

GENERAL SCIENCE, Paper - I

(Physical Sciences)

(English version)

Time : 2 hours 45 min.]

[Maximum Marks : 40

Instructions :

- (i) The question paper comprises of **Four** sections - I, II, III and IV.
- (ii) **All** the questions are **compulsory**.
- (iii) There is no over-all choice. However there is internal choice to the questions under section-I.
- (iv) In the time duration of 2 hrs. 45 minutes, 15 minutes of time is exclusively allotted to read and understand the question paper.

SECTION - I

Note :

(4×4=16 marks)

- (i) Answer **all** the questions.
- (ii) Each question carries FOUR marks.
- (iii) There is internal choice for each question. Only one option from each question is to be attempted.
- (iv) Answer each question in 8 to 10 sentences.

1. An object is placed at the following distances from a convex lens of focal length 10 cm.

- (a) 8 cm. (b) 15 cm.
- (c) 20 cm. (d) 25 cm.

Which position of the object will produce

- (i) a diminished, real and inverted image ?
- (ii) a magnified, real and inverted image ?

- (iii) a magnified, virtual and erect image ?
 (iv) an image of same size as the object ?

Justify your answer in each case.

OR

1. How do you verify that resistance of a conductor of uniform cross-section area is proportional to the length of the conductor at constant temperature.

2. Explain the process of melting and latent heat of fusion.

OR

2. (a) State Right hand rule with a labelled diagram.
 (b) A coil of insulated Copper wire is connected to a Galvanometer.
 What happens, if a bar magnet is ...
 (i) pushed into the coil ?
 (ii) withdrawn from inside the coil ?
 (iii) held stationary inside the coil ?

3. (a) Equal lengths of Magnesium ribbons are taken in two test-tubes X and Y. Hydrochloric acid is added to test-tube X and Acetic acid is added to test-tube Y.

In which test-tube, the reaction will be more vigorous ? Why ?

- (b) Name the four chemicals that are obtained from common salt and write their molecular formulae.

OR

3. (a)
$$\text{N}_2 + \text{O}_2 + \text{Heat} \rightarrow 2\text{NO}$$

$$\underset{(g)}{\text{N}_2} + \underset{(g)}{\text{O}_2} + \text{Heat} \rightarrow \underset{(g)}{2\text{NO}}$$

What information do you get from the above equation ? Comment.

- (b) Write an activity about how you conduct an experiment to show that more reactive metals replace less reactive metals from their compounds.

4. Two elements X and Y belong to Groups 1 and 2 respectively in the same period of the Periodic Table. Compare these elements with respect to :

- (i) number of electrons in their outer-most orbit.
- (ii) their atomic size and their valencies.
- (iii) their ionisation energy and metallic character.
- (iv) formulae of their chlorides and sulphates.

OR

4. Four metals A, B, C and D are in turn added to the following solutions one by one. The observations made are tabulated below.

Metal	Iron (II) sulphate	Copper (II) sulphate	Zinc sulphate	Silver nitrate
A	No reaction	Displacement	-	-
B	Displacement	-	No reaction	-
C	No reaction	No reaction	No reaction	Displacement
D	No reaction	No reaction	No reaction	No reaction

Answer the following based on the above information :

- (i) Which is the most reactive metal ? Why ?
- (ii) What would be observed, if 'B' is added to a solution of Copper (II) sulphate and why ?
- (iii) Arrange the metals A, B, C and D in order of increasing reactivity.
- (iv) Which one among A, B, C and D metals can be used to make containers that can be used to store any of the above solutions safely ?

SECTION - II**Note :****(6×2=12 marks)**

- (i) Answer **all** the questions.
 (ii) Each question carries **TWO marks**.
 (iii) Answer each question in 4-5 sentences.
5. Suggest reasons for the phenomenon associated with the following.
 (i) the sky appearing blue.
 (ii) twinkling of stars.
6. Draw the diagram that explains the formation of an image by a plane mirror.
7. A ray of light enters from air to a medium X. The speed of light in the medium is 1.5×10^8 m/s and the speed of light in air is 3×10^8 m/s. Find the Refractive index of the medium X.
8. For a better understanding about the electronic configuration in an atom, the teacher wrote shorthand notation nl^x on the black-board. Looking at this notation, what could be the probable questions that generate in the student's mind? Write any two of them.
9. Represent each of the following molecules using Lewis notation.
 (i) Calcium and Chlorine to form Calcium chloride.
 (ii) Formation of Oxygen molecule from Oxygen atoms.
10. (a) Why are vegetable oils healthy as compared to vegetable ghee?
 (b) $\text{CH}_3-\underset{\text{Cl}}{\text{CH}}-\text{CH}=\text{CH}_2$ has the IUPAC name

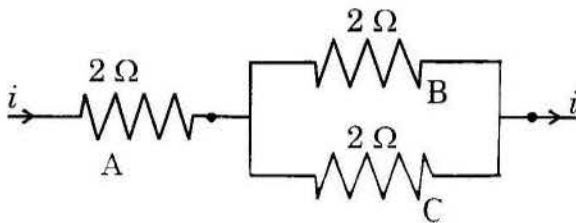
SECTION - III**Note :****(7×1=7 marks)**

- (i) Answer **all** the questions.
- (ii) Each question carries **ONE** mark.
- (iii) Answer each question in **1** or **2** sentences.

