# ARMY PUBLIC SCHOOL  BIRPUR, DEHRADUN

# SUMMER HOLIDAY HOMEWORK (2024 – 25)

# CLASS – XII

## ENGLISH

1. Prepare a presentable project file on any topic from the text books of class 12.
   The students have to make a beautiful file with complete details of the topic for the class XII final project. Sample of the same will be shown to the students by the subject teacher.
2. Revise and make value points of all the lesson done in the class
3. Prepare three analytical questions from the following topics:
   a) Lost Spring
   b) Deep water
   c) The Last Lesson
   d) The Third Level
   e) Journey to the end of the earth.
   f) The tiger King
   g) The Enemy
4. Write two job applications for different posts
5. Write two articles on the issues of latest happenings.
   *Do all the above work in a sperate thin copy.*

## PHYSICS

**A.** Each student of class XII has to prepare a slide show /PPT with audio and file on the same topic.

**B.** AIP-  The topics can be chosen from the mentioned list

   · First slide (a) Name of school – APS BIRPUR    (b) Name of student –         (c) Class and Section –

   · Second slide onwards – Related to the topic (Literature and Photos)

   · Topics (any one) –  **(MINIMUM 20 SLIDES)**

   Electrostatic Charge and Electrostatic Field
   Gauss's Theorem and Electrostatic Potential
   Current Electricity
   Magnetic Effect of Current
   Electromagnetic Induction
   Reflection of Light
   Refraction of Light
   Dual nature of radiation and Matter

Atoms and Molecules
Semiconductor Devices

**C.** Each student of class XII has to prepare Working model and Project file on same topic.

THE TOPICS CAN BE CHOSEN FROM THE MENTIONED LIST

Electrostatic Charge and Electrostatic Field
Current Electricity
Magnetic Effect of Current
Electromagnetic Induction
Reflection of Light
Refraction of Light
Semiconductor devices

Note: CONTENTS OF PROJECT FILE

Page-1 ------ Title of project with your name and school name.

Page-2 ------ Acknowledgement.

Page-3 ------ Certificate.

Page-4 ------ List of components and values of components.

Page-5 ------ Circuit diagram of model.

Page-6 ------ Working of model.

Page-7 ------ Bibliography.

**NOTE**----- (a) Page no. 1 to 4 and page 6 and 7 should be computerized printout

(b) Page no. 5 ------ Draw a neat circuit diagram.

**D. Do following questions in physics holiday homework notebook**

Q1. The electrostatic force on a small sphere of charge 0.4 µC due to another small sphere of charge -0.8 µC in air is 0.2N (a) what is the distance between two spheres? (b) What is the force on the second sphere due to the first.

Q2. Four point charges $q_A$ = 2 µC, $q_B$ = -5 µC, $q_C$ = 2 µC and $q_D$ = 5 µC are located at the corners of the square ABCD of side 10cm. What is the force on a charge 1 µC placed at the center of the square.

Q3. Two point charges $q_A$ = 3 µC and $q_B$ = -3 µC are located 20 cm in apart in vacuum, (a) What is the electric field at the midpoint O of the line AB joining the two charges? (b) If a negative test charge of magnitude $1.5 \times 10^{-9}$ C is placed at this point, what is the force experienced by the test charge.

Q4. A system has two charges $q_A$ = $2.5 \times 10^{-7}$ C and $q_B$ = $-2.5 \times 10^{-7}$ C located at the points A: (0,0,-15cm) and B: (0,0,+15cm) respectively. What are the total charge and electric dipole moment of the system?

Q5. Suppose the spheres A and B have identical sizes and charges. A third sphere of the same size but uncharged is brought in contact with a first, then brought in contact with second and finally removed from both. What is the new force of repulsion between A and B?

Q6. Consider a uniform electric field $E = 3 \times 10^3 i$ N/C. (a) What is the flux of this field through a square of 10cm on a side, whose plane is parallel to the yz plane? (b) What is the flux through the same square, if the normal to its plane makes a 600 angle with x-axis.

Q7. What is the net flux of uniform electric field $E = 3 \times 10^3 i$ N/C through a cube of side 20cm oriented so that its faces are parallel to the coordinate planes?

