited by ionic compound?
- (a) Solubility in water
 - (b) Electrical conductivity in solid state
 - (c) high melting and boiling point
 - (d) (d)Electrical conductivity in molten state.
6. Which of the following oxide(s) of iron would be obtained on prolonged reaction of iron with steam?



- a) FeO
- b) Fe₂ O₃
- c) Fe₃ O₄
- d) Fe₂ O₃ and Fe₃ O₄

7. Mineral acids stronger acids than carboxylic acids because

- (i) Mineral acids are completely ionized.
- (ii) Carboxylic acids are completely ionized
- (iii) Mineral acids are partially ionized
- (iv) Carboxylic acids are partially ionized

- a) (i) and (iv)
- b) (ii) and (iii)
- c) (i) and (ii)
- d) (iii) and (iv)

8. When we touch the leaves of “touch-me-not” plant, they begin to fold up and droop. How does the plant communicate the information of touch?

- (a) The plant uses electrical signals to transfer information from the external environment to cells.
- (b) The plant uses electrical- chemical signals to transfer information from cell to cell.
- (c) The plant uses electrical- chemical signals to transfer information from tissue to specialized cells.
- (d) The plant uses electrical signals to transfer information from cell to specialized tissues.

9. After our nose senses a smell, which option shows the mechanism of the travelling of sense in our body?

- (a) Olfactory receptors → dendritic tip of a nerve cell → axon → nerve ending → release of signal → dendritic tip of other nerve cell
- (b) Olfactory receptors → dendritic tip of a nerve cell → axon → cell body → release of signal → dendritic tip of other nerve cell
- (c) Gustatory receptors → dendritic tip of a nerve cell → cell body → axon → release of signal → dendritic tip of other nerve cell
- (d) Gustatory receptors → dendritic tip of a nerve cell → axon → cell body → release of signal → dendritic tip of other nerve cell

10. Which of the following is an example of genetic variation?

- (a) One person has a scar but his friend doesn't
- (b) One person is older than the other
- (c) Eats meat but her sister Geeta is a vegetarian
- (d) Two children have different eye color

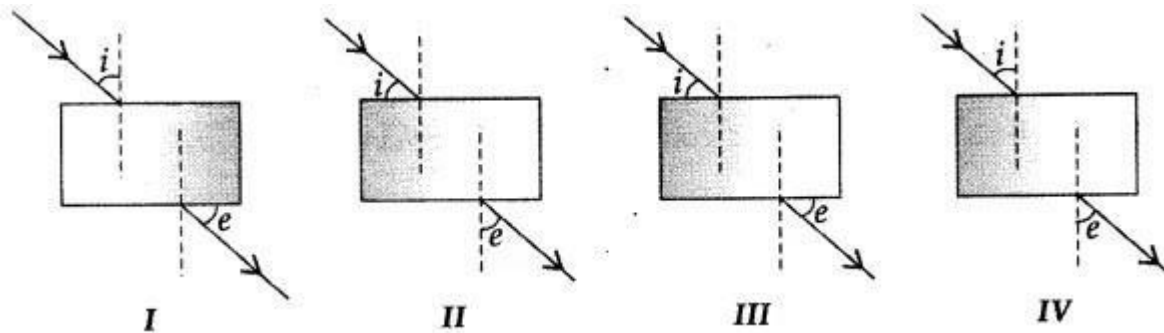
11. Two plants one with round green seeds (RRyy) and another with wrinkled yellow (rrYY) seeds produce F1 progeny that have round yellow (RrYy) seeds. When F1 plants are self-pollinated, the F2 progeny will have a new combination of characters. Choose the new combinations from the following:

- (i) Round, yellow
- (ii) Round, green
- (iii) Wrinkled, Yellow
- (iv) Wrinkled, green
- (a) (i) and (ii)
- (b) (i) and (iv)
- (c) (ii) and (iii)
- (d) (i) and (iii)

12. Which of the following is a contraceptive?

- A) Copper T
- B) Condom
- C) Diaphragm
- D) All of these

13. A student does the experiment on tracing the path of a ray of light passing through a rectangular



glass slab for different angles of incidence. He can get a correct measure of the angle of incidence and the angle of emergence by following the labelling indicated in figure:

- a) I
- b) II
- c) III
- d) IV

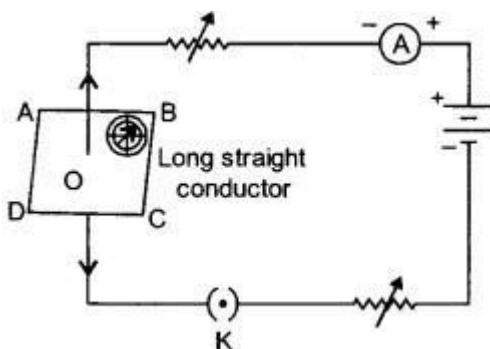
14. At a particular minimum value of angle of deviation, the refracted ray becomes:

- a) Parallel to base of prism
- b) Perpendicular to base of prism
- c) Inclined at 45degrees w.r.t base of prism
- d) None

15. The resistance of hot filament of the bulb is about 10 times the cold resistance. What will be the resistance of 100 W-220 V lamp, when not in use?

- a) 48Ω
- b) 400Ω
- c) 484Ω
- d) 48.4Ω

16. If the key in the given arrangement is taken out (the circuit is made open) and magnetic field lines are drawn over the horizontal plane ABCD, the lines are



- a) Concentric circles
- b) Elliptical in shape
- c) straight lines parallel to each other
- d) Concentric circles near the point O but of elliptical shapes as we go away from it

Qn. no 17 to 20 Reason and assertion

The following questions consist of two statements – Assertion (A) and Reason ®. Answer these questions selecting the appropriate option given below:

- i. Both A and R are true and R is the correct explanation of A.
- ii. Both A and R are true but R is not the correct explanation of A.
- iii. A is true but R is false.
- iv. A is false but R is true.

17. Assertion: photosynthesis is considered as an endothermic reaction

Reason: energy gets released in the process of photosynthesis

18. Assertion(A): The offspring produced by sexual reproduction is likely to adjust better in environmental fluctuation.

Reason ®: During the fusion of gametes there is mixing of genetic material from two parents.

19. Assertion: females, the egg is carried from the ovary to the womb through a thin oviduct or fallopian tube.

Reason ®: The uterus opens into the vagina through the cervix.

20. Assertion (A): When the resistances are connected between the same two points, they are said to be connected in parallel.

Reason (R): In case the total resistance is to be decreased, then the individual resistances are connected in parallel.

SECTION – B

6 x 2 = 12

Q. no. 21 to 26 are very short answer question

21. What is meant by galvanisation? Why is it done?

OR

Why do ionic compounds conduct electricity in molten state?

22. A. Give the basic features of the mechanism of inheritance.

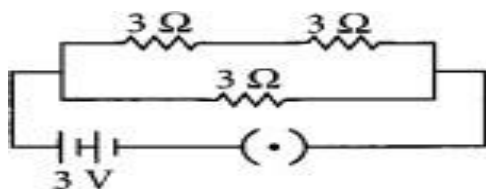
B. How can pregnancy be prevented surgically?

23. Which compounds are responsible for the depletion of ozone layer?

24. What are the various steps in a food chain called?

25. What are enzymes? Name any one enzyme of the digestive system and write its function.

26. Three resistors of $3\ \Omega$ each are connected to a battery of $3\ \text{V}$ as shown. Calculate the current drawn from the battery.



OR

Draw a labelled diagram to explain the formation of a rainbow in the sky.

SECTION C

Qn. No 27 to 33 (Short answer)

7 x 3 = 21

27. An element A react with water to form a compound B which is used in white washing. The compound B on heating forms an oxide which on treatment with water gives back B. identify A, B and C and give reason involved?

28. What is meant by skeletal type chemical equation? What does it present? using the equation for electrolytic decomposition of water, differentiate between a skeletal equation and balanced equation?

29. Can you justify the statement that “Human males are responsible for determining the sex of the baby and not females”?

OR

- a. Define Glycolysis.
 - b. What is saliva? State its role in the digestion of food.
30. a) With the help of labelled ray diagram show the path followed by a narrow beam of monochromatic light when it passes through a glass prism.
- b) What would happen if this beam is replaced by a narrow beam of white light?
31. Wire has a resistance of 16Ω . It is melted and drawn into a wire of half its original length. Calculate the resistance of the new wire. What is the percentage change in its resistance?
32. Give reason for the following
- (i) There is either a convergence or a divergence of magnetic field lines near the ends of a current carrying straight solenoid.
 - (ii) The current carrying solenoid when suspended freely rests along a particular direction.

OR

- a) State three factors on which the strength of magnetic field produced by a current carrying solenoid depends.
 - b) Draw circuit diagram of a solenoid to prepare an electromagnet.
33. Distinguish between biodegradable and non-biodegradable wastes?

SECTION – D

Long answer questions

3 x 5 = 15

34) Write the next homologue of each of the following:

- a) (i) C_2H_4
- (ii) C_4H_6

b) What is meant by isomers? Draw the structures of two isomers of butane, C_4H_{10} . Explain why we cannot have isomers of first three members of alkane series.

c) State two properties of carbon which lead to huge number of carbon compounds we see around us.

OR

Answer the following questions:

- (a) Describe a chemical test to distinguish between ethanol and ethanoic acid.
- (b) Give reason for the following:
 - (i) Ethanol is used in the preparation of tincture iodine.
 - (ii) acid is used in the preservation of pickles.

35. Write the main functions of the following:

- (a) Sensory neuron
- (b) Cranium

- (c) vertebral column
- (d) Motor neuron

OR

a) State the role played by the following in the process of digestion:

- (i) Enzyme trypsin
- (ii) Enzyme lipase-

b) List two functions of finger-like projections present in the small intestine

36. The rainbow is a natural spectrum appearing in the sky after a rain Shower.

- a. Is it correct to say that a rainbow is always formed in a direction opposite to sun? (1m)
- b. Can it be seen on a sunny day? (1m)
- c. Arrange the sequence in correct sequential order Refraction, Internal Reflection, Refraction & Dispersion. (1m)
- d. Explain why the planets do not twinkle. (2m)

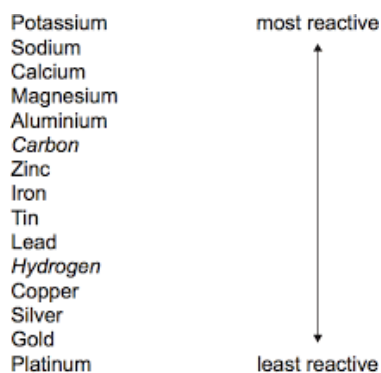
SECTION – E

QN. NO.37 to 39 case study questions

3 x 4 = 12

37. Activity series

Relative reactivities of metals



1. What happens when iron nail is added to copper sulphate solution? What is the colour change?
2. Identify the metal which reacts with very dilute nitric acid to evolve hydrogen gas. Name one more metal not given in the above series which reacts in the same way with dilute nitric acid.
3. Name one important ore of copper with its chemical formula.
4. a) Which method is used to extract sodium from molten sodium chloride

OR

b) Which metal is used in the galvanization of iron?

38. An ecosystem may be defined as a structural and functional unit of the biosphere comprising living organisms and their non-living environment which interact by means of food chains and biogeochemical cycles resulting in energy flow, biotic diversity, and material cycling to form a stable, self-supporting system.

1. The two basic processes involved in an ecosystem are:
 - a) Cycling of materials and food chains
 - b) Energy flow and self-sustainability
 - c) carbon cycle and biotic diversity
 - d) Cycling of materials and flow of energy
2. Which among the following is not an artificial ecosystem?
 - a) Orchard
 - b) Lake
 - c) Aquarium
 - d) Cropland
3. The role of fungi and bacteria in an ecosystem is to:
 - a) Increase the supply of nutrients
 - b) Increase the supply of energy
 - c) release nutrients from dead organic matter
 - d) Increase the amount of carbon dioxide in the atmosphere
4. Which of the following holds true for an ecosystem?
 - a) Animals can live without plants.
 - b) Plants can live without animals.
 - c) Animals can survive for long without plants.
 - d) Plants can survive for long without animals.

39. An insulated copper wire wound on a cylindrical cardboard tube such that its length is greater than its diameter is called a solenoid. When an electric current is passed through the solenoid, it produces a magnetic field around it. The magnetic field produced by a current-carrying solenoid is similar to the magnetic field produced by a bar magnet. The field lines inside the solenoid are in the form of parallel straight lines. The strong magnetic field produced inside a current-carrying solenoid can be used to magnetise a piece of magnetic material like soft iron, when placed inside the solenoid. The strength of magnetic field produced by a current carrying solenoid is directly proportional to the number of turns and strength of current in the solenoid.