11. What is the cause of Presbyopia ?

12. Draw a ray diagram to show the angle of deviation when a ray of light passes through a glass prism.

13.



Three resistors A, B and C are connected as shown in the figure. Each of them dissipates energy to a maximum of 18 W. Find the maximum current that can flow through the three resistors.

- 14. What happens when a current carrying wire is placed in a magnetic field ?
- 15. On adding dilute Hydrochloric acid to Copper oxide powder, the solution formed is blue-green. Write the new compound formed.
- 16. Draw a neat labelled diagram of a Reverberatory furnace.
- 17. How do you explain the role of Oxygen in combustion process ?

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SECTION - IV**Note :** $(10 \times \frac{1}{2} = 5 \text{ marks})$

- (i) Answer **all** the questions.
- (ii) Each question has **FOUR** choices. Choose the correct answer for each question and write the relevant alphabet (A, B, C, D) against the question number in your booklet.
- (iii) Each question carries $\frac{1}{2}$ mark.

18. The temperature (T) of two samples of the same substance with masses m_1 and m_2 and temperatures T_1 and T_2 . when added together is ...

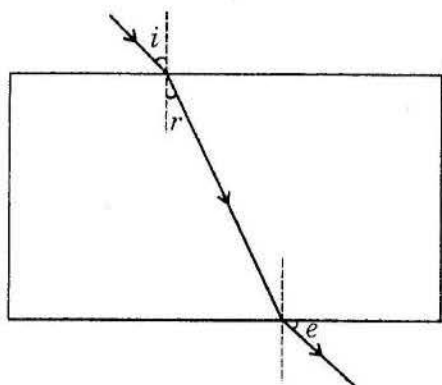
(A) $\frac{m_2 T_1 - m_1 T_2}{m_1 - m_2}$

(B) $\frac{m_1 T_1 + m_2 T_2}{m_1 + m_2}$

(C) $m_1 T_1 + m_2 T_2$

(D) $m_1 T_2 + m_2 T_1$

19. In the diagram, the correctly marked angles are



(A) $\angle i$ and $\angle r$

(B) $\angle i$ and $\angle e$

(C) $\angle r$ and $\angle e$

(D) $\angle i$, $\angle r$ and $\angle e$

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20. A teacher held a pencil close to a spherical mirror and asked four students W, X, Y and Z to predict the nature of the mirror with the help of the image formed in the mirror. The image was erect and enlarged.

The four students identified it as follows :

W - Convex in nature

X - Concave in nature

Y - Plane mirror

Z - Plano-concave mirror

The correct statement was given by ...

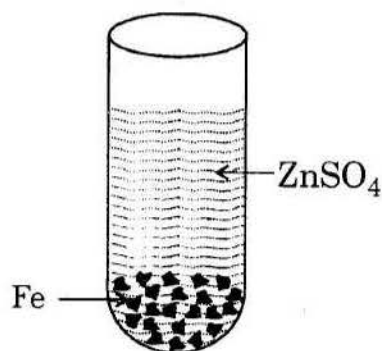
- (A) W
(B) X
(C) Y
(D) Z
21. The far point of a myopia eye is 1.5 m. To correct this defect of the eye, the power of lens is ...
- (A) 0.66 D
(B) - 0.66 D
(C) +1.5 D
(D) -1.55 D
22. A device for producing electric current is ...
- (A) Ammeter
(B) Voltmeter
(C) Generator
(D) Galvanometer
23. When Ethanoic acid is added to a solution of substance X, a colourless and odourless gas Y is liberated. The gas Y turns lime-water milky. The substance X is ...
- (A) NaHCO_3
(B) NaOH
(C) CH_3COONa
(D) NaCl

24. Soaps do not create water pollution because

- (A) Soaps are insoluble in water.
- (B) Soaps are soluble in water.
- (C) Soaps are 100% bio-degradable.
- (D) Soaps are non-biodegradable.

25. The correct observation made by the student after putting clean pieces of Iron in the test-tube containing Zinc sulphate are as shown in the figure.

- (A) Solution becomes colourless and Zinc gets deposited on Iron.
- (B) Solution becomes green and Zinc gets deposited on Iron.
- (C) Iron pieces get dissolved in the solution making it green.
- (D) No reaction is observed.



26. The maximum number of electrons that can be accommodated in all the orbitals for which $l = 3$ is ...

- (A) 6
- (B) 10
- (C) 14
- (D) 18

27. Mendeleev's eka-aluminium is ...

- (A) Scandium
- (B) Gallium
- (C) Germanium
- (D) Indium