Q8. A uniformly charged conducting sphere of 2.4m diameter has a surface charge density of 80μC/m2. (a) Find the charge on the sphere. (b) What is the total electric flux leaving the surface of the sphere?

Q9. An infinite line charge produces a field of $9 \times 10^4$ N/C at a distance of 2cm. Calculate the linear charge density.

Q10. Two charges $5 \times 10^{-8}$C and $-3 \times 10^{-8}$C are located 16cm apart. At what point (s) on the line joining the two charges is the electric potential zero?

Q11. A regular hexagon of side 10cm has a charge 5μC at each of its vertices. Calculate the potential at the center of the hexagon.

Q12. Two charges 2μC and -2μC are placed at a points A and B, 6cm apart. Identify an equipotential surface of the system.What is the direction of the electric field at every point on this surface?

Q13. A spherical conductor of radius 12cm has a charge of $1.6 \times 10^{-7}$ C distributed uniformly on its surface. What is the electric field (a) inside the sphere (b) just outside the sphere (c) at a point 18cm from the center of the sphere.

Q14. A charge of 8 mC is located at the origin. Calculate the work done in taking a small charge of $-2 \times 10^{-9}$ C from a point P(0, 0, 3 cm) to a points Q(0, 4cm, 0), via a point R(0, 6cm, 9cm)

Q15. A spherical conducting shell of inner radius r1 and outer radius r2 has a charge Q. (a) A charge q is placed at the center of the shell. What is the surface charged density of the inner and outer surfaces of the shell?  (b) Is the electric field inside a cavity (with no charge) zero, even if the shell is not spherical, but has an irregular shape? Explain.

Q16. Define the term drift velocity. Obtain the expression for it.

Q17. At room temperature 270 c the resistance of a heating element is 100 ohm. What is the temperature of element if the resistance is found to be 117 ohm, given that the temperature coefficient of material of resistor is $1.7 \times 10^{-4}$ per 0c?

Q18. Show variation of resistivity of copper as a function of temperature

Q19. Why constantan or manganin wire is used for making standard resistance wire.

Q20. State the condition for maximum current to be drawn from a cell?

Q21.State the condition under which terminal potential difference is a) greater than emf b) equal to emf

Q22. Obtain the relation of resistivity with relaxation time.

Q23. Plot a graph showing variation of emf with a) Internal resistance for a cell. B) Current obtained through a cell.

Q24. Plot a graph showing variation of V and I for Ga-As.

Q25. If the ammeter in the given circuit shown in the diagram reads 2A, the resistance R is

a)  1Ω  (b) 2Ω  (c) 3Ω  (d) 4Ω

Q26.The heat produced by 100W heater in 2 minutes is equal to

a)  10.5kJ  (b) 16.3Kj  (c) 12.0kJ  (d) 14.2kJ

Q27. Kirchhoff's second law is based on law of conservation of

a)  Sum of mass and energy  (b) momentum  (c) energy  (d) charge

Q28. Two wires A and B of equal masses and of the same metals are taken. The diameter of the wire A is half the diameter of the wire B. If the resistance of A is 24 Ω then find the resistance of wire B?

a)  0.5  (b) 1  (c) 1.5  (d) 3

Q29.Drift velocity vd varies with the intensity of electric field as per the relation

a)  Vd  E  (b) vd  1/E  (c) vd = constant  (d) vd  $E^2$

Q30. Determine the magnitude of the magnetic field B at the centre of the circular coil of wire carrying a current of 0.4 A and having 100 turns with 8 Cm being the radius of each turn

Q31. Determine the direction and magnitude of B at a point that is 2.5 m away in the east direction of the long straight wire that is in a horizontal plane carrying a current of 50 A in North to South direction.

Q32. A flat overhead electrical cable carries a current of 90 A in the east to west course. What is the direction and magnitude of the magnetic field due to the current 1.5 m below the line?

Q33. A wire carrying a current of 8 A makes an angle of 300 with the direction of a uniform magnetic field of 0.15 T. Find the magnitude of magnetic force per unit length on the wire.