- (i) The strength of magnetic field inside a long current -carrying straight solenoid is
 - (a) More at the ends than at the centre
 - (b) Minimum in the middle
 - (c) same at all points
 - (d) Found to increase from one end to the other.
- (ii) The north-south polarities of an electromagnet can be found easily by using
 - (a) Fleming's right-hand rule

- (b) Fleming's left-hand rule
- (c) Clock face rule
- (d) Left-hand thumb rule

(iii) For a current in a long straight solenoid N- and S-poles are created at the two ends.

Among the following statements, the incorrect statement is

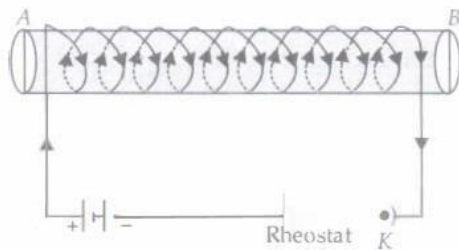
- (a) The field lines inside the solenoid are in the form of straight lines which indicates that the magnetic field is the same at all points inside the solenoid.
- (b) The strong magnetic field produced inside the solenoid can be used to magnetise a piece of magnetic material like soft iron, when placed inside the coil.
- (c) The pattern of the magnetic field associated with the solenoid is different from the pattern of the magnetic field around a bar magnet.
- (d) The N- and S-poles exchange position when the direction of current through the solenoid is reversed.

(iv) long solenoid carrying a current produces a magnetic field B along its axis. If the current is double and the number of turns per cm is halved, then new value of magnetic field is

- a) B (b) $2B$ (c) $4B$ (d) $B/2$

OR

(iv) A soft iron bar is enclosed by a coil of insulated copper wire as shown in figure. When the plug



of the key is closed, the face B of the iron bar marked as

- a) N-pole
- b) S-pole
- c) N-pole if current is large
- d) S-pole if current is small

Class-10 (set 2)

Science (086)

Time Allowed: 3 hours

Maximum Marks:80

Roll No.:

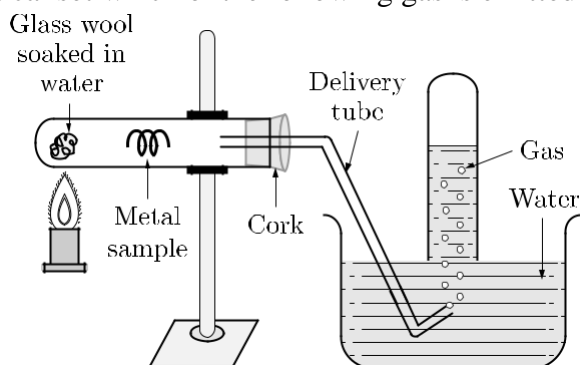
Date: --/--/----

SECTION – A

1 X 20 = 20

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

1. In the following practical set which of the following gas is emitted?



- (a) Hydrogen
- (b) Carbon monoxide
- (c) Carbon dioxide
- (d) Nitrogen

2. When hydrogen sulphide gas is passed through a blue solution of copper sulphate, a black precipitate of copper sulphide is obtained and the sulphuric acid so formed remains in the solution. The reaction is an example of-

- (a) a combination reaction
 - (b) a displacement reaction
 - (c) a decomposition reaction
 - (d) a double decomposition reaction
3. Consider the following table:

Substance	pH
Lemon	2.3
Battery acid	x
Sea water	8.5
Apple	3.1

The value of x in above table is:

- (a) 0
 - (b) 1.3
 - (c) 2.5
 - (d) 1.9
4. The soap molecule has a
- (a) hydrophilic head and a hydrophobic tail
 - (b) hydrophobic head and a hydrophilic tail
 - (c) hydrophobic head and a hydrophobic tail
 - (d) hydrophilic head and a hydrophilic tail
5. Which of the following statements about the reaction given below are incorrect?
- $$2\text{PbO}(s) + \text{C}(s) \rightarrow 2\text{Pb}(s) + \text{CO}_2(g)$$
- 1. Lead is getting reduced.
 - 2. Carbon dioxide is getting oxidised.
 - 3. Carbon is getting oxidised.
 - 4. Lead oxide is getting reduced.
- (a) 1 and 2
 - (b) 3 and 4
 - (c) 1 and 3
 - (d) 2 and 4
6. An element reacts with oxygen to give a compound with a high melting point. This compound is also soluble in water. The element is likely to be
- (a) Calcium
 - (b) Carbon
 - (c) Silicon
 - (d) iron
7. Identify the basic salt from the following salt?
- (a) Na_2CO_3
 - (b) NH_4Cl
 - (c) NaNO
 - (d) KCl

8. In peas, a pure tall (TT) is crossed with a pure short plant(tt). The ratio of pure tall plants to pure short plants in F2 generation is:

- (a) 1:3
- (b) 3:1
- (c) 1:1
- (d) 2:1

9. Which of the following statements is correct about receptors?

- (a) Gustatory receptors detect taste while olfactory receptors detect smell
- (b) Both gustatory and olfactory receptors detect smell
- (c) Auditory receptors detect smell and olfactory receptors detect taste
- (d) Olfactory receptors detect taste and gustatory receptors smell

10. The characteristic processes observed in anaerobic respiration are

- i) presence of oxygen
- ii) release of carbon dioxide
- iii) release of energy
- iv) release of lactic acid

- (a) i), ii) only
- (b) i), ii), iii) only
- (c) ii), iii), iv) only
- (d) iv) only

11. Which of the following is an example of genetic variation?

- (a) One person has a scar but his friend doesn't
- (b) One person is older than the other
- (c) Reeta eats meat but her sister Geeta is a vegetarian
- (d) Two children have different eye colour

12. The manufacturing of Chlorofluorocarbons free refrigerators is mandatory throughout the world. How does this help prevent ozone depletion?

- a) This will help convert oxygen molecules into ozone.
- b) This will help convert the CFCs into ozone molecules.
- c) This will reduce the production of CFC from oxygen molecules.
- d) This will reduce the release of CFCs that reacts with ozone molecules

13. A person cannot see distinctly objects kept beyond 2 m. This defect can be corrected by using a lens of power:

- (a) + 0.5 D
- (b) - 0.5 D
- (c) + 0.2 D
- (d) - 0.2 D

14. If we place the magnetic compass near the north pole of the magnet, which pole of the needle will point towards it?

- (a) North pole
- (b) South pole
- (c) Keep deflecting
- (d) None of these

15. Two conducting wires of the same material and of equal lengths and equal diameters are first connected in series and then in parallel in a circuit across the same potential difference. The ratio of heat produced in series and parallel combinations would be:

- (a) 1 : 2
- (b) 2 : 1
- (c) 1 : 4
- (d) 4 : 1

16. In an experiment to trace the path of a ray of light through a triangular glass prism, a student would observe that the emergent ray:

- (a) is parallel to the incident ray.

(b) is along the same direction of incident ray.

- (c) gets deviated and bends towards the thinner part of the prism.
(d) gets deviated and bends towards the thicker part (base) of the prism.

Q. no 17 to 20 are Assertion - Reasoning based questions.

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

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

17. Assertion (A): An equation is the shorthand representation of a chemical reaction.

Reason (R): A chemical reaction is a process in which a chemical substance is transformed into another chemical substance

18. Assertion(A): A geneticist crossed two pea plants and got 50% tall and 50% dwarf in the progeny.

Reason (R): One plant was heterozygous tall and the other was dwarf.

19. Assertion(A): The effect of Auxin hormone on the growth of root is exactly opposite to that on a stem.

Reason(R): Auxin hormone increase the rate of growth in root and decrease rate of growth in stem.

20. Assertion: In a series circuit, the current is constant throughout the electric circuit.

Reason: All electric devices do not need equal currents to operate properly.

SECTION – B

Q. no. 21 to 26 are very short answer questions

6 X 2 = 12

21. A metal A, which is used in thermit process, when heated with oxygen gives an oxide B, which is amphoteric in nature. Identify A and B. Write down the reactions of oxide B with HCl and NaOH.

OR

Aluminium occurs in combined state whereas gold is found in free state. Why?

22. (a) Name the various factors which affect the rate of photosynthesis.

(b) what are peristaltic movements?

23. Name the various cells through which water moves upward to reach the leaves.

24. In which chamber of heart is oxygenated and deoxygenated blood found?

25. Genes and chromosomes have similar behaviour. Justify this Statement.

26. Differentiate lens and mirror

OR

Differentiate reflection and refraction of light

SECTION - C

Q.no. 27 to 33 are short answer questions

7 X 3 = 21

27. When hydrogen sulphide gas is passed through a blue solution of copper sulphate, the colour of the solution fades and a black precipitate is obtained.

a) Name the type of reaction mentioned above.

b) Why does the colour of the solution fade away?

c) Write the chemical name of the black precipitate formed.

28.(a) Arrange the metals Zn, Mg, Al, Cu and Fe in decreasing order of reactivity.

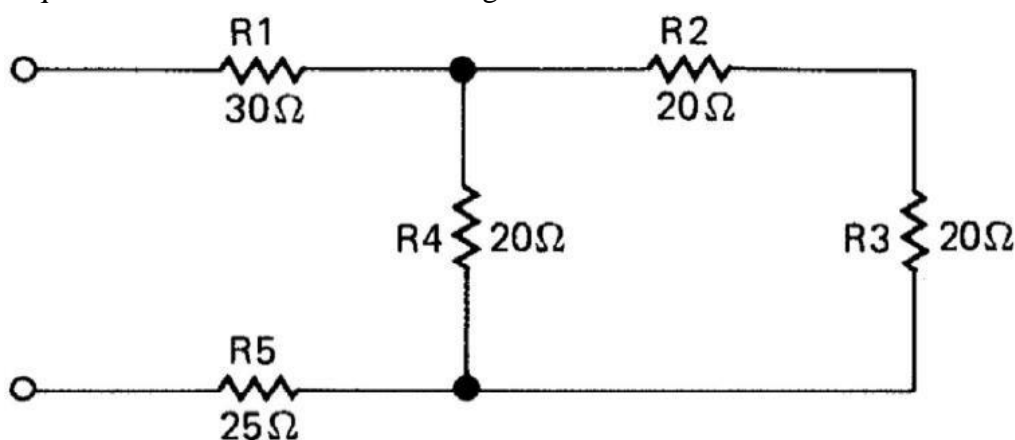
(b) What would you observe when you put

(i) Some zinc pieces into blue copper sulphate solution?

(ii) Some copper pieces into green ferrous sulphate solution.

(c) Name a metal which combines with hydrogen gas. Name the compound formed.

29. A. Draw the longitudinal section of flower and mention the parts.
 B. Explain process of digestion in amoeba with diagram
 or
 C. List the two types of reproduction. Which one of the two is responsible for bringing in more variations in its progeny and how?
30. What is fragmentation in organisms? Name a multicellular organism which reproduces by this method.
31. i) Name the mirror that can give an erect and enlarged image of an object and write its uses.
 ii) An object is placed at 20cm in front of a concave mirror of focal length 10cm. At what distance from the mirror should a screen be placed in order to obtain a sharp image?
32. A 14-year-old student is not able to see clearly the questions written on the blackboard placed at a distance of 5m from him.
 a) Name the defect of vision he is suffering from.
 b) With the help of labelled ray diagrams show how this defect can be corrected
 c) Name the type of lens used to correct this defect.
33. Find the equivalent resistance of the following circuit:



SECTION - D

Q.no. 34 to 36 are long answer questions.

3 X 5 = 15

34. The formula of four organic compounds are given below:

A B C D



- Which one of these compounds A, B, C or D is a saturated hydrocarbon?
- Identify the organic acid and give its structural formula.
- Which of the above compounds when heated at 443K in the presence of concentrated H_2SO_4 forms ethene as the major product? What is the role played by concentrated H_2SO_4 in this reaction? Also write the chemical equation involved.
- Give a chemical equation when B and C react with each other in presence of concentrated H_2SO_4 . Name the major product formed and mention one of its important uses.

OR

- Carry out the following conversions giving complete conditions for the reaction to take place in each case:
 - Ethanoic acid from Ethanol
 - Ethane from Ethene
 - Ester from Ethanoic acid and ethanol
- Detergents are preferred over soaps. Why? (Give one reason)

35. A.(a) How does Mendel's experiment show that traits may be dominant or recessive?
 (b) How traits get expressed from parents to offspring? Explain with an example.

OR

B.(a) What is ovulation?

(b) How is it beneficial for the foetus to have a circulatory system that is not directly attached to the circulatory system of mother?

(c) What changes occur at the time of birth?

36. i) State one main difference between A.C and D.C. Why A.C is preferred over D.C for long range transmission of electric power? Name one source each of D.C and A.C

ii) When does an electric short circuit occur?

