

**SSC**

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# Newton's Academy March 2024

## Science and Technology Part - 1

**Time: 2 Hours**
**Max. Marks: 40**

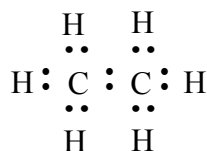
- Note:**
- i. All questions are compulsory.
  - ii. Use of a calculator is not allowed.
  - iii. The numbers to the right of the questions indicate full marks.
  - iv. In case of MCQs (Q. No. 1(A)) only the first attempt will be evaluated and will be given credit.
  - v. Scientifically correct, labelled diagrams should be drawn wherever necessary.

**Q.1. (A) Write the correct alternative:** [5]

- i. The SI unit of heat is \_\_\_\_\_.  
 (A) calorie (B) joule  
 (C) kcal/kg °C (D) cal/g °C
- ii. We can see the sun even when it is little below the horizon because of \_\_\_\_\_.  
 (A) Reflection of light (B) Refraction of light  
 (C) Dispersion of light (D) Absorption of light
- iii. \_\_\_\_\_ is the functional group of carboxylic acid.  
 (A) —COOH— (B) —CO—  
 (C) —CHO— (D) —OH—
- iv. In simple microscope \_\_\_\_\_ lens is used.  
 (A) Concave (B) Plano concave  
 (C) Plano convex (D) Convex
- v. In \_\_\_\_\_ process a layer of molten tin is deposited on metals.  
 (A) Anodization (B) Tinning  
 (C) Galvanizing (D) Alloying

**(B) Answer the following:** [5]

- i. Write the name of the atom having the smallest size.
- ii. Write the molecular formula of calcium carbonate.
- iii. Write the use of 'Calorimeter'.
- iv. Identify the hydrocarbon from the given electron-dot structure :

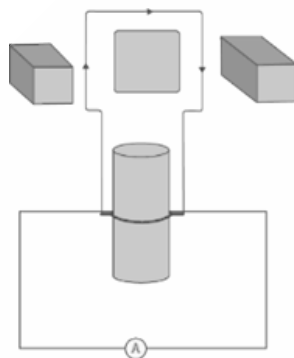


- v. Match the columns:

Column 'A'		Column 'B'
Refractive index of water	(a)	1.31
	(b)	1.36
	(c)	1.33

- Q.2. (A) Give scientific reasons (any two):** [4]
- When the gas formed on heating limestone, is passed through freshly prepared lime water, the lime water turns milky.
  - Tungsten metal is used to make a solenoid type coil in an electric bulb.
  - On exposure to air, silver articles turn blackish after some time.

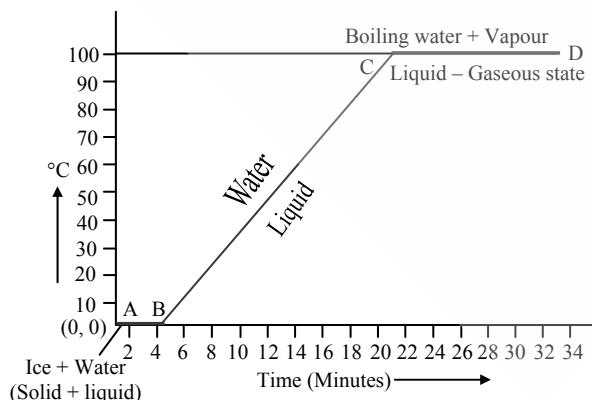
- (B) Answer the following (any three):** [6]
- State Dobereiner's law of triad. Give *one* example of it.
  - Identify the figure and explain its use:



- What is meant by satellite launch vehicle? Name any one Indian satellite launch vehicle.
- What is free fall? When is it possible?
- The focal length of a convex lens is 20 cm. What is its power?