Q34. Two long and parallel wires, wire A carrying current 8.0 A and wire B carrying current 5.0 A in the same direction are isolated by a distance of 4 cm. Calculate the force on a 10 cm section of wire A.

Q35. Determine the magnitude of the torque experienced by the square coil when it is suspended vertically and the normal to the plane makes an angle of 300 with the direction of a uniform horizontal magnetic field of magnitude 0.8 T. Taking square coil of side 10 cm consisting of 20 turns and carrying a current of 12 A.

E.  Make a question bank of 1 mark, 2 marks and 3 marks other than given in NCERT book (10 questions each from units electrostatics and current Electricity covered in class and solve it


## MATHS

1.Do Activity 4,5,7,8,14,18 of NCERT lab manual

2.Do 10 question from previous year Board Exam of CH 2,3,4,5,6

3 Solve all the question and examples of the NCERT Textbook from all the chapters covered in the class

# BIOLOGY

1. Make a Project File from the given topics (ANY ONE)

## 2. CASE STUDY

The traits studied by Mendel showed two distinct alternate forms, called contrasting characters. But, there are many heritable characters, which are not so distinct in their occurrence, but are spread across a gradient. Such traits are controlled by more than one gene and their inheritance is described as polygenic inheritance. When the relative frequency of the polygenic cross is plotted, a bell-shaped curve appears as given below:

**Answer the following questions:**

a. Give two examples of human traits that show polygenic inheritance.

b. How many genes are involved in the trait shown in the graph and how many phenotypes have appeared?

c. How does polygenic inheritance differ from pleiotropy?

d. How does Polygenic inheritance differ from Multiple allelism?
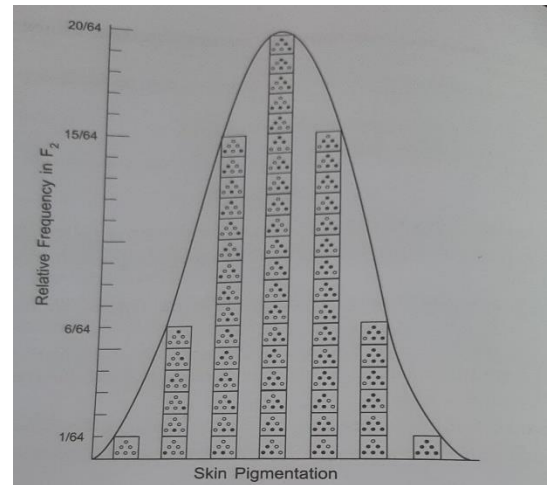


2. **The picture given shows a Commelina plant, bearing two types of bisexual flowers, an adaptation for assured seed set and genetic variation in the progeny.**

a. Name the type of flower A and the type(s) of pollination that can occur in it.

b. Name the type of flower B and the type(s) of pollination that can occur in it.



c. Name two other plant species, which also produce these two types of flowers on the same plant.

d. Which of the two types of flowers A or B, will show (i) assured seed set (ii) genetic variation in the progeny, respectively.
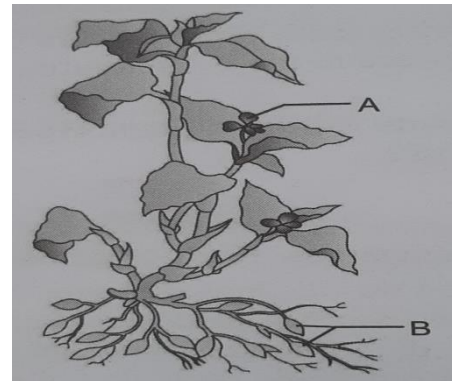
3. **Mendel's work remained unrecognized for several years. Later, three scientists independently rediscovered Mendel's results. Also by this time, due to advancements in microscopy, scientists were able to carefully deserve cell division. The chromosome movements during meiosis had been worked out.**

   a. When do the members of homologous pair of chromosomes separate from each other during cell division? What is this phenomenon called?

   b. Name the scientists who proposed the chromosomal theory of inheritance.

c. Who provided experimental evidence for the chromosomal theory of inheritance? Write the scientific name of the oraganism, he worked on,

d. Give 4 reasons,why Mendel's work remained unrecognised for a long time.

