

**CLASS X (2019-20)**  
**SCIENCE (CODE 086)**  
**SAMPLE PAPER-20**

**Time : 3 Hours**

**Maximum Marks : 80**

**General Instructions :**

- (i) The question paper comprises of three sections-A, B and C. Attempt all the sections.
- (ii) All questions are compulsory.
- (iii) Internal choice is given in each sections.
- (iv) All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
- (v) All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50-60 words each.
- (vi) All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80-90 words each.
- (vii) This question paper consists of a total of 30 questions.

**SECTION A**

Q1. State the nature of the lens in human eye and name the part responsible for adjusting its focal length. [1]

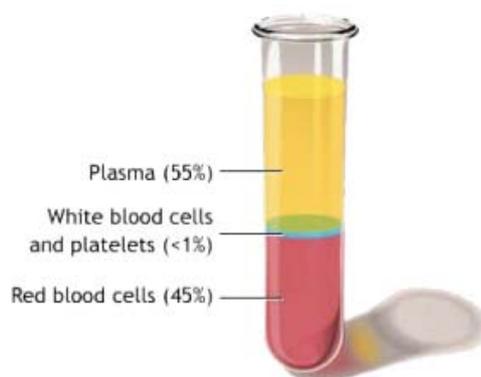
Q2. Name the gas generally liberated when an acid reacts with a metal. Illustrate with an example. [1]

Q3. **Answer question numbers 3.1-3.4 on the basis of your understanding of the following paragraph and the related studied concepts.**

Blood is a fluid connective tissue that circulates throughout our body and delivers essential substances

like oxygen to the body cells. It also transports metabolic waste products away from the cells.

Figure alongside depicts the percentage composition of different components of blood.



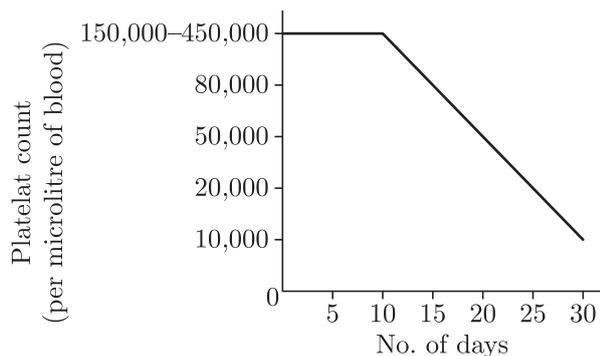
Blood cannot be made or manufactured outside the body. Blood donation is the only source of blood for patients that need blood transfusion.

**3.1** Why do you think donating blood isn't harmful even though red blood cells carry oxygen to the body cells? [1]

**3.2** Which component is deficient in your blood if you lose too much of blood from a cut? [1]

**3.3** Name the pigment present in red blood cells that carries oxygen from the lungs to all the body tissues. [1]

3.4 Based on the information shown by the bar graph, what could be the possible cause for reduced platelet count? [1]



Q4. Question numbers 4.1-4.4 are based on the two tables given below and the related studied concepts. Analyse these tables and answer the questions that follow.

**Table A: Amount of air pollutants (microgram per cubic metre)**

Air Pollutants	Microgram per cubic metre
SO <sub>2</sub>	50
NO <sub>2</sub>	40
PM10	60

**Table B: Status of ambient air quality in five metropolitan cities of India**

S.No.	Name of the city	State	2011		
			SO <sub>2</sub>	NO <sub>2</sub>	PM10
1.	Banglore	Karnataka	14	28	91
2.	Delhi	U.T.	6	61	777
3.	Gwalior	M.P.	12	20	311
4.	Chennai	Tamil Nadu	9	24	92
5.	Agra	U.P.	3	23	155

4.1 Refer to Table B showing the status of ambient air quality in five metropolitan cities of India.

Which city has the maximum risks of respiratory diseases? [1]

4.2 Which is the least polluted city among the five metropolitan cities of India and why? [1]

4.3 Taj Mahal in Agra is said to be suffering from 'Marble Cancer'. Which of the following statements correctly defines marble cancer? [1]

- Formation of fungus at Taj Mahal
- Corrosion of marble by acid rain
- Formation of perforations in Taj Mahal
- Yellowing of marble by soot particles

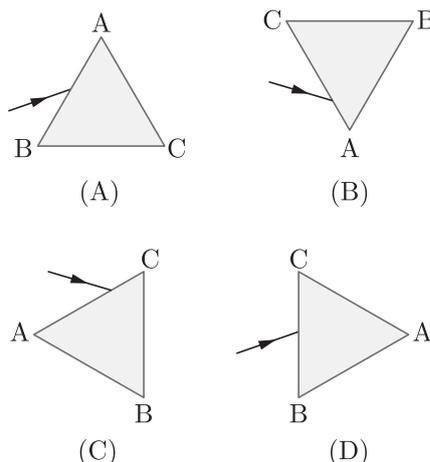
4.4 Which of the following steps should be taken to reduce SO<sub>2</sub> and NO<sub>2</sub> pollutants in the air? [1]