SECTION - E

Q.no. 37 to 39 are case - based/data -based questions with 2 to 3 short sub - parts. Internal choice is provided in one of these sub-parts. 3 X 4 = 12

37. A metal carbonate *X* on heating with an acid gives a gas which when passed through a solution *Y* gives the carbonate back. On the other hand, a gas *G* that is obtained at anode during electrolysis of brine is passed on dry *Y*, it gives a compound *Z*, used for disinfecting drinking water.

(i) Identify *X*, *Y*, *G* and *Z*.

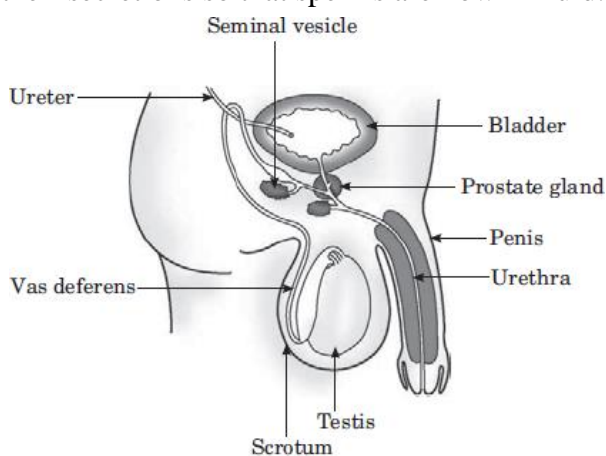
(ii) What is the nature of the gas evolved when *X* is heated?

(iii) Write the reaction involved in the formation of *G*?

OR

(iv) Write the reaction involved when *G* reacts with *Y*.

38. The male reproductive system consists of portions which produce the germ-cells and other portions that deliver the germ-cells to the site of fertilisation. Testes are located outside the abdominal cavity in scrotum because sperm formation requires a lower temperature than normal body temperature. It also has a role of secretion of male sex hormone which brings changes in appearance seen in boys at the time of puberty. Vas deferens unites with a tube coming from urinary bladder. Urethra is a common passage for sperms and urine. Prostate gland and seminal vesicles add their secretions so that sperms are now in fluid.



Human-male reproductive system

i) Name the sex hormone associated with males.

(a) Testosterone

(b) Progesterone

(c) Oestrogen

(d) None of these

ii) Which of the following statements is incorrect?

(a) Sperms are present in a fluid

(b) Fluid provides nutrition to sperms

(c) Fluid makes easier transportation of sperms

(d) Fluid helps to bind the sperms together

- iii) Testes are located outside the abdominal cavity in scrotum because
- sperms formation requires higher temperature than body temperature
 - sperms formation requires lower temperature than body temperature
 - it is easier to transport sperms from the scrotum
 - None of these

(iv) Which of the following statement is incorrect?

- Sperms and urine has a common passage from urethra.
- Sperms have long tail that helps them to move forward.
- Sperms contain genetic material.
- Sperms formation requires $1-3^{\circ}\text{C}$ higher temperature than normal body temperature.

39. White light is a mixture of seven colours is violet, indigo, blue, green, yellow, orange and red. Every colour has its own characteristic wavelength. Different colours with their wavelengths are given below in the table.

S.No	Colour	Wavelength
1	Red	7900 Å
2	Orange	6000 Å
3	Yellow	5800 Å
4	Green	5400 Å
5	Blue	4800 Å
6	Indigo	4500 Å
7	Violet	4000 Å

The phenomenon of splitting white light into seven colours when it passes through a glass prism is called dispersion of white light.

- Name the phenomenon occurring in nature due to dispersion of light.
- Light of two colours A and B pass through a glass prism. 'A' deviate more than B from its path of incidence. Which colour has a higher speed in the prism?
- Choose the correct option.
 - Each colour of light travels with same speeds in a given medium.
 - Each colour of light travels with different speeds in a given medium.
 - Only red colour of light travels with fast speed in a given medium.
 - All of the above.
- The speed of light depends upon:
 - frequency
 - wavelength
 - density
 - none of the above

_____The End_____

KENDRIYA VIDYALYA DRDO

BIOLOGY HOLIDAY HOMEWORK CLASS 11 – BIOLOGY

1. Draw a neat labelled diagram of the following and explain
 - i) C₃ cycle
 - ii) Hatch and Slack pathway
 - iii) Electron transport system
2. List growth promoters and explain their function and uses.
3. Explain with a diagram oxygen dissociation curve
4. Give diagrammatic representation of glycolysis and Citric acid cycle.
5. Draw a neat labelled diagram of human heart and explain
6. Differentiate between the different types of
 - a) Algae
 - b) Fungi
 - c) Circulatory pathways
7. Describe meiosis I
8. With help of neat labelled diagram explain the dicot root.
9. What is placentation. Explain the types with diagram.
10. Complete your practical records and classwork books (if any pending work is there)

HOLIDAY HOME WORK
CLASS -XI
SUBJECT – PHYSICS

- A. Complete the write up of following practical in Lab notebook.
- 1) To measure the diameter of a small spherical body using a Vernier Callipers.
 - 2) To measure internal diameter and depth of a given beaker/calorimeter using a Vernier Callipers and hence find its volume.
 - 3) To measure diameter of a given wire using screw gauge.
 - 4) To determine volume of an irregular lamina using screw gauge.
 - 5) To determine radius of curvature of a given spherical surface by a spherometer.
 - 6) Using a simple pendulum , plot its $L-T^2$ graph and use it to find the effective length of second's pendulum.
 - 7) To study the relationship between the temperature of a hot body and time by plotting a cooling curve.
- B. Answer the following **Assertion and Reasoning questions** -
- Directions:** Each of these questions contain two statements, Assertion and Reason. Each of these questions also has four alternative choices, only one of which is the correct answer. You have to select one of the options (a), (b), (c) and (d) given below.
- (a) Assertion is correct, reason is correct; reason is a correct explanation for assertion.
(b) Assertion is correct, reason is correct; reason is not a correct explanation for assertion
(c) Assertion is correct, reason is incorrect
(d) Assertion is incorrect, reason is correct.
- 1) **Assertion :** Bulk modulus of elasticity (K) represents incompressibility of the material.
Reason : Bulk modulus of elasticity is proportional to change in pressure.
 - 2) **Assertion :** Young's modulus for a perfectly plastic body is zero.
Reason : For a perfectly plastic body, restoring force is zero.
 - 3) **Assertion :** The angle of contact of a liquid decrease with increase in temperature.
Reason : With increase in temperature, the surface tension of liquid increase.
 - 4) **Assertion :** A large soap bubble expands while a small bubble shrinks, when they are connected to each other by a capillary tube.
Reason : The excess pressure inside bubble (or drop) is inversely proportional to the radius.
 - 5) **Assertion :** The water rises higher in a capillary tube of small diameter than in the capillary tube of large diameter.
Reason : Height through which liquid rises in a capillary tube is inversely proportional to the diameter of the capillary tube.
 - 6) **Assertion :** A beaker is completely filled with water at 4°C . It will overflow, both when heated or cooled.
Reason : There is expansion of water below and above 4°C .
 - 7) **Assertion :** Two bodies at different temperatures, if brought in thermal contact do not necessary settle to the mean temperature.
Reason : The two bodies may have different thermal capacities.
 - 8) **Assertion :** When a bottle of cold carbonated drink is opened, a slight fog forms around the opening.
Reason : Adiabatic expansion of the gas causes lowering of temperature and condensation of water vapours.
 - 9) **Assertion :** The specific heat of a gas in an adiabatic process is zero and in an isothermal process is infinite.
Reason : Specific heat of a gas is directly proportional to change of heat in system and inversely proportional to change in temperature.
 - 10) **Assertion :** In adiabatic compression, the internal energy and temperature of the system get decreased.
Reason : The adiabatic compression is a slow process.
 - 11) **Assertion :** The number of degrees of freedom of a linear triatomic molecules is 7.
Reason : The number of degree of freedom depends on number of particle in the system.
 - 12) **Assertion :** The total translational kinetic energy of all the molecules of a given mass of an ideal gas is 1.5 times the product of its pressure and its volume.
Reason : The molecules of a gas collide with each other and the velocities of the molecules change due to collision.
- C. Find out and solve one case study question from the chapters-

1) Mechanical properties of fluids

2) Thermodynamics

KENDRIYA VIDYALAYA, DRDO

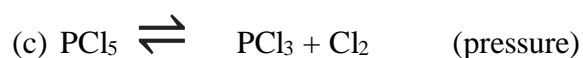
HHW- WINTER BREAK

Topic: Equilibrium

1. The value of K_c for the reaction, $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$, is 0.5 at $400^\circ C$. Find K_p at this temperature when concentrations are expressed in mol L^{-1} and pressure in atm.
2. If in the reaction $N_2O_4(g) \rightleftharpoons 2NO_2(g)$, x is that part of N_2O_4 which dissociates, then how many total number of molecules will be present at equilibrium?
3. What is the K_c for the reaction: $\frac{1}{2} A(g) + \frac{1}{3} B(g) \rightleftharpoons \frac{2}{3} C(g)$
4. For the reaction- $2NOCl(g) \rightleftharpoons 2NO(g) + Cl_2(g)$, calculate the standard equilibrium constant at 298K. Given that the values of ΔH^0 and ΔS^0 of the reaction are 77.2 kJ mol^{-1} and 122 JK^{-1} respectively.
5. For the reaction $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$, if initially 25mL of H_2 and 20mL of I_2 are present in a container and at eq 30mL of HI is formed then calculate K_c .
6. For the reaction $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$ the value of K_c is 0.1 at $800^\circ C$. When the equilibrium concentrations of both reactants is 0.5 mol what is the value of K_p ?
7. Choose the correct option:
 - (i) For a reversible reaction, equilibrium is said to be attained when:
 - (a) Conc of all reactants and products are equal
 - (b) Conc of only reactants are equal
 - (c) Rates of forward and backward reactions are equal
 - (d) Reaction stops
 - (ii) For a reaction $A + 2B \rightleftharpoons 3C + D$, equilibrium concentration is K_c then the same for reverse reaction will be:
 - (a) K_c
 - (b) $1/K_c$
 - (c) $\sqrt{K_c}$
 - (d) $(K_c)^2$

- (iii) If $K_c < Q_c$, the reaction tends to proceed in ----- direction to attain equilibrium:
- Forward
 - Backward
 - Reaction is already at equilibrium
 - Reaction cannot proceed in either direction
- (iv) Value of K_c for a reaction at a particular temperature indicates:
- Rate of attaining equilibrium
 - Extent of a reaction
 - Direction of a reaction
 - Both c and d
- (v) According to Le Chatelier's principle, a change in any factor(s) that determine the equilibrium of a reaction causes the reaction to proceed in a manner that:
- Reinforces the change
 - Nullifies the change
 - Has no effect on equilibrium

8. Write the reaction conditions (temperature and pressure) that will favour the formation of products for each of the following reactions:



9. Find log of:

- 8.9543
- 653.90
- 23.9199

10. Find antilog of:

- 3.711
 - 6.589
 - 2.097
-

Class XI -Holiday Homework -CS

1. <u>s</u>	<i>What will be the output of following code-</i> list1=[1, 3, 2] list1 * 2
2.	<i>What will be the output of following code-</i> l="Welcome to Python".split()
3.	<i>What will be the output of following code-</i> print([i.lower() for i in "HELLO"])
4.	<i>What will be the output of following code-</i> a=[[1,2],[3,4],[5],[6,7]] a[0][1][1]
5.	<i>What will be the output of following code-</i> a,b=[3,1,2],[5,4,6] a+b
6.	What will be the output of following program: a=[2,1,3,5,2,4] a.remove(2)
7.	What will be the output of following program: theList=[1, 2, [1.1, 2.2]] print(len(theList))
8.	What will be the output of following program: my_list = ['p', 'r', 'o', 'b', 'l', 'e', 'm'] print('p' in my_list) print('a' in my_list) print('c' not in my_list)
9.	What will be the output of following program: for fruit in ['apple','banana','mango']: print("I like",fruit)
10.	What will be the output of following program: odd = [1, 9] odd.insert(1,3) print(odd) odd[2:2] = [5, 7] print(odd)