- Q.3. Answer the following questions (any five):** [15]

- Select the appropriate option and complete the following paragraph :  
(Metals, non-metals, metalloids, four, seven, s-block, p-block, d-block, f-block.)  
On the basis of electronic configuration, elements in the modern periodic table are classified into \_\_\_\_\_ blocks. Group 1 and 2 elements are included in \_\_\_\_\_ and all these elements are metals. (except hydrogen). Group 13 to 18 elements are included in \_\_\_\_\_. This block contains metals, non-metals and metalloids. Group 3 to 12 elements are included in \_\_\_\_\_ and all the elements are \_\_\_\_\_ elements shown at the bottoms of the periodic table i.e., lanthanides and actinides constitute \_\_\_\_\_ and all these elements are metals.
- (a) What are the factors affecting the rate of chemical reaction?  
(b) Explain any *one* factor.
- Observe the following graph answer the following questions.



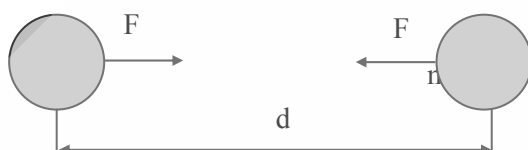
- What does the graph represent?
- What does the line AB represent?
- What does the line BC represent?

iv. Complete the following table by observing the given figures:

Points ↓	Figure →		
(a) Name of the defect		_____	_____
(b) Position of the image		_____	_____
(c) Lens used to correct the defect.		_____	_____

v. Write any *three* general properties of ionic compounds.

vi. Observe the figure and answer the questions:

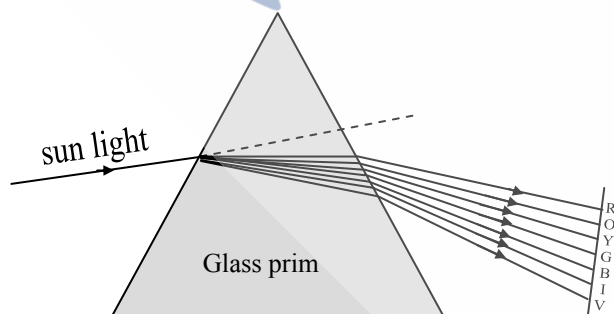


- State Newton's universal law of gravitation.
  - If the distance between the two bodies is tripled, how will the gravitational force between them change?
  - What will happen to gravitational force, if mass of one of the objects is doubled?
- vii. The orbit of a satellite is exactly 35780 km above the Earth's surface and its tangential velocity is 3.08 km/s.  
How much time the satellite will take to complete one revolution around the earth?  
(Radius of the Earth = 6400 km.)
- viii. What is a solenoid? Draw a neat diagram and name its various components.

**Q.4. Answer the following questions (any one):**

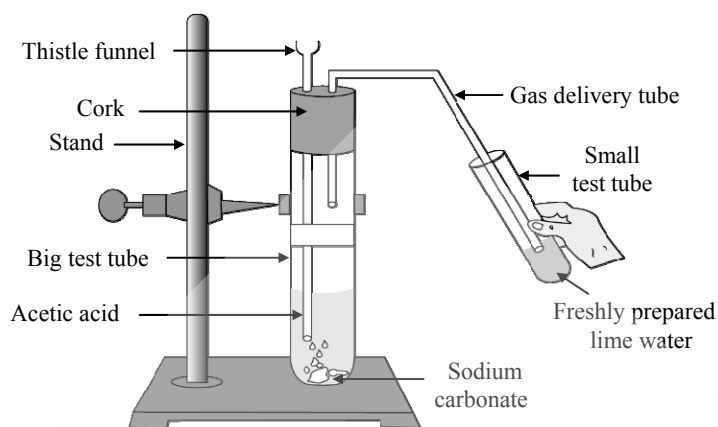
[5]

i. Observe the given diagram and answer the questions :



- Name the process shown in the figure.
- Name the colour that deviates the most.
- Name the colour that deviates the least.
- Name any *one* phenomenon in the nature which is based on the above process.
- Define 'spectrum'.

- ii. Observe the diagram given below and answer the questions :



- Name the reactants in this reaction.
- Which gas comes out as effervescence in the bigger test tube?
- What is the colour change in the lime water?
- In the above experiment instead of sodium carbonate which chemical can be used to get same product?
- Write the use of acetic acid.