**4.** Explain functions of Placenta in a human female.

**5.** How can childless couples be helped by the ARTs like GIFT and ICSI.

**6.** Describe the process of Megasporogenesis in an angiosperm and Draw the diagram of a mature embryo sac of angiosperm. Label its six parts.

**7**. Name the proper sequence of the phases of Menstrual cycle. When do the hormone Estrogen and Progesterone reach their peal levels and What is Ovulation?

**8.** Explain in detail Sex Determination in Honey Bee.

**9**. Draw and Explain Human Male and Female Reproductive system.

**10.** Complete Bio Practical Work and Learn and solve NCERT intext Questions of CH 2,3, 4 and 5.


# PAINTING

**Make 12 paintings in your  big Art file (DOMS ) (A3 sIze) or bigger   having good  quality art   pages)**

1) TWO  - Landscapes

2) TWO  -  Posters

3) THREE - Picture compositions   ( festival, mela ,market, circus ,playing games,  farmers working,  vegetable / ballon seller, etc)

4) TWO - Still life

5)  ONE - folk art ( Folk art of any state,  Aipan art  , Kolam  design ,   Madhubani art ,  etc)

6)  ONE -   Monochromatic  painting

7)  ONE – Make  any  one  painting  from  the  syllabus  painting   book

8)  Prepare ONE  BIG  CANVAS  also  (20` x 30` inch  or 50 cm x 75cm )

   As for  your  final  Board    practical exam .


# HINDI

1- विद्यालय पत्रिका हेतु अपनी रुचि के किसी विषय पर लेख/कविता/तथ्य/हास्य मौलिक लेख word या docs पर लिखिए।

2 – अपने प्रिय कवि/लेखक का जीवन परिचय Project paper पर लिखिए,आपको उनकी जो रचना पसंद है,उस का विवरण देते हुए चित्रों से सजाइए।. (4 पृष्ठ)

3- इकाईपरीक्षा-1 में आए सभी निबंधों को अपनी अभिव्यक्ति माध्यम की कॉपी में लिखिए।

# PHYSICAL EDUCATION (048)

1. Prepare a report on the Annual Sports Day of your school for publishing in a National daily.

2. Given below is a list of some common postural deformities children may suffer from. What do you know about them? Complete the first two columns of the KWL (Know-Want-Learned) Chart given below. Fill in the last column after completing your research by reading more about them.

| word | What I know | What I want to know | What I learned |
|---|---|---|---|
| Knock knees | | | |
| Flat Foot | | | |
| Round Shoulders | | | |
| Kyphosis | | | |
| Lordosis | | | |
| Scoliosis | | | |
| Bow legs | | | |

NOTE:   Work should be done in hand written form.
         Work should be done in the fair notebook.
          Homework is to be submitted on 5th of July 2024.

# IP

**Complete the following questions in IP practical file.**

1. Make 20 programs using Python Programming Series and Data Frame.
2. Create 5 tables using MySQL. Perform 5 queries on each table.

# PSYCHOLOGY

1. Prepare a case study on "Mobile Phone Addiction and its effect on adolescence in India".Use Self Report Questionnaire on "**Nomophobia**" as an assessment tool. Assess your subject using interview and observation method.

2. Prepare one PowerPoint presentation on "Famous psychologists "whose birthday falls in July month.(Minimum 3 slides for each psychologist).

# HINDUSTANI CLASSICAL VOCAL (034)

1. Make a practical file.

2. Write the notation of Raag Bhairav and Raag Malkauns ( bada khayal and chota khayal along with taans )

3. Write the biography of any two Hindustani classical vocalists who are still alive.

4. Write a complete introduction of any two talas along with thaa, dugun, tigun and chagun.( Dhamar, Rupak, jhaptaal )

5. Write Dhrupad or Dhamar in any one raag .

6. Write life sketch and contribution of Fayaz khan , Bade Gulam Ali Khan, Krishna Rao Shankar pandit .


# YOGA

1.Visit any nearest Yoga Center and describe all the positive points and submit the report in 150 words.