11.	<p>What will be the output of following program:</p> <pre> odd = [1, 3, 5] print(odd + [9, 7, 5]) print(["re"] * 3) </pre>
12.	<p>What will be the output of following program:</p> <pre> odd = [2, 4, 6, 8] odd[0] = 1 print(odd) odd[1:4] = [3, 5, 7] print(odd) </pre>
13.	<p>What will be the output of following program:</p> <pre> list1 = ["python", "list", 1952, 2323, 432] list2 = ["this", "is", "another", "list"] print(list1) print(list1[1:4]) print(list1[1:]) print(list1[0]) print(list1 * 2) print(list1 + list2) </pre>
14.	<p>What will be the output of following program:</p> <pre> l=[10,20,30,40,50,60] for i in range(1,6): l[i-1]=l[i] for i in range(0,6): print(l[i],end="") </pre>
15.	<p>What will be the output of following program:</p> <pre> l=[6,12,18,24,30] for i in l: for j in range(1,i%5): print(j,'#',end="") print() </pre>
16.	<p>What will be the output of following program:</p> <pre> names = ['Hardik', 'Virat', 'Rahul', 'Dhavan'] print(names[-1][-1]) </pre>
17.	<p>What will be the output of following program:</p> <pre> "Welcome to Python4csip.com".split() </pre>
18.	<p>What will be the output of following program:</p> <pre> myList = [1, 5, 5, 5, 5, 1] max = myList[0] indexOfMax = 0 for i in range(1, len(myList)):if myList[i] > max: </pre>

	<pre> max = myList[i] indexOfMax = i print(indexOfMax) </pre>
19.	<p>What will be the output of the program?</p> <pre> m = [[x, x + 1, x + 2] for x in range(0, 3)] : m </pre>
20.	<p>What will be the output of following program:</p> <pre> list("a#b#c#d".split('#')) </pre>
21.	<p>What will be the output of following program:</p> <pre> values = [[3, 4, 5, 1], [33, 6, 1, 2]] for row in values: row.sort() for element in row: print(element, end = " ") print() </pre>
22.	<p>What will be the output of following program:</p> <pre> data = [[[1, 2], [3, 4]], [[5, 6], [7, 8]]] print(data[1][0][0]) </pre>
23.	<p>What will be the output of following program</p> <pre> a=[]*3 a[1].append(7) print(a) </pre>
24.	<p>What will be the output of following program:</p> <pre> L1 = list() L1.append([1, [2, 3], 4]) L1.extend([7, 8, 9]) print(L1[0][1][1] + L1[2]) </pre>
25.	<p>What will be the output of following program:</p> <pre> T = [1, 2, 3, 4, 5, 6, 7, 8] print(T[T.index(5)], end = " ") print(T[T[T[6]-2]-4]) </pre>
26.	<p>What will be the output of following program:</p> <pre> aList = [4, 8, 12, 16] aList[1:4] = [20, 24, 28] print(aList) </pre>
27.	<p>What will be the output of following program:</p> <pre> l = [None] * 10 print(len(l)) </pre>
28.	<p>What will be the output of following program:</p> <pre> sampleList = [10, 20, 30, 40, 50] sampleList.pop() print(sampleList) sampleList.pop(2) print(sampleList) </pre>

29.	<p>What will be the output of following program:</p> <pre>A = [2, 4, 6, 8,10] L = len (A) S = 0 for I in range (1, L, 2): S+=A[I] print("Sum=",S)</pre>
30.	Which function is used to reverse objects of list in place.
31.	Write a Python program to sum all the items in a list.
32.	Write a Python program to get the largest number from a list.
33.	<p>Write a Python program to count the number of strings where the string length is 2 or more and the first and last character are same from a given list of strings.</p> <p>Sample List : ['abc', 'xyz', 'cbc', '121']</p> <p>Expected Result : 2</p>
34.	Write a Python program to remove duplicates from a list.
35.	<p>Write a program to shift every element of a list to circularly right. E.g.-</p> <p>INPUT : 1 2 3 4 5</p> <p>OUTPUT : 5 1 2 3 4</p>
36.	<p>Take a list of 10 elements. Split it into middle and store the elements in two different lists. E.g.-</p> <p>INITIAL list :</p> <p>58 24 13 15 63 9 8 81 1 78</p> <p>After splitting :</p> <p>58 24 13 15 63</p> <p>9 8 81 1 78</p>
37.	Python Program to Find the Second Largest Number in a List
38.	
39.	What will be the output of the following program:
40.	<pre>l=[10,20,30,40,50,60] for i in range(len(l)):</pre>

	<pre>if(i%2==0): print(l[i],end='#') else: print(l[i])</pre>
41.	<p>What will be the output of the following program:</p> <pre>l=[10,20,30,40,50,60] for i in range(len(l)): if(i%2==0): print(l[i],end='#') else: print(l[i],end='@')</pre>
42.	Program to Find Even elements in a List:
43.	Program to Print list having numbers less than 10
44.	WAP to display the frequency of each item in a list.
45.	<p>What will be the output of the following program:l=[6,12,18,24,30]</p> <pre>for i in l: for j in range(1,i%4): print(j,'#',end='') print()</pre>

HOLIDAY HOME WORK
CLASS -XI
SUBJECT – PHYSICS

- A. Complete the write up of following practical in Lab notebook.
- 1) To measure the diameter of a small spherical body using a Vernier Callipers.
 - 2) To measure internal diameter and depth of a given beaker/calorimeter using a Vernier Callipers and hence find its volume.
 - 3) To measure diameter of a given wire using screw gauge.
 - 4) To determine volume of an irregular lamina using screw gauge.
 - 5) To determine radius of curvature of a given spherical surface by a spherometer.
 - 6) Using a simple pendulum , plot its $L-T^2$ graph and use it to find the effective length of second's pendulum.
 - 7) To study the relationship between the temperature of a hot body and time by plotting a cooling curve.

B. Answer the following **Assertion and Reasoning questions -**

Directions: Each of these questions contain two statements, Assertion and Reason. Each of these questions also has four alternative choices, only one of which is the correct answer. You have to select one of the options (a), (b), (c) and (d) given below.

(a) Assertion is correct, reason is correct; reason is a correct explanation for assertion.

(b) Assertion is correct, reason is correct; reason is not a correct explanation for assertion

(c) Assertion is correct, reason is incorrect

(d) Assertion is incorrect, reason is correct.

- 1) **Assertion :** Bulk modulus of elasticity (K) represents incompressibility of the material.
Reason : Bulk modulus of elasticity is proportional to change in pressure.
- 2) **Assertion :** Young's modulus for a perfectly plastic body is zero.
Reason : For a perfectly plastic body, restoring force is zero.
- 3) **Assertion :** The angle of contact of a liquid decrease with increase in temperature.
Reason : With increase in temperature, the surface tension of liquid increase.
- 4) **Assertion :** A large soap bubble expands while a small bubble shrinks, when they are connected to each other by a capillary tube.
Reason : The excess pressure inside bubble (or drop) is inversely proportional to the radius.
- 5) **Assertion :** The water rises higher in a capillary tube of small diameter than in the capillary tube of large diameter.
Reason : Height through which liquid rises in a capillary tube is inversely proportional to the diameter of the capillary tube.
- 6) **Assertion :** A beaker is completely filled with water at 4°C . It will overflow, both when heated or cooled.
Reason : There is expansion of water below and above 4°C .
- 7) **Assertion :** Two bodies at different temperatures, if brought in thermal contact do not necessary settle to the mean temperature.
Reason : The two bodies may have different thermal capacities.
- 8) **Assertion :** When a bottle of cold carbonated drink is opened, a slight fog forms around the opening.
Reason : Adiabatic expansion of the gas causes lowering of temperature and condensation of water vapours.
- 9) **Assertion :** The specific heat of a gas in an adiabatic process is zero and in an isothermal process is infinite.
Reason : Specific heat of a gas is directly proportional to change of heat in system and inversely proportional to change in temperature.
- 10) **Assertion :** In adiabatic compression, the internal energy and temperature of the system get decreased.
Reason : The adiabatic compression is a slow process.
- 11) **Assertion :** The number of degrees of freedom of a linear triatomic molecules is 7.
Reason : The number of degree of freedom depends on number of particle in the system.
- 12) **Assertion :** The total translational kinetic energy of all the molecules of a given mass of an ideal gas is 1.5 times the product of its pressure and its volume.
Reason : The molecules of a gas collide with each other and the velocities of the molecules change due to collision.

C. Find out and solve one case study question from the chapters-

1) Mechanical properties of fluids

2) Thermodynamics

K V D R D O

Holiday Homework (Winter Break)

Class 6

Science

I. Fill in the blanks.

1. Light travels in a _____ line
2. Standard unit of length is _____.
3. _____ objects allow light to pass through them partially.
4. 1km = _____ m.
5. Changes in our surroundings that make us respond to them are called _____.

II. Answer the following.

1. What do you understand by 'measurement'?
2. Why is the hand span not considered as a reliable unit for measuring the length?
3. Why are camels surviving in the desert?
4. What is meant by terrestrial habitats?
5. Why aquatic animals cannot live on land?
6. Draw an electric circuit which consists of an electric cell, bulb and a switch.
7. What is a habitat?
8. The height of a person is 1.65 m. Express it into cm and mm.
9. How would you measure the length of a curved line?
10. Why should an electrician use rubber gloves while repairing an electric switch at your home? Explain.
11. Differentiate between conductor and insulator.

12. What is the purpose of using an electric switch?
13. List the common characteristics of living things.
14. Differentiate between biotic and abiotic components.
15. What is the SI unit of weight? The school bag of three students weigh A, B, C measures 3kg, 2800 gm and 5000gm respectively. Whose bag is the heaviest?

III. Competency based questions.

1. A deer is an animal that lives in the forest. It has strong teeth for chewing hard Plant stems. A deer needs to know about the presence of predators to run away from them. It has long ears to hear the movements of predators. The eyes on the side of its head allow it to look in all directions for danger. The speed of the deer helps them to run away from the predators.

1. Which is the strongest feature of deer which help them to survive in its habitat
(a) Colour (b) Jump (c) Speed of the deer
2. Which animal is more likely to be predator of deer
(a) Lion (b) zebra (c) yak
3. Write the various characteristics of deer which help them to survive in its habitat.

2. Electric cells are also used in alarm clocks, transistor radios, cameras and many other devices. It has a small metal cap on one side and a metal disc on the other side. The metal cap is the positive terminal of the electric cell. The metal disc is the negative terminal of electric cell. All electric cells have two terminals; a positive terminal and negative terminal. Electric cell is used as electric source of energy. In an electric cell chemical energy converts into electrical energy.

1. Which type of conversion of energy takes place in an electric cell?
2. How many terminals are there in an electric cell? Name them.
3. Name some devices in which we use an electric cell.

Class IX -AI Holiday Homework

AI

Sl.No	Question
1.	What is intelligence? Explain the 9 types of intelligence?
2.	What are the different stages of AI Project Cycle
3.	What do you mean by Problem Statement Template
4.	Who are stakeholders?
5.	Explain the 4W framework.
6.	What is data acquisition? What are the different ways to acquire data?
7.	What are the different visualisation techniques that are used in data exploration stage?
8.	What do you mean by data features?
9.	Differentiate between : a) training data and testing data b) Unlabelled and Labelled data c) Supervised learning and unsupervised learning d) Classification and Regression
10.	Explain Neural Network with a neatly labelled diagram . Write 4 features of the neural network

Python

11.	Write a Python Program to print the area of a rectangle
12.	Write a Python Program to print the perimeter of an equilateral triangle
13.	Write a Python Program to print the average of 3 numbers
14.	Write a Python Program to print the area of a circle by taking radius from user. Take pi as 3.14
15.	Write a Python Program to take your name from user and print “hello” and name Eg: Input Name: Samhita Expected Output : Hello Samhita

KENDRIYA VIDYALYA DRDO

BIOLOGY HOLIDAY HOMEWORK CLASS 12– BIOLOGY

1. Mention the role of 'genetic mother' in MOET.
2. What is biopiracy?
3. Following are the features of genetic codes. What does each one indicate?
 - a. Stop Codon
 - b. Unambiguous codon
 - c. Degenerate codon
 - d. Universal Codon
4. What do 'Y' and 'B' stand for in 'YAC' and 'BAC' used in Human Genome
5. Expand 'SNPs' identified by scientists in HGP
6. Explain with a neat labelled diagram replication of retrovirus.
7. Make a tabular representation of different drugs that are commonly abused along with its source and effect.
8. What are statins? Name the microorganism that produces this substance. How is it medically important?
9. Describe Meselson and Stahl's experiment.
10. Insulin in the human body is secreted by pancreas as prohormone/proinsulin. The proinsulin has to undergo processing before it becomes functional in the body.

Answer the questions below:

 - i) State the change the proinsulin undergoes at the time of its processing to become functional
 - ii) Name the technique the American company Eli Lilly used for the commercial production of human insulin.
 - iii) How are the two polypeptides of a functional insulin chemically held together.
11. Complete your practical records and classwork books (if any pending work is there)

SUBJECT: Class xii physics holiday home work

1. Obtain the expression for electric field due to dipole on its axial line
2. Derive an expression for electric field due to dipole on its equatorial line?
3. Show that dipole placed in a uniform electric field experiences torque?
4. Using Gauss's theorem obtain the electric field due to a) infinite line of charge b) plane sheet
5. Show that capacitance of a parallel plate capacitor increases with dielectric slab
6. Obtain the expression for energy stored in a capacitor?
7. Explain the principle of capacitor and derive expression for capacitance of parallel plate capacitor?
8. Define resistivity and relaxation time. Obtain the relation between them?
9. State and prove wheat stone bridge principle? State the laws used to derive it?
10. State the principle of potentiometer and explain how potentiometer is used to compare the emf s of two primary cells?
11. On what factors internal resistance of the cell depends? How will you determine internal resistance of the cell using potentiometer?
12. Two long parallel conductors carrying current in the same direction experiences attractive force hence define ampere?
13. State Biot-Savart's law? Using this, calculate electric field due to circular coil; carrying current on its axial line?
14. With a neat labelled diagram explain construction principle and working of a galvanometer? Explain how will you convert galvanometer to a) ammeter b) voltmeter?
15. Differentiate dia, para and Ferro magnetic materials?
16. Obtain the expression for Bohr's magnetron?
17. A rectangular coil carrying current placed in a uniform magnetic field show that it experiences torque?
18. Define mutual induction? Obtain the expression for mutual inductance of co axial solenoid
19. With a neat diagram explain the principle and working of transformer?
20. With a neat diagram explain the principle of Ac generator? Derive an expression for induced emf ?
21. Show that in an inductive circuit voltage leads current by 90? Plot the graph between X_L and frequency?
22. Draw a circuit for series LCR circuit and obtain the expression for its impedance?
23. Define capacitive reactance? Show that in a capacitive circuit current leads voltage by 90?
24. Derive expression for displacement current?
25. Draw the variation of electric and magnetic fields to represent an electromagnetic wave? State its properties?
26. Derive expression for object distance, image distance and focal length using concave mirror?
27. Define TIR? Under what conditions takes place? Using this principle explain how it is used to bend the light?
28. When a ray of light moving from rarer to denser medium from a point object lying on its principle axis obtain the expression for refraction through a convex spherical refracting surface ?
29. Obtain the expression for lens maker's formula?
30. With a neat diagram obtain the expression for refractive index of prism?
31. Using Huygens's principle verify laws of refraction?

32. Show that in interference the fringe width remains same for dark or bright Bands formed in YDS experiment?
33. Using single slit diffraction experiment, show that width of central fringe is twice that of dark or bright Band?
34. Define sustained interference? State its conditions?
35. Draw a neat labelled diagram for formation of image at least distant of distinct vision using compound microscope? Write expression for its magnifying power?
36. With a neat labelled diagram explain the formation image by a astronomical telescope for normal eye? Write the expression for its magnifying power?
37. Draw advantages and disadvantages of reflective type of telescopes over refractive type telescopes?
38. Obtain the expression for Einstein photo electric equation? Using this deduce laws of photo electric laws?
39. Plot the graphs
 - a) Intensity VS photo electric current
 - b) Photo electric current VS voltage for different intensities and fixed frequency
 - c) Photo electric current VS voltage for two different frequencies with same intensity
 - d) Stopping potential VS frequency
40. Show that circumference of the orbit is equal to integral multiples of wavelength?
41. Show that nuclear density is independent of mass number?
42. Draw binding energy per nucleon curve? State the significance of binding energy per nucleon? What are the conclusion can be drawn from this curve?
43. What are nuclear force? State any four properties?
44. Explain potential barrier & depletion layer using pn junction diode
45. Using band diagram explain conductor, insulator & semi-conductor
46. With a neat circuit diagram explain forward and reverse bias of P N junction diode Plot V-I characteristics?
47. Explain how p n junction diode is used as half wave rectifier using circuit diagram? Also draw input and output wave forms?
48. Explain how p n junction diode is used as full wave rectifier using circuit diagram? Also draw input and output wave forms?
49. Differentiate between n type and p- type semiconductor?
50. ANY TWO SAMPLE PAPERS SOLVING AS PER LATEST CBSE NORMS

KENDRIYA VIDYALAYA SANGATHAN, CHANDIGARH REGION

PRE-BOARD EXAMINATION 2023-24

CLASS – XII

CHEMISTRY

Max. Marks:70

Time: 3 hours

General Instructions:

Read the following instructions carefully.

- (a) There are 33 questions in this question paper with internal choice.
- (b) SECTION A consists of 16 multiple -choice questions carrying 1 mark each.
- (c) SECTION B consists of 5 short answer questions carrying 2 marks each.
- (d) SECTION C consists of 7 short answer questions carrying 3 marks each.
- (e) SECTION D consists of 2 case - based questions carrying 4 marks each.
- (f) SECTION E consists of 3 long answer questions carrying 5 marks each.
- (g) All questions are compulsory.
- (h) Use of log tables and calculators is not allowed.

Q. NO.	QUESTION	MARKS
	Section A	
1.	The amount of electricity required to produce one mole of Zn from ZnSO ₄ solution will be: (a) 3F (b) 2F (c) 1F (d) 4F	1
2.	If the rate of a gaseous reaction is independent of pressure, the order of reaction is: (a) 0 (b) 1 (c) 2 (d) 3	1
3.	For a chemical reaction A→B, it is found that the rate of reaction doubles when the concentration of A is increased four times. The order of reaction is (a) Two (b) One (c) Half (d) Zero	1
4.	The magnetic nature of elements depend on the presence of unpaired electrons. Identify the configuration of transition element, which shows highest magnetic moment. (a) 3d ⁷ (b) 3d ⁵ (c) 3d ⁸ (d) 3d ²	1
5.	Electronic configuration of a transition element X in +3 oxidation state	1

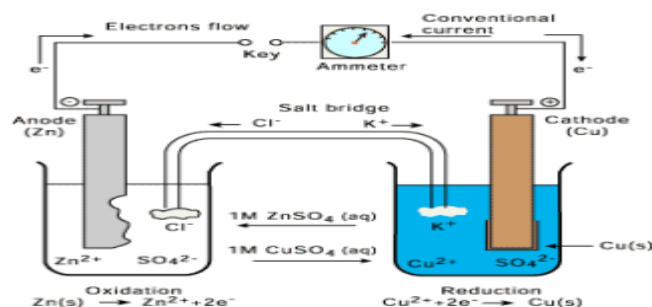
	<p>is $[\text{Ar}] 3d^5$. What is its atomic number?</p> <p>(a) 25</p> <p>(b) 26</p> <p>(c) 27</p> <p>(d) 24</p>	
6.	<p>Chlorobenzene reacts with Cl_2 in the presence of FeCl_3 giving ortho and para chloro compounds. The reaction is:</p> <p>(a) Nucleophilic substitution (b) Nucleophilic addition</p> <p>(c) Electrophilic addition (d) Electrophilic substitution</p>	1
7.	<p>Aldehydes other than formaldehyde react with Grignard's reagent to give addition products which on hydrolysis give</p> <p>(a) tertiary alcohols (b) secondary alcohols</p> <p>(c) primary alcohols (d) carboxylic acids</p>	1
8.	<p>In the following compounds: The order of acidity is</p> <div style="text-align: center;"> <p style="text-align: center;"> $\text{C}_6\text{H}_5\text{OH}$ $\text{CH}_3\text{-C}_6\text{H}_4\text{OH}$ $\text{C}_6\text{H}_4(\text{OH})(\text{NO}_2)$ $\text{O}_2\text{N-C}_6\text{H}_3(\text{OH})_2$ I II III IV </p> </div> <p>(a) $\text{III} > \text{IV} > \text{I} > \text{II}$ (b) $\text{I} > \text{IV} > \text{III} > \text{II}$</p> <p>(c) $\text{II} > \text{I} > \text{III} > \text{IV}$ (d) $\text{IV} > \text{III} > \text{I} > \text{II}$</p>	1
9.	<p>Methyl ketones are usually characterised through</p> <p>(a) Tollen's reagent (b) Iodoform test</p> <p>(c) Schiff's test (d) Benedict solution test</p>	1
10	<p>Imine derivatives of aldehyde and ketone is called as</p> <p>(a) Schiff's reagent (b) Fehling's reagent</p> <p>(c) Schiff's base (d) Schiff's acid.</p>	1
11.	<p>Amine that cannot be prepared by Gabriel-Phthalimide synthesis is</p>	1

	(a) aniline (b) benzyl amine (c) methyl amine (d) iso-butylamine	
12.	Which of the following Amino acid is optically inactive? (a) Glycine (b) Valine (c) Alanine (d) Phenyl alanine	1
	For the Questions from Q No 13 to 16, select the most appropriate answer from the options given below: A. Both A and R are true and R is the correct explanation of A B. Both A and R are true but R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true.	
13.	Assertion (A): For complex reaction, the order of overall reaction is equal to the molecularity of the slowest step of the reaction. Reason (R): The overall rate of the complex reaction is controlled by the slowest step of the reaction	1
14.	Assertion -Compounds containing —CHO group are easily oxidised to corresponding carboxylic acids. Reason: Carboxylic acids can be reduced to alcohols by treatment with LiAlH_4	1
15.	Assertion: Ethers behave as bases in the presence of mineral acids. Reason: Due to the presence of lone pairs of electrons on oxygen.	1
16.	Assertion: Conductivity of an electrolyte increases with decrease in concentration. Reason: Number of ions per unit volume decreases on dilution.	1
	SECTION B	
17.	Explain why: (a) The dipole moment of chlorobenzene is lower than that of cyclohexyl chloride. (b) Alkyl halides, though polar, are immiscible with water	2
18.	A reaction is first order with respect to A & second order with respect	2

	to B (i)How is the rate affected on increasing Concentration of B three times. (ii)How is the rate affected when concentration of A is reduced to half & that of B is doubled.	
19.	(i) Mention the condition when Raoult's law becomes special case of Henry's law (ii) At the same temperature, H ₂ is more soluble in water than He, which of them will have higher KH value and why?	2
20.	Explain the following (i) Cl-CH ₂ COOH has lower Pka than CH ₃ COOH. (ii) There are two -NH ₂ groups in semicarbazide, only one is involved in the formation of semicabazone OR (ii) Illustrate the following name reactions giving a chemical equation in each case- (i) HVZ reaction (ii) Clemmensen's reduction	2
21.	Differentiate between (i) Nucleotides and nucleosides (ii) Peptide and glycosidic linkage	2
22.	Calculate e.m.f. of the following cell at 298 K : $2\text{Cr}(s) + 3\text{Fe}^{2+} (0.1\text{M}) \rightarrow 2\text{Cr}^{3+} (0.01\text{M}) + 3\text{Fe}(s)$ $E^\circ(\text{Cr}^{3+} \text{Cr}) = -0.74 \text{ V}$ $E^\circ(\text{Fe}^{2+} \text{Fe}) = -0.44 \text{ V}$	3
23.	The half-life for radioactive decay of C-14 isotope is 5730 years. An archaeological artefact containing wood had only 80% of the C-14 found in a living tree. Estimate the age of the sample. (log 2= 0.3010)	3
24.	a) Explain on the basis of valence bond theory that [Ni(CN) ₄] ²⁻ ion with square planar structure is diamagnetic and [NiCl ₄] ²⁻ ion with tetrahedral geometry is paramagnetic. b) FeSO ₄ solution mixed with (NH ₄) ₂ SO ₄ solution in 1: 1 molar ratio gives the test of Fe ²⁺ ion but CuSO ₄ solution mixed with aqueous ammonia in 1:4 molar ratio does not give the test of Cu ²⁺ ion. Explain why?	3

25.	<p>(a) Which one of the following compounds will undergo faster hydrolysis reaction by SN_1 mechanism? Justify your answer. $C_6H_5CH_2Cl$ or $CH_3CH_2CH_2Cl$</p> <p>(b) What happens when chlorobenzene reacts with Sodium hydroxide at 623K and 300 atm pressure?</p>	3
26.	<p>Give equations of the following reactions:</p> <p>(i) Oxidation of propan-1-ol with alkaline $KMnO_4$ solution.</p> <p>(ii) Conc. HNO_3 with phenol.</p> <p>(iii) Treating phenol with chloroform in the presence of aqueous $NaOH$.</p>	3
27.	<p>Do any two parts</p> <p>(i) Arrange the following in the increasing order of their reactivity towards nucleophilic reaction $C_6H_5COCH_3$, CH_3CHO, CH_3COCH_3</p> <p>(ii) How will you distinguish between acetophenone and benzophenone</p> <p>(iii) Complete the following</p> <p>(a) $(CH_3)_2C=CH-CH_3 \xrightarrow{(i)O_3(ii)Zn/H_2O}$</p> <p>(b) $CH_3COCH_2COOC_2H_5 \xrightarrow{(i)NaBH_4(ii)H^+}$</p>	3
28.	<p>(a) Name the products of hydrolysis of lactose</p> <p>(b) Write down the structures and names of the products formed when D-glucose is treated with (i) Hydroxylamine (ii) Acetic anhydride</p>	3
29.	<p>In Question no 29 & 30 read the paragraph and answer the question given at the end of paragraph.</p> <p>A device used to convert the energy evolved in a redox reaction into electrical energy is called an electrochemical cell. These devices are also called galvanic cells or voltaic cells, after the names of Luigi Galvani (1780) and Alessandro Volta (1800) who were the first to perform experiments on the conversion of chemical energy into electrical energy. How exactly the chemical energy of a redox reaction is converted into electrical energy can be seen from the following example: Redox reaction between Zn and $CuSO_4$. The reaction is</p>	4

represented as: $\text{Zn(s)} + \text{CuSO}_4(\text{aq}) \rightarrow \text{ZnSO}_4(\text{aq}) + \text{Cu(s)}$. It may also be written in ionic form as: $\text{Zn} + \text{Cu}^{2+} \rightarrow \text{Zn}^{2+} + \text{Cu}$. The reaction essentially comprises of two half reactions: one for reduction and the other for oxidation. $\text{Zn(s)} \rightarrow \text{Zn}^{2+}(\text{aq}) + 2\text{e}^-$; $\text{Cu}^{2+}(\text{aq}) + 2\text{e}^- \rightarrow \text{Cu(s)}$. Thus, Zn is oxidized to Zn^{2+} in the oxidation half reaction and Cu^{2+} is reduced to Cu in the reduction half reaction. The overall reaction can be obtained by adding the two half reactions. $\Lambda_m^0 \text{NaCl} = 126.4 \text{ Scm}^2\text{mol}^{-1}$
 $\Lambda_m^0 \text{HCl} = 426.1 \text{ Scm}^2\text{mol}^{-1}$ $\Lambda_m^0 \text{CH}_3\text{COONa} = 91.5 \text{ Scm}^2\text{mol}^{-1}$
 $\Lambda_m^0 \text{NH}_4\text{Cl} = 129.8 \text{ Scm}^2\text{mol}^{-1}$



Electrochemical cell based on redox reaction

- What is the direction of flow of current in a cell?
- Suggest two materials other than hydrogen that can be used as fuels for fuel cell.
- The equilibrium can be achieved in chemical reaction at what value of emf ? Or
- Why an electrochemical cell stops working after sometime?

30.

The d-block, which lies between s and p-blocks contains, elements of groups 3-12, in which d-orbitals are progressively filled in each of four long periods of periodic table. These elements are also called transition elements or metals. The elements constituting the f-block are those in which 4f and 5f-orbitals are progressively filled. They are placed in a separate panel at the bottom of the periodic table. The elements of f-block are also called inner-transition.

- Transition metal are very good catalyst. Why?

4

	<p>(ii) Transition metals form a large number of interstitial compounds. Give reason.</p> <p>(iii) Why the paramagnetic characteristic in 3d- transition series increases up to Cr and then decreases? Or Out of $\text{La}(\text{OH})_3$ and $\text{Lu}(\text{OH})_3$, which is more basic and why?</p>	
31	<p>(a) Explain why on addition of 1 mol glucose or NaCl to 1 litre water, the boiling point of water increases while on addition of 1 mol of methyl alcohol to 1 litre of water decreases its boiling point?</p> <p>(b) Calculate the amount of CaCl_2(molar mass=111g/mol) which must be added to 500g of water to lower its freezing point by 2K, assuming CaCl_2 is completely dissociated.(K_f for water=1.86 Kkgmol^{-1})</p> <p>OR</p> <p>(a) Why does measurement of osmotic pressure method is preferred for the determination of molar masses of macromolecules such as proteins and polymers? (b) Calculate the value of van't Hoff factor 'i' for an aqueous solution of AlCl_3 which is 0.01molal.(Given : K_f for water = $1.86 \text{ K kg mol}^{-1}$, T_f of solution = $-0.068 \text{ }^\circ\text{C}$</p>	5
32	<p>Attempt any five:</p> <p>(a) (i) Which transition element in 3d series has maximum number of unpaired electrons</p> <p>(ii) Name a member of lanthanoid series which is well known to exhibit +4 oxidation state and why?</p> <p>(b) The highest oxidation state is exhibited in oxoanions of transition metals.</p> <p>(c) HCl is not used to acidify KMnO_4 solution.</p> <p>(d) Transition metals have high enthalpy of atomisation.</p> <p>(e) $E^\circ (\text{M}^{2+}/\text{M})$ value for Cu is +0.34V while that of Zn is -0.76 V</p> <p>(f) Chromium is typically hard metal while mercury is a liquid .</p> <p>(g) Complete and balance the following equation : $\text{Cr}_2\text{O}_7^{2-} + \text{Fe}^{2+} + \text{H}^+ \rightarrow$</p>	5
33	<p>(a) An aromatic compound 'A' on treatment with aqueous ammonia and</p>	5

	<p>heating, forms compound 'B' which on heating with Br₂ and KOH forms a compound 'C' of molecular formula C₆H₇N. Write the structures and IUPAC names of compound A, B and C</p> <p>(b) Arrange the following: (i) In decreasing order of the pK_b values: C₂H₅NH₂ , C₆H₅NHCH₃ , (C₂H₅)₂NH and C₆H₅NH₂</p> <p>(ii) In increasing order of basic strength: Aniline, p-nitroaniline and p-toluidine OR</p> <p>Complete the following reactions:</p> <p>(i) C₆H₅N₂Cl + H₃PO₂ + H₂O → (ii) C₆H₅NH₂ + CH₃COCl →</p> <p>(iii) C₂H₅NH₂ + C₆H₅SO₂Cl → (iv) C₂H₅NH₂ + HNO₂ →</p> <p>(v) CH₃CH₂NH₂ + CHCl₃ + KOH (Alcoholic) →</p>	
--	--	--

End of Paper

KENDRIYA VIDYALAYA SANGATHAN, JAIPUR REGION
FIRST PRE BOARD EXAM- 2023-24 (Set C)
CLASS-XII
SUBJECT-CHEMISTRY THEORY (043)

Max. Marks: 70

Time: 3 hours

General Instructions:

Read the following instructions carefully.

- (a) There are **33** questions in this question paper with internal choice.
- (b) SECTION A consists of 16 multiple-choice questions carrying 1 mark each.
- (c) SECTION B consists of 5 short answer questions carrying 2 marks each.
- (d) SECTION C consists of 7 short answer questions carrying 3 marks each.
- (e) SECTION D consists of 2 case-based questions carrying 4 marks each.
- (f) SECTION E consists of 3 long answer questions carrying 5 marks each.
- (g) All questions are compulsory.
- (h) Use of log tables and calculators is not allowed.

SECTION A

The following questions are multiple-choice questions with one correct answer. Each question carries 1 mark. There is no internal choice in this section.

1. Which of the following undergoes nucleophilic substitution exclusively by S_N^1 mechanism?
(a) Benzyl chloride (b) Ethyl chloride (c) Chlorobenzene (d) Isopropylchloride
2. The magnetic nature of elements depends on the presence of unpaired electrons. Identify the configuration of transition elements which shows highest magnetic moment?
(a) $3d^7$ (b) $3d^5$ (c) $3d^8$ (d) $3d^2$
3. Zinc is coated over iron to prevent rusting of iron because.
(a) it is cheaper than iron (b) $E_{Zn^{2+}/Zn}^0 = E_{Fe^{2+}/Fe}^0$
(c) $E_{Zn^{2+}/Zn}^0 > E_{Fe^{2+}/Fe}^0$ (d) $E_{Zn^{2+}/Zn}^0 < E_{Fe^{2+}/Fe}^0$
4. A first order reaction is 50% completed in 1.26×10^{14} s. How much time would it take for 100% completion?
(a) 1.26×10^{15} s (b) 2.52×10^{14} s (c) 2.52×10^{28} s (d) Infinite
5. The slope in the plot of $\ln[R]$ vs. time gives in first order reaction.
(a) +k (b) +k/2.303 (c) -k (d) -k/2.303
6. Arrange the following in increasing order of basic strength:
Aniline, p-nitroaniline and p-toluidine
(a) Aniline < p-nitroaniline < p-toluidine
(b) Aniline < p-toluidine < p-nitroaniline
(c) p-toluidine < p-nitroaniline < Aniline
(d) p-nitroaniline < Aniline < p-toluidine
7. How many ions are produced from the complex $[Co(NH_3)_6]Cl_2$ in solution?
(a) 6 (b) 4 (c) 3 (d) 2

8. How many alcohols with molecular formula $C_4H_{10}O$ are chiral in nature?
 (a) 1 (b) 2 (c) 3 (d) 4
9. Which of the following species are involved in the carbylamine test ?
 (a) $R-NC$ (b) $NaNO_2+HCl$ (c) $COCl_2$ (d) All of the above
10. For the reaction $A \rightarrow B$, the rate of reaction becomes three times when the concentration of A is increased by nine times. What is the order of reaction?
 (a) 1 (b) 2 (c) $\frac{1}{2}$ (d) 0
11. Amongst the following, the most stable complex is-
 (a) $[FeCl_6]^{3-}$ (b) $[Fe(NH_3)_6]^{3+}$ (c) $[Fe(C_2O_4)_3]^{3-}$ (d) $[Fe(H_2O)_6]^{3+}$
12. Which of the following alcohols gives 2-butene on dehydration by conc. H_2SO_4 ?
 (a) 2-methyl propene-2-ol (b) 2-methyl 1-propanol
 (c) Butane-2-ol (d) Butane 1-ol

In the Following questions a statement of Assertion(A) is followed by a statement of Reason(R). Select the most appropriate answer from the options given below:

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

13. **Assertion (A):** CH_3CH_2OH can be converted into CH_3CHO by treatment with PCC.
Reason (R): PCC is a better reagent for oxidation of primary alcohols to aldehydes.

14. **Assertion (A):** Group 12 elements are not considered as transition metals.
Reason (R): Transition metals are those which have incompletely filled d shell in their compounds.

15. **Assertion (A):** Acetanilide is less basic than aniline.
Reason (R): Acetylation of aniline results in decrease of electron density on nitrogen

16. **Assertion (A):** All naturally occurring α - amino acids except glycine are optically active.
Reason (R): Most naturally occurring amino acids have L - configuration.

SECTION B

This section contains 5 questions with internal choice in one question. The following questions are very short answer type and carry 2 marks each.

17. A first order reaction has a rate constant $1.15 \times 10^{-3} S^{-1}$. How long will 5g of this reactant take to reduce to 3g? Given: $\log 5 = 0.6989$, $\log 3 = 0.477$
18. Give reasons
 (a) C-Cl bond length in chlorobenzene is shorter than C-Cl bond length in CH_3-Cl
 (b) S_N1 reactions are accompanied by racemization in optically active alkyl halides.

OR

What happens when-

- (a) $\text{CH}_3\text{-Cl}$ is treated with aqueous KOH
- (b) CH_3Br is treated with Mg in the presence of dry ether?

19. Write the reaction involved when D-glucose is treated with the following reagents.
- (a) Br_2 water
 - (b) $\text{NH}_2\text{-OH}$
20. A complex of the type $[\text{M}(\text{AA})_2\text{X}_2]^{n+}$ is known to be optically active. What does this indicate about the structure of the complex? Give one example of such complex.
21. (a) On increasing temperature, activation energy of a reaction decreases, why?
(b) In some cases, it is found that a large number of colliding molecules have energy more than threshold energy, yet the reaction is slow why?

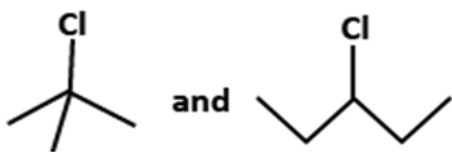
SECTION C

This section contains 7 questions with internal choice in one question. The following questions are short answer type and carry 3 marks each.

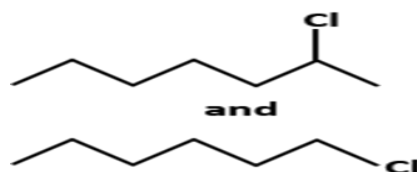
22. Write the equations for the following conversion
- (a) Phenol to Anisol
 - (b) Salicylic acid to aspirin
 - (c) Ethyl alcohol to Ethoxyethane
23. (a) Although both $[\text{NiCl}_4]^{2-}$ and $[\text{Ni}(\text{CO})_4]$ have sp^3 hybridization, yet $[\text{NiCl}_4]^{2-}$ is paramagnetic and $[\text{Ni}(\text{CO})_4]$ is diamagnetic. Give reason. (Atomic number of $\text{Ni}=28$)
(b) On the basis of crystal field theory, write the electronic configuration for d^5 ion.
- (i) $\Delta_0 > P$
 - (ii) $\Delta_0 < P$
24. Answer the following questions.
- (a) Measurement of osmotic pressure method is preferred for the determination of molecular masses of macromolecules such as protein and polymers.
 - (b) Aquatic animals are more comfortable in the cold water than in warm water.
 - (c) Elevation of boiling point of 1 M KCl solution is nearly double than that of 1 M sugar solution.
25. Give reason for the following
- (a) pK_a value of aniline is more than that of methylamine.
 - (b) Aniline does not undergo Friedel-Crafts reaction.
 - (c) Diazonium salts of aromatic amines are more stable than those of aliphatic amines.

26. In the following pairs of halogen compounds, which compound undergoes faster S_N1 reaction? And why?

(a)

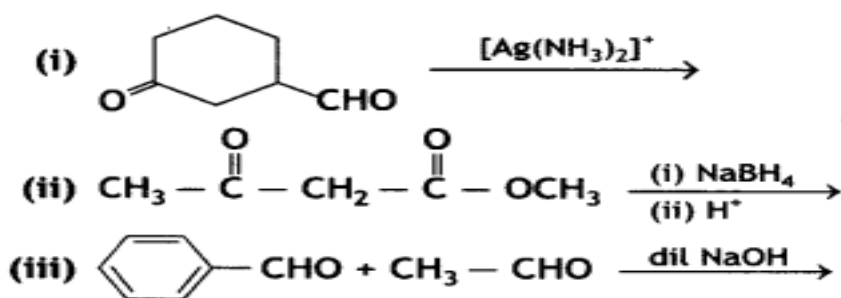


(b)



27. Calculate E_{cell} for the following reaction at 298 K
 $2\text{Cr}(s) + 3\text{Fe}^{2+}(0.01\text{ M}) \rightarrow 2\text{Cr}^{3+}(0.01\text{ M}) + 3\text{Fe}(s)$ Given: $E^{\circ}_{\text{cell}} = 0.261\text{ V}$

28. Predict the main product of the following reactions:



OR

Give reasons:

- (i) Alpha hydrogen of aldehydes and ketones are acidic in nature.
- (ii) Propanone is less reactive than ethanal towards addition of HCN.
- (iii) Benzoic acid does not give Friedel-Crafts reaction.

SECTION D

The following questions are case -based questions. Each question has an internal choice and carries 4 (1+1+2) marks each. Read the passage carefully and answer the questions that follow.

29. Read the passage given below and answer the following questions:

Polysaccharides may be very large molecules. Starch, glycogen, cellulose, and chitin are examples of polysaccharides. Starch is the stored form of sugars in plants and is made up of amylose and amylopectin (both polymers of glucose). Amylose is soluble in water and can be hydrolyzed into glucose units breaking glycoside bonds, by the enzymes α -amylase and β -amylase. It is straight chain polymer. Amylopectin is a branched chain polymer of several D-glucose molecules. 80% of amylopectin is present in starch. Plants are able to synthesize glucose, and the excess glucose is stored as starch in different plant parts, including roots and seeds. The starch that is consumed by animals is broken down into smaller molecules, such as glucose. The cells can then absorb the glucose. Glycogen is the storage form of glucose in humans and other vertebrates, and is made up of monomers of glucose. It is structurally quite similar to amylopectin. Glycogen is the animal equivalent of starch. It is stored in liver and skeletal muscles. Cellulose is one of the most abundant natural

biopolymers. The cell walls of plants are mostly made of cellulose, which provides structural support to the cell. Wood and paper are mostly cellulosic in nature.

Answer the following questions.

- (a) Differentiate between Amylose and Amylopectine
- (b) Define polysaccharides.
- (c) Write chemical reaction to show that open structure of D-glucose contains the following.
(i) Straight chain (ii) Five alcohol group

OR

- (c) What are the products of hydrolysis of- (i) Maltose (ii) lactose

30. Read the passage given below and answer the following questions:

Boiling point or freezing point of liquid solution would be affected by the dissolved solids in the liquid phase. A soluble solid in solution has the effect of raising its boiling point and depressing its freezing point. The addition of non-volatile substances to a solvent decreases the vapor pressure and the added solute particles affect the formation of pure solvent crystals. According to many researches the decrease in freezing point directly correlated to the concentration of solutes dissolved in the solvent. This phenomenon is expressed as freezing point depression and it is useful for several applications such as freeze concentration of liquid food and to find the molar mass of an unknown solute in the solution. Freeze concentration is a high quality liquid food concentration method where water is removed by forming ice crystals. This is done by cooling the liquid food below the freezing point of the solution. The freezing point depression is referred as a colligative property and it is proportional to the molar concentration of the solution (m), along with vapor pressure lowering, boiling point elevation, and osmotic pressure.

Give reasons of following

- (a) Cooking is faster in pressure cooker than in cooking pan.
- (b) Red blood cells(RBC) shrink when placed in saline water but swell in distilled water.
- (c) A decrease in temperature is observed on mixing ethanol and acetone.

OR

- (c) Potassium chloride solution freezes at a lower temperature than water.

SECTION E

The following questions are long answer type and carry 5 marks each.

All questions have an internal choice.

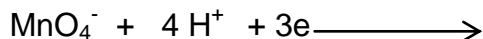
31. Attempt any five of the following:

- (a) Transition metal form complex compounds.
- (b) Actinoids show wide range of oxidation states.
- (c) E^0 value for (Zn^{2+}/Zn) is negative while that of (Cu^{2+}/Cu) is positive.
- (d) Sc^{3+} is colourless in an aqueous solution whereas Ti^{3+} is coloured.
- (e) Complete and balance the following chemical equations.



(f) The transition metals are generally paramagnetic in nature why?

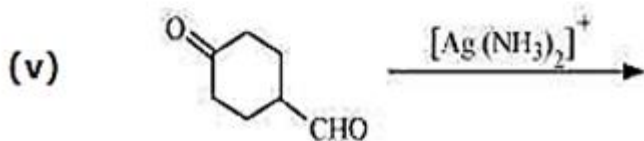
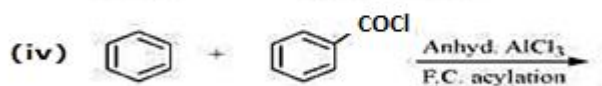
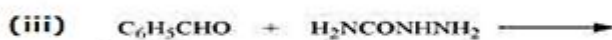
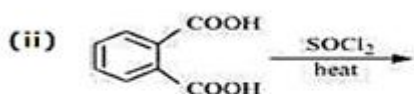
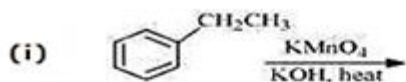
(g) Complete and balance the following chemical equations



32. An organic compound (A) (molecular formula $\text{C}_8\text{H}_{16}\text{O}_2$) was hydrolysed with dilute sulphuric acid to give a carboxylic acid (B) and an alcohol (C). Oxidation of (C) with chromic acid produced (B). (C) on dehydration gives but-1-ene. Identify A, B and C. Write equations for the reactions involved.

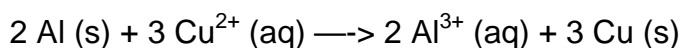
OR

Complete the following



33.(a) The conductivity of 0.001 M acetic acid is $4 \times 10^{-5} \text{ S/m}$. Calculate the dissociation constant of acetic acid if λ^0_m for acetic acid is $390 \text{ S cm}^2 \text{ mol}^{-1}$.

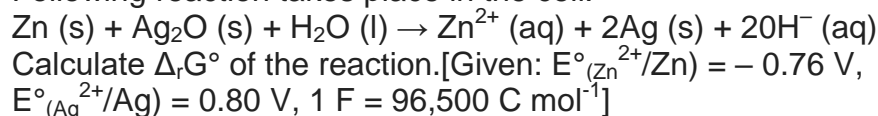
(b) Write Nernst equation for the reaction at 25°C :



(c) What are Secondary Batteries ? Give an example.

OR

(a) Following reaction takes place in the cell:



(b) How can you determine limiting molar conductivity (Λ_m°) for strong electrolyte and weak electrolyte?

(c) How much electricity in terms of Faraday is required to produce 20.0 g of Ca from molten CaCl_2 ?



BANGALORE SAHODAYA SCHOOLS COMPLEX ASSOCIATION

PRE-BOARD EXAMINATION (2023-2024)
Grade XII SET 2

Date: _____

Max. Marks: 70

Subject: Chemistry

Time: 3 Hrs

General Instructions:

Read the following instructions carefully

- (a) There are 33 questions in this question paper with internal choice.
- (b) SECTION A consists of 16 multiple -choice questions carrying 1 mark each.
- (c) SECTION B consists of 5 short answer questions carrying 2 marks each.
- (d) SECTION C consists of 7 short answer questions carrying 3 marks each.
- (e) SECTION D consists of 2 case - based questions carrying 4 marks each.
- (f) SECTION E consists of 3 long answer questions carrying 5 marks each.
- (g) All questions are compulsory. (h) Use of log tables and calculators is not allowed.

SECTION A

The following questions are multiple -choice questions with one correct answer. Each question carries 1 mark. There is no internal choice in this section.

Q1. The molar conductance of 0.001M acetic acid is $50 \text{ ohm}^{-1} \text{ cm}^2 \text{ mol}^{-1}$. The maximum value of molar conductance is $250 \text{ ohm}^{-1} \text{ cm}^2 \text{ mol}^{-1}$. What is its degree of ionisation?

- (a) 0.5 % (b) 2 % (c) 20 % (d) 22 %

Q2. In which order the rate of reaction does not depend on the concentration of reactant.

- (a) 0.5 (b) 1 (c) 2 (d) 0

Q3. which of the following is a diamagnetic ion? (Atomic number of Sc, V, Mn, and Cu are 21, 23, 25, and 29 respectively.)

- (a) V^{2+} (b) Sc^{3+} (c) Cu^{2+} (d) Mn^{3+}

Q4. Ambidentate ligands like NO_2^- and SCN^- are _____.

- (a) Unidentate (b) didentate (c) polydentate (d) has variable denticity.

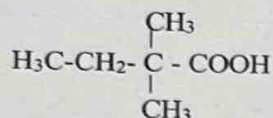
Q5. Which of the following represents correct variation of the property indicated

- (a) BP of $\text{C}_2\text{H}_5\text{Br} > \text{C}_2\text{H}_5\text{I} > \text{C}_2\text{H}_5\text{Cl}$
- (b) MP of $p\text{-C}_6\text{H}_4\text{Cl}_2 > m\text{-C}_6\text{H}_4\text{Cl}_2 > o\text{-C}_6\text{H}_4\text{Cl}_2$
- (c) BP of $o\text{-C}_6\text{H}_4\text{Cl}_2 > p\text{-C}_6\text{H}_4\text{Cl}_2 > m\text{-C}_6\text{H}_4\text{Cl}_2$
- (d) BP of $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Br} > \text{C}(\text{CH}_3)_3\text{Br} > \text{CH}_3\text{CH}_2\text{-}\underset{\text{Br}}{\text{CH}}\text{-CH}_3$

- Q6. Which one of the following statements is correct about sucrose?
- (a) It can reduce Tollen's reagent, however cannot reduce Fehling's reagent..
 - (b) It undergoes mutarotation like glucose and fructose.
 - (c) It undergoes inversion in the configuration on hydrolysis.
 - (d) It is laevorotatory in nature.

- Q7. Which of the following B group vitamins can be stored in our body?
- (a) Vitamin B₁
 - (b) Vitamin B₂
 - (c) Vitamin B₆
 - (d) Vitamine B₁₂.

- Q8. What is the correct IUPAC name of the given compound?



- (a) 2,2-Dimethylbutanoic acid
- (b) 2-Ethyl-2-methylpropanoic acid
- (c) 2-Carboxyl-2-methylbutane
- (d) 3-Methylbutanecarboxylic acid.

- Q9. CH₃CHO and C₆H₅CH₂CHO can be distinguished chemically by _____.

- (a) Benedict's test
- (b) Iodoform test
- (c) Tollen's reagent test
- (d) Fehling's solution test.

- Q10. Iodoform test is not given by _____.

- (a) ethanol
- (b) ethanal
- (c) pentan-2-one
- (d) pentan-3-one

- Q11. How many alcohols with molecular formula C₄H₁₀O are chiral in nature?

- (a) 1
- (b) 2
- (c) 3
- (d) 4

- Q12. Which of the following haloalkanes is optically active?

- (a) 1-Butanol
- (b) 1-Propanol
- (c) 2-Chlorobutane
- (d) 4-Hydroxybutanal

- Q13. Arrange the following alkyl halides in the decreasing order of the SN¹ reactivity.

- (I) CH₃CH₂CH₂Cl (II) CH₂=CH-CH(Cl)CH₃ (III) CH₃CH₂CH(Cl)CH₃

- (a) I > II > III
- (b) II > I > III
- (c) II > III > I
- (d) III > II > I

In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following:

- (a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
- (b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
- (c) Assertion is correct statement but reason is wrong statement.
- (d) Assertion is wrong statement but reason is correct statement

- Q14. Assertion (A) : Conductivity of an electrolyte increases with decrease in concentration.

Reason (R) : Number of ions per unit volume decreases on dilution,

- Q15. Assertion (A) : Hydrolysis of an ester follows first order kinetics.

Reason (R) : Concentration of water remains nearly constant during the course of the reaction.

Q16. Assertion (A): The melting point and solubility of amino acids in water is greater than that of corresponding halo acids.

Reason (R) : Except glycine, all naturally occurring α amino acids are optically active.

SECTION B

This section contains 5 questions, with internal choice in one question. The following questions are very short answer type and carry 2 marks each.

Q17. For a 5% of urea (Molar mass= 60g/mol), calculate the osmotic pressure at 300K.
[$R = 0.0821 \text{ L atm K}^{-1} \text{ mol}^{-1}$].

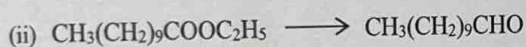
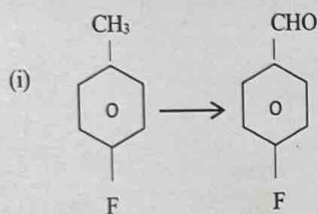
Q18. Calculate molarity and molality of 20% (mass/mass) aqueous solution of KI if density is 1.2 g/cm^3 .
(molar mass of KI = 166 g/mol)

Q19.

(a) Alkylhalides, though polar, are immiscible in water. Justify.

(b) Name the reactant and reagent required for the manufacture of Freon12.

Q20. (a) Name the reagents required for the conversion of



(b) Arrange the following compounds in increasing order of their reactivity towards nucleophilic addition reactions:

Benzaldehyde, p-Tolualdehyde, p-nitrobenzaldehyde, Acetophenone.

OR

Give one chemical test to distinguish the following pair of compounds.

(a) Benzoic acid and Phenol

(b) Propanal and Propanone

Q21. Name the monosaccharide units present in maltose and draw its Haworth structure.

SECTION C

This section contains 7 questions with internal choice in one question. The following questions are short answer type and carry 3 marks each.

Q22. (a) Using Valence bond theory, explain the bonding and magnetic properties of $[\text{Mn}(\text{CN})_6]^{3-}$. Atomic number of Mn is 25.

(b) Draw the geometrical isomers of $[\text{Co}(\text{NH}_3)_3(\text{NO}_2)_3]$

Q23. (a) What is corrosion? Give the anode and cathode reaction in the process of rusting.

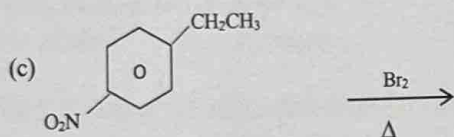
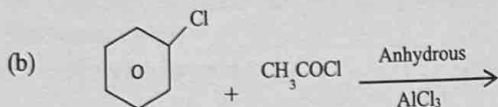
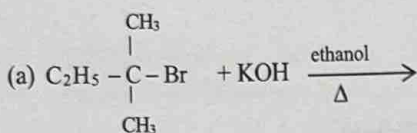
(b) Predict the products of electrolysis of a dilute solution of H_2SO_4 using platinum electrodes.

$$E^{\circ}_{S O_2 / SO_4^{2-}} = 1.96V$$

Q24.

- (a) What is van't Hoff factor? What possible value can it have, if the solute undergoes dissociation?
 (b) Henry's law constant for CO_2 is 1648 atm at 298K. Calculate the number of moles of CO_2 present in 500ml of soda water, when packed under 2.5 atm CO_2 pressure at 298K.

Q25. Write the major and minor product formed in the following reactions.



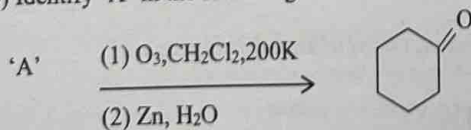
Q26. Give reasons for the following :

- (a) H_2SO_4 is not used during reaction of alcohols with KI.
 (b) Arylalkylethers undergo electrophilic substitution reaction to form o & p - derivatives.
 (c) Alcohols are more soluble in water than hydrocarbons of comparable molecular mass.

Q27. (a) Explain the following reactions:

- (i) Wolff Kishner reduction
 (ii) Cannizzaro reaction.

(b) Identify 'A' in the following reaction.



OR

- (a) Write structure of
 (i) semicarbazone of acetone
 (ii) oxime of cyclohexane carbaldehyde

- (b) Convert benzoic acid to benzophenone
 (c) Write short notes on soda lime decarboxylation.

- Q28. Differentiate the following: (2 differences each)
- Fibrous protein and globular protein
 - Essential amino acids and non-Essential amino acids.
 - DNA and RNA

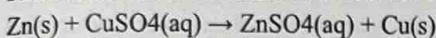
SECTION- D

The following questions are case based questions and carries 4 marks each. Read the passage and answer the questions that follow:

Q29.

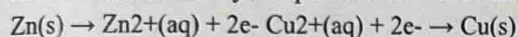
A device used to convert the energy evolved in a redox reaction into electrical energy is called an electrochemical cell. These devices are also called galvanic cells or voltaic cells, after the names of Luigi Galvani (1780) and Alessandro Volta (1800) who were the first to perform experiments on the conversion of chemical energy into electrical energy. How exactly the chemical energy of a redox reaction is converted into electrical energy can be seen from the following example:

Redox reaction between Zn and CuSO_4 . The reaction is represented as:

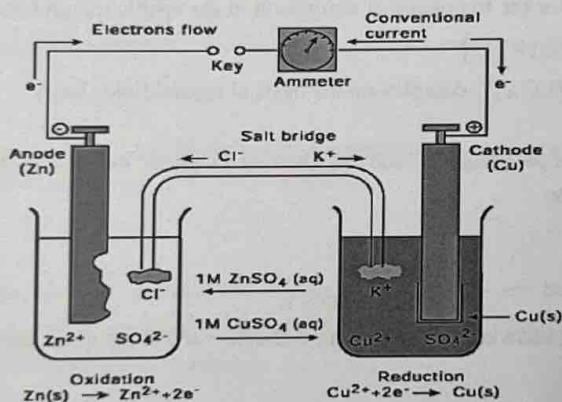


It may also be written in ionic form as: $\text{Zn} + \text{Cu}^{2+} \rightarrow \text{Zn}^{2+} + \text{Cu}$

The reaction essentially comprises of two half reactions: one for reduction and the other for oxidation.



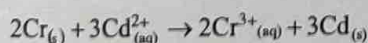
Thus, Zn is oxidized to Zn^{2+} in the oxidation half reaction and Cu^{2+} is reduced to Cu in the reduction half reaction. The overall reaction can be obtained by adding the two half reactions.



- If copper electrode in the above cell is replaced by $\text{Ag}/\text{AgNO}_3(\text{aq})$ electrode, can KCl be used in the salt bridge? Comment.
- Suggest two materials other than hydrogen that can be used as fuels for fuel cell.
- Give the construction and working (discharge only) of lead storage battery.

OR

- Calculate $\Delta_r G^\circ$ and K_c for the following reaction taking place in a Galvanic cell



Given $E^\circ_{\text{Cd}^{2+}/\text{Cd}} = -0.4\text{V}$

$$E^\circ_{\text{Cr}^{3+}/\text{Cr}} = -0.74\text{V}$$

Q30. Valence bond theory considers the bonding between the metal ion and the ligands as purely covalent. On the other hand, crystal field theory considers the metal-ligand bond to be ionic arising from electrostatic interaction between the metal ion and the ligands. In coordination compounds, the interaction between the ligand and the metal ion causes the five d-orbitals to split-up. This is called crystal field splitting and the energy difference between the two sets of energy level is called crystal field splitting energy. The crystal field splitting energy (Δ_o) depends upon the nature of the ligand. The actual configuration of complexes is divided by the relative values of Δ_o and P (pairing energy)

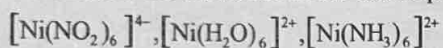
If $\Delta_o < P$, then complex will be high spin.

If $\Delta_o > P$, then complex will be low spin.

Arrangement of ligands in order of their ability to cause splitting Δ is called spectrochemical series. Ligands which cause large splitting (large Δ) are called strong field ligands while those which cause small splitting (small Δ) are called weak field ligands. When strong field ligands approach metal atom/ion, the value of Δ_o is large, so that electrons are forced to get paired up in lower energy t_{2g} orbitals. Hence, a low-spin complex is resulted from strong field ligand. When weak field ligands approach metal atom/ion, the value of Δ_o is small, so that electrons enter high energy e_g orbitals rather than pairing in low energy t_{2g} orbitals. Hence, a high-spin complex is resulted from weak field ligands. Strong field ligands have tendency to form inner orbital complexes by forcing the electrons to pair up. Whereas weak field ligands have tendency to form outer orbital complex because inner electrons generally do not pair up.

(a) Write the electronic configuration of the central metal ion in $K_4[Fe(CN)_6]$ on the basis of crystal field theory in terms of t_{2g} of e_g .

(b) What will be the correct order for the frequency of absorption in the visible region for the following



(c) Explain the violet color of $[Ti(H_2O)_6]^{3+}$ complex on the basis of crystal field theory.

OR

Predict whether the compounds are paramagnetic and calculate the magnetic moment of that complex.

(a) Hexaammine chromium (III) ion

(b) Hexaaqua cobalt (III) ion.

SECTION E

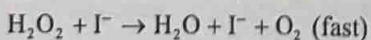
The following questions are long answer type and carry 5 marks each. Two questions have internal choice.

Q31. Explain the following:

- Transition metals exhibit variable oxidation states.
- Transition metals and their compounds act as a catalyst.
- Many of the transition elements are known to form interstitial compounds.
- The metallic radii of the third (5d) series of transition metals are virtually the same as those of the corresponding group member of the second (4d) series.
- With the same d-orbital configuration (d^4) Cr^{2+} is a reducing agent while Mn^{3+} is an oxidising agent.

Q32.

(a) Decomposition of H_2O_2 in alkaline medium catalysed by iodide ion, takes place as follows:



Write the rate equation for reaction and identify the molecularity of elementary reactions.

(b) In a reaction between A and B, the initial rate of reaction (r_0) was measured for different initial concentrations of A and B as given below:

A (mol/L)	0.2	0.2	0.4
B (mol/L)	0.3	0.1	0.05
r_0	5.07×10^{-5}	5.07×10^{-5}	1.43×10^{-4}

What is the order of the reaction with respect to A and B?

(c) The rate of reaction quadruples when the temperature changes from 300K to 320K. Calculate the activation energy for the reaction assuming that it does not change with temperature.

$$R = 8.314 \text{ J / K / mol}$$

$$\text{Log } 2 = 0.3010$$

OR

(a) What is unit for rate constant of a second order reaction?

(b) The following data were obtained during the first order thermal decomposition of SO_2Cl_2 at a constant volume.



Time (s)	Total pressure (atm)
0	0.5
100	0.6

Calculate rate constant for the reaction:

$$\text{Log } 5 = 0.6989$$

$$\text{Log } 2 = 0.3010$$

(c) For first order reaction, show that time required for 99% completion is twice the time required for the completion of 90% of reaction.

Q33.

a) An aromatic compound 'A' on treatment with aqueous ammonia and heating forms compound 'B' which on heating with Br_2 and KOH forms compound 'C' of molecular formula $\text{C}_6\text{H}_7\text{N}$. Write the structures and IUPAC names of compounds A, B and C.

b) Carry out the following conversion:

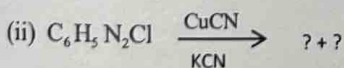
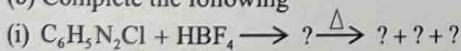
(i) p-Nitrotoluene to 2-Bromobenzoic acid .

(ii) Nitrobenzene to 1, 3, 5 - Tribromobenzene.

OR

(a) Write the structures of different isomers corresponding to the molecular formula $\text{C}_3\text{H}_9\text{N}$. Write the IUPAC names of the isomers which will liberate nitrogen gas on treatment with NaNO_2 and HCl .

(b) Complete the following



(c) Arrange the following compounds in the decreasing order of basic strength in aqueous medium.