- Increase the use of fossil fuels
- Cut a large number of trees
- Install catalytic converters in the vehicles
- Use petrol run vehicles for covering short distances

Q5. One of the constituents of the baking powder is sodium hydrogencarbonate, the other constituent is [1]

- oxalic acid
- lactic acid
- ethanoic acid
- tartaric acid

Q6. A prism ABC (with BC as base) is placed in different orientations. A narrow beam of white light is incident on the prism as shown in the figure. In which of the following cases, after dispersion, the third colour from the top corresponds to the colour of the sky? [1]

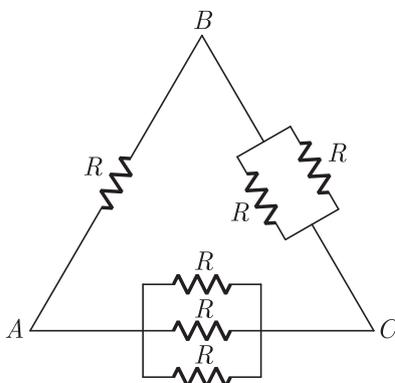


- (a) A
- (b) B
- (c) C
- (d) D

Q7. An element E forms a halide with formula  $\text{EH}_4$  which is a solid with low melting point. Element E is most likely to be in the same group of periodic table as [1]

- (a) Be
- (b) Mg
- (c) Ca
- (d) Si

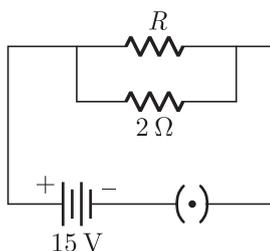
Q8. Consider the following network of six identical resistors. If the equivalent resistance of this circuit between A and B, B and C, and A and C are  $R_{AB}$ ,  $R_{BC}$  and  $R_{AC}$  respectively then which of the following relations is correct? [1]



- (a)  $R_{AB} = R_{BC} > R_{AC}$
- (b)  $R_{AC} > R_{BC} > R_{AB}$
- (c)  $R_{AB} = R_{BC} = R_{AC}$
- (d)  $R_{BC} > R_{AC} > R_{AB}$

**OR**

The power dissipation in this circuit would be 150 W, if the value of R is



- (a)  $4 \Omega$  (b)  $6 \Omega$   
(c)  $8 \Omega$  (d)  $12 \Omega$

- Q9. What happens when copper rod is dipped in iron sulphate solution? [1]  
(a) Copper displaces iron  
(b) Blue colour of copper sulphate solution is obtained  
(c) No reaction takes place  
(d) Reaction is exothermic

**OR**

A student added dilute HCl to a test tube containing zinc granules and made following observations :

- (a) the zinc surface became dull and black  
(b) a gas evolved which burnt with a pop sound  
(c) the solution remained colourless  
(d) the solution becomes green in colour
- Q10. Which of the following phenomena of light are involved in the formation of a rainbow? [1]  
(a) Reflection, refraction and dispersion  
(b) Refraction, dispersion and total internal reflection  
(c) Refraction, dispersion and internal reflection  
(d) Dispersion, scattering and total internal reflection
- Q11. Which of the following gives the correct increasing order of the atomic radii of chlorine (Cl), phosphorous (P) and sulphur (S)? [1]  
(a) Cl, S, P (b) P, S, Cl  
(c) S, P, Cl (d) P, Cl, S
- Q12. A plane mirror is moving towards you with a speed of 1 m/s. The speed with which your image is approaching you is [1]  
(a) 1 m/s (b) 2 m/s  
(c) 4 m/s (d) 8 m/s

**For question numbers 13 and 14, two statements are given—one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.**

- (a) Both A and R are true and R is correct explanation of the assertion.  
(b) Both A and R are true but R is not the correct explanation of the assertion.  
(c) A is true but R is false.  
(d) A is false but R is true.
- Q13. **Assertion :** Sodium metal is stored under Kerosene. [1]  
**Reason :** Metallic sodium melts when exposed to air.  
Sodium is a very reactive metal. It is kept in kerosene to prevent it from coming in contact with oxygen and moisture present. If this happens, it will react with the moisture present in air and form sodium hydroxide. This is a strongly exothermic reaction, and lot of heat is generated.

**OR**

**Assertion :** To dilute sulphuric acid, acid is added to water and not water to acid.  
**Reason :** Specific heat of water is quite large.

Q14. **Assertion :** When two long parallel straight conductors hanging freely are connected in parallel to a powerful battery, they come near to each other.