2. Complete the project file for board examination as per the format discuss in class. (XII class)

3. Describe any 12 Aasan in other separate notebook with clean and neat diagram


# CHEMISTRY

**Q1. Write the formulae and colours of the following salts:**

1. Potassium chromate

2. Potassium dichromate

3. Nickel chloride

4. Aluminium sulphate

5. Manganese sulphate

6. Lead acetate

7. Copper sulphate

8. Ferrous sulphate

9. Potassium permanganate

10. Ferrous ammonium sulphate

**Q2. Write the following experiments in practical file**

1. To determine the molarity and strength of given $KMnO_4$ solution using standard solution of M/20 solution of Mohr's salt.
2. To determine the molarity and strength of given $KMnO_4$ solution using standard solution of M/40 solution of Mohr's salt.

**Q3. Practice previous years board questions (last 5 years) of chapters completed so far in your classes.**

**Q4. Students are advised to prepare a project file on any one topic of investigatory project from the following suggested list or if they have any other idea prepare a project file on it.**

1. Aldol condensation
2. Electrochemical cell
3. Paper chromatography
4. Sterilization of water using bleaching powder
5. Removal of alcohol from body by esterification
6. Neutralizing ability of antacid tablets
7. Common food adulterants in fat, butter, oil, turmeric powder, pepper, chili powder, sugar, etc.
8. Comparative study of the rate of fermentation of following materials: wheat flour, gram fluor, potato juice, carrot juice, etc.
9. Study of common food adulterants in fat, oil, butter, sugar, turmeric powder, chilli powder and pepper.
10. Preparation of soyabean milk and its comparison with the natural milk with respect to curd formation, effect of temperature, etc.
11. Study of quantity of casein present in different samples of milk.
12. Measuring solubility of saturated solutions
13. Measure the amount of acetic acid in vinegar
14. Determination of contents in cold drinks
15. Study of diffusion of solids in liquids
16. Analysis of fertilizer
17. Chemistry in black and white photography
18. Presence of oxalate ions in guava fruit and different stages of ripening
19. Compare the rate of evaporation of water
20. Check the ions present in toothpaste
21. Preparation of Toilet Soaps
22. Study of Constituents of an Alloy
23. Study of Diffusion of Solids in Liquids
24. To Analyse a Sample of Brass Qualitatively
25. To Prepare a Smoke Bomb
26. Acidity In Tea
27. Analysis Of Honey
28. Water concentration and texture
29. Study the effects of metal coupling on the rate of corrosion
30. Effects of voltage and concentration

**Q4. Do the following exercises in your chemistry note book.**

# SOLUTIONS

| | |
|---|---|
| 1 | State Henry's law correlating the pressure of a gas and its solubility in a solvent and mention two applications of the law. |
| 2 | Calculate the temperature at which a solution containing 54 g of glucose, ($C_6 H_{12} O_6$ ) in 250 g of water will freeze. ($K_f$ for water =1.86 K mol kg$^{-1}$ ) |
| 3 | State Raoult's law for solutions of volatile liquids. Taking suitable examples explain the meaning of positive and negative deviations from Raoult's law. <br><br>OR<br><br>Define the term osmotic pressure. Describe how the molecular mass of a substance can be determined by a method based on measurement of osmotic pressure? |
| 4 | Define osmotic pressure. How is it that measurement of osmotic pressures is more widely used for determining molar masses of macromolecules than the rise in boiling point or fall in freezing point of their solutions?                              OR<br>Derive an equation to express that relative lowering of vapour pressure for a solution is equal to the mole fraction of the solute in it when the solvent alone is volatile. |
| 5 | Differentiate between molality and molarity of a solution. What is the effect of change in temperature of a solution on its molality and molarity? |
| 6 | (a) Define the following terms: (i) Mole fraction(ii) Van't Hoff factor<br><br>(b) 100 mg of a protein is dissolved in enough water to make 100 mL of a solution. If this solution has an osmotic pressure 13.3 mm Hg at 25° C, what is the molar mass of protein? (R = 0.0821 L atm mol$^{-1}$ K$^{-1}$ and 760 mm Hg = 1 atm.)<br>                              OR<br>What is meant by:      (i) Colligative properties    (ii) Molality of a solution.<br>(b) What concentration of nitrogen should be present in a glass of water at room temperature? Assume a temperature of 25° C, total pressure of 1 atmosphere and mole fraction of nitrogen in air of 0.78. [KH for nitrogen = 8.42 × 10$^{-7}$ M/mm Hg] |
| 7 | Calculate the freezing point depression for 0.0711 m aqueous solution of sodium sulphate(Na2 SO4), if it is completely ionised in solution. If this solution actually freezes at – 0.320 °C, what is the value of Van't Hoff factor for it at the freezing point? (Kf for water is 1.86°C mol–1) |
| 8 | What is 'reverse osmosis'? |
| 9 | Non-ideal solutions exhibit either positive or negative deviations from Raoult's law. What are these deviations and why are they caused? Explain with one example for each type. |

| | |
|---|---|
| 10 | A solution prepared by dissolving 1.25 g of oil of winter green (methyl salicylate) in 99.0 g of benzene has a boiling point of 80.31°C. Determine the molar mass of this compound. (B.P. of pure Benzene = 80.10°C and Kb for benzene = 2.53°C kg mol-1) |
| 11 | A solution of glycerol ($C_3H_8O_3$; molar mass = 92 g mol-1) in water was prepared by dissolving some glycerol in 500 g of water. This solution has a boiling point of 100.42°C. What mass of glycerol was dissolved to make this solution? Kb for water = 0.512 K kg mol-1. |
| 12 | Define the terms, 'osmosis' and 'osmotic pressure'. What is the advantage of using osmotic pressure as compared to other colligative properties for the determination of molar masses of solutes in solutions. |
| 13 | What mass of NaCl (molar mass = 58.5 g mol-1) must be dissolved in 65 g of water to lower the freezing point by 7.5°C? The freezing point depression constant, Kf , for water is 1.86 K kg mol-1. Assume van't Hoff factor for NaCl is 1.87. |
| 14 | What mass of ethylene glycol (molar mass = 62.0 g mol-1) must be added to 5.50 kg of water to lower the freezing point of water from 0°C to – 10.0°C? (Kf for water = 1.86 K kg mol-1) |
| 15 | 15 g of an unknown molecular substance was dissolved in 450 g of water. The resulting solution freezes at – 0.34°C. What is the molar mass of the substance? (Kf for water = 1.86 K kg mol-1). |
| 16 | (a) Differentiate between molarity and molality for a solution. How does a change in temperature influence their values?<br>(b) Calculate the freezing point of an aqueous solution containing 10.50 g of MgBr2 in 200 g of water. (Molar mass of MgBr2= 184 g) (Kf for water = 1.86 K kg mol-1)      OR<br>(a) Define the terms osmosis and osmotic pressure. Is the osmotic pressure of a solution a colligative property? Explain.<br>(b) Calculate the boiling point of a solution prepared by adding 15.00 g of NaCl to 250.00 g of water. (Kb for water = 0.512 kg mol-1), (Molar mass of NaCl = 58.44 g) |
| 17 | (a) State the following: (i) Henry's law about partial pressure of a gas in a mixture. (ii) Raoult's law in its general form in reference to solutions.<br>(b) A solution prepared by dissolving 8.95 mg of a gene fragment in 35.0 mL of water has an osmotic pressure of 0.335 torr at 25°C. Assuming the gene fragment is a non-electrolyte, determine its molar mass. |

Section A

● **Choose correct answer from the given options.**

1. Consider a first order gas phase decomposition reaction given below : $A_{(g)} \rightarrow B_{(g)} + C_{(g)}$

   The initial pressure of the system before decomposition of A was $p_i$. After lapse of time '$t$', total pressure of the system increased by $x$ units and became '$p_t$'. The rate constant $k$ for the reaction is given as .........

   (A) $k = \dfrac{2.303}{t} \log \dfrac{p_i}{p_i - x}$
   
   (B) $k = \dfrac{2.303}{t} \log \dfrac{p_i}{2p_i - p_t}$

   (C) $k = \dfrac{2.303}{t} \log \dfrac{p_i}{2p_i + p_t}$
   
   (D) $k = \dfrac{2.303}{t} \log \dfrac{p_i}{p_i + x}$

2. Which of the following statements is not correct about order of a reaction ?

   (A) The order of a reaction can be a fractional number.

   (B) Order of a reaction is experimentally determined quantity.

   (C) The order of a reaction is always equal to the sum of the stoichiometric coefficients of reactants in the balanced chemical equation for a reaction.

   (D) The order of a reaction is the sum of the powers of molar concentration of the reactants in the rate law expression.

3. For unknown reaction half mole of reactant of total 2 moles reactant is converted in to product in 1 hour. Calculate how many moles of reactant will remain after 4 hours ?

   (A) 0.225 mole          (B) 0.425 mole          (C) 0.125 mole          (D) Zero mole

4. If reactant concentration is increased by 8 times for a certain reaction then rate of reaction becomes double. Then what is order of reaction ?

   (A) 2          (B) Zero          (C) $\dfrac{1}{3}$          (D) $\dfrac{1}{2}$

5. If one first order reaction is completed by 50% in $1.26 \times 10^{14}$ second then how much time will be taken by this reaction to complete 100% ?

   (A) $1.26 \times 10^{15}$ second          (B) $2.52 \times 10^{14}$ second          (C) $2.52 \times 10^{25}$ second          (D) Infinite time

6. Identify difference between first order and second order reaction.

   (A) Rate of first order reaction depends on concentration of reactant, rate of second order reaction does not depend on concentration of reactant.

   (B) Rate of first order reaction does not depend on concentration of reactant; rate of second order reaction depends on concentration of reactant.

   (C) First order reaction can be catalytic reaction; second order reaction cannot be catalytic reaction.

   (D) Half life of first order does not depend on $[A_0]$, half life of second order depends on $[A_0]$.

7. Unit of rate constant for third order of reaction is...

   (A) $Liter^2/(mole)^2 \ s^{-1}$
   
   (B) $Second^{-1}$

   (C) $(mole/liter)^{-1} \ s^{-1}$
   
   (D) $(liter/mole)^2 \ second$

8. Assertion [A] : Rate constants determined from Arrhenius equation are fairly accurate for simple as well as complex molecules.

   Reason [R]   : Reactant molecules undergo chemical change irrespective of their orientation during collision.
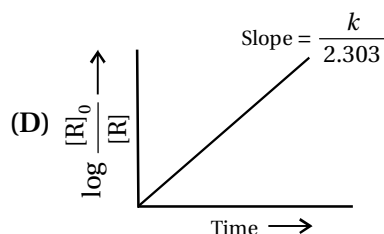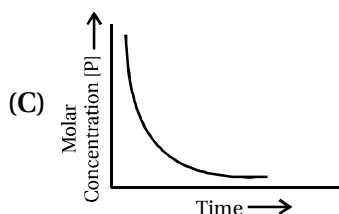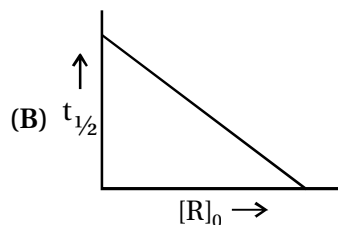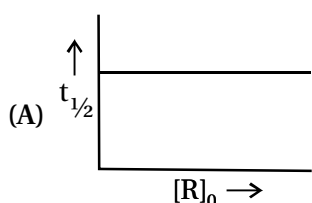
   (A) Both assertion [A] and reason [R] are correct and the reason [R] is correct explanation of assertion [A].

   (B) Both assertion [A] and reason [R] are correct but reason [R] does not explain assertion [A].
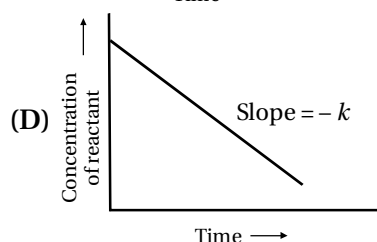