



Third Weekly Exam – [Bhadra 15, 2082]

PHYSICAL GROUP

Class: XI

Time: 80 min + 80 min

Full Marks: 70

Attempt all the questions.

Physics

Group A

[4 × 1 = 4]

Multiple Choice Questions

Rewrite the best option in your answer sheet.

1. A vernier caliper of least count 0.1mm is used to measure the length of tube. The length of tube is found to be 5cm long. How should this measurement be recorded in a table of results?
a) 5cm b) 5.0cm c) 5.00cm d) 5.000cm
2. Which is a vector quantity?
a) Energy b) temperature
c) electric current d) temperature gradient
3. What is the name of thermometer which is suitable to measure very high temperature?
a) Gas thermometer b) Resistance Thermometer
c) Cryometer d) Radiation pyrometer
4. The minimum distance between the real object of real image found by a concave mirror when object is placed at
a) between P and F b) at F
c) between F and C d) at C

Group B

Short Answer Questions.

[3 × 5 = 15]

5. a) Define significant figures. [1]
b) Find the number of significant figures in following measurements: 0.0010 m and 2.10×10^{-3} kg. [2]
c) Check the dimensional correctness of the formula $T = 2\pi \frac{\sqrt{l \cos \theta}}{g}$, where 'T' is time-period, 'l' is length and 'g' is acceleration due to gravity. [2]
6. a) Define thermal energy in terms of molecular vibration? [1]
b) State and explain zeroth law of thermodynamics. [2]
c) Two thermometer X and Y have ice point marked at 15°C and 25°C and the steam point marked at 75°C and 125°C respectively. If the thermometer X measure the temperature of bath as 60°C. What is the temperature as measured by thermometer Y? [2]
7. a) State and prove the mirror formula for a convex mirror. [3]
b) Can a plane mirror also hold the mirror formula? If yes then prove it. [2]

Group C

Long Answer Questions.

[2 × 8 = 16]

8. a) If $y = a + bt + ct^2$, where y is the distance and t is the time. What is the dimension and unit of c? [2]
b) The density of gold is 19.3 g/cm^3 . Express its value in SI unit using dimensional analysis. [2]
c) Write two differences between scalars and vectors. [2]
d) Is electric current scalar or vector? Justify your answer. [2]
9. a) Show the relation between radius of curvature and focal length of a spherical mirror. [2]
b) What happens to the focal length of a concave mirror when it is broken into two equal parts? [2]
c) Where the image will be formed by a concave mirror of focal length 20 cm when the object is placed at 40 cm from the pole? [1]
d) On an arbitrary scale of temperature water freezes at 40° and boils at 290°. Calculate the boiling point of liquid in this scale if it boils at 60°C. [3]

Chemistry

Group A

Multiple Choice Questions

[4 × 1 = 4]

Rewrite the best option in your answer sheet.

1. When $K_2Cr_2O_7$ is converted into K_2CrO_4 , the change in oxidation number of Cr is
a) 0 b) 6 c) 4 d) 3
2. Which of these species has a coordinate covalent bond?
a) CH_4 b) NH_4Cl
c) O_2 d) CO_2
3. Boyle's law is valid only when:
a) Temperature remains constant
b) Pressure remains constant
c) Volume remains constant
d) Temperature and pressure both change
4. Which of the following does not displace hydrogen from dilute acid
a) Pb b) Al c) Hg d) Fe

Group B

Short Answer Questions.

[3 × 5 = 15]

5. a) The electronic configuration of element X is $1s^2, 2s^2 2p^6, 3s^2 3p^4$. [3]
 - i. Write the formula of the compound formed when sodium reacts with X. What type of bond is formed?
 - ii. Write the formula of the compound formed when hydrogen reacts with X. What type of bond is formed?
 - iii. Write the difference between the two types of bonds formed when element X reacts with sodium and with hydrogen.
- b) What is a coordinate covalent bond? Describe with a suitable example. [1+1]

6. a) State Boyle's law and derive the relation between pressure and volume at constant temperature. [1+2]
- b) Illustrate Boyle's law using the following graphs. [2]
- i) V vs 1/P
- ii) V vs P
7. a) Differentiate between atomic hydrogen and nascent hydrogen. [2]
- b) Describe three different experiments, including the chemical reactions, to show that nascent hydrogen is a better reducing agent than molecular hydrogen. [3]

Group C

Long Answer Questions.

[2 × 8 = 16]

8. a) Identify the oxidation and reduction half reaction in the given reaction. [2]
- $$P_4 + NaOH + H_2O \longrightarrow PH_3 + NaH_2PO_2$$
- Also identify oxidizing and reducing agent. [1]
- b) Calculate the oxidation number of; [3]
- i) Fe in $K_3[Fe(CN)_6]$
- ii) P in $H_2PO_4^-$
- iii) S in $Cr_2(SO_4)_3$
- iv) C in C_3O_2
- v) N in HNO_2
- vi) P in NaH_2PO_3
- c) Write the applications of atomic hydrogen. [2]
9. a) Write the important postulates of kinetic theory of gases. [4]
- b) Draw the Lewis structure of: [4]
- i) H_2SO_4
- ii) CH_3OH
- iii) HNO_3
- iv) H_3BO_3

The End