**Reason :** Conductors carrying current in same direction attract each other. [1]

### SECTION B

Q15. (a) Give an example of a combination reaction which is exothermic.  
(b) Identify the substance oxidised and the substance reduced in the following reaction:



(c) Name the phenomenon due to which the taste and smell of oily foods change when left for a long time. Suggest one method to prevent it. [3]

#### OR

What are exothermic and endothermic reactions? Give examples. [3]

Q16. Differentiate between strong and weak acids. Identify the strong and weak acids from the following list of acids. [3]

Hydrochloric acid, Acetic acid, Formic acid, Nitric acid

Q17. Four elements P, Q, R and S belong to the third period of the Modern Periodic Table and have 1, 3, 5 and 7 electrons respectively in their outermost shells. Write the electronic configurations of Q and R and determine their valencies. Write the molecular formula of the compound formed when P and S combine. [3]

Q18. (a) Name the part of brain which controls:  
(i) voluntary actions  
(ii) involuntary actions  
(b) State the significance of the peripheral nervous system. Name the components of this nervous system and distinguish between their origins. [3]

Q19. How does chemical coordination occur in plants? [3]

Q20. "It is possible that a trait is inherited but may not be expressed." Give a suitable example to justify this statement. [3]

#### OR

Describe any three methods of tracing evolutionary relationship among organisms. [3]

Q21. What is advanced sunrise and delayed sunset? Draw a labelled diagram to explain these phenomena. [3]

#### OR

Why does the sun appear reddish early in the morning? Will this phenomenon be observed by an astronaut on the Moon? Give reason to justify your answer. [3]

Q22. Draw magnetic field lines produced around a current-carrying straight conductor passing through a cardboard. Apply right hand thumb rule to mark the direction of these field lines. How will the strength of the magnetic field change, when the point where the magnetic field is to be determined, is moved away from the straight wire carrying constant current? Justify your answer. [3]

Q23. What is meant by the term overloading of an electrical circuit? Explain two possible causes due to which overloading may occur in household circuits. State one preventive measure that should be taken to avoid the overloading of domestic electric circuits. [3]

- Q24. Draw schematic labelled diagram of a box-type solar cooker. Name three components of a solar cooker which are responsible for increasing the temperature inside it. Explain their functions in brief. [3]

### SECTION C

- Q25. (a) In the formation of compound between two atoms A and B, A loses two electrons and B gains one electron. [5]  
(i) What is the nature of bond formed between A and B?  
(ii) Suggest the formula of the compound formed by the combination of A and B.  
(b) On similar lines explain the formation of  $MgCl_2$  molecule.  
(c) Common salt conducts electricity only in the molten state. Why?  
(d) Why is melting point of sodium chloride high?

#### OR

- (a) Name the systematic steps involved in metallurgy.  
(b) If A, B, C, D, E, F, G, H, I, J and K represent the metals in decreasing order of reactivity, which metal is likely to occur in the free state?  
(c) Carbon reduction process is not applied for reducing aluminium oxide to aluminium. Give reasons.  
(d) Thermite process is quite useful for repairing the broken parts of railway tracks. Justify.  
(e) Aqueous solution of sodium chloride cannot be used for the isolation of sodium by electrolytic reduction. Give reasons. [5]
- Q26. Elements forming ionic compounds attain noble gas electronic configuration by either gaining or losing electrons from their valence shells. Explain giving reason why carbon cannot attain stable configuration in this manner to form its compounds. Name the type of bonds formed in ionic compounds and in the compounds formed by carbon. Also explain with reason why carbon compounds are generally poor conductors of electricity. [5]
- Q27. Name the organelle which is site of photosynthesis in green plants. List the raw materials essential for this process to take place. How are they obtained by the green plants? Write balanced chemical equation for the process, stating the by product of the reaction. [5]
- Q28. (a) Draw the diagram of a flower and label the four whorls.  
(b) What is pollination? Explain its significance.  
(c) Explain the process of fertilisation in flowers. [5]

#### OR

- Why are budding, fragmentation and regeneration all considered as asexual types of reproduction? With neat diagrams explain the process of regeneration in Planaria. [5]
- Q29. A student has focused the image of a candle flame on a white screen using a concave mirror. The situation is as given below: [5]  
Length of the flame = 1.5 cm  
Focal length of the mirror = 12 cm  
Distance of flame from the mirror = 18 cm  
If the flame is perpendicular to the principal axis of the mirror, calculate the following:  
(a) Distance of the image from the mirror  
(b) Length of the image  
If the distance between the mirror and the flame is reduced to 7 cm, what would be observed on the screen? Draw ray diagram to justify your answer for this situation.

**OR**

- (a) What is meant by power of a lens? The focal length of a lens is  $-10$  cm. Write the nature of the lens and find its power.
- (b) The image of an object formed by a lens is real, inverted and of the same size as the object. If the image is at a distance of  $40$  cm from the lens, find the nature and power of the lens. Draw a ray diagram to justify your answer. [5]

- Q30. (a) Calculate the resistance of the wire using the graph.

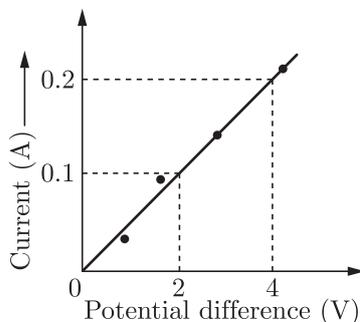


Fig: Potential difference (V)

- (b) How many  $176 \Omega$  resistors in parallel are required to carry  $5$  A on a  $220$  V line?
- (c) Define electric power. Derive relation between power, potential difference and resistance. [5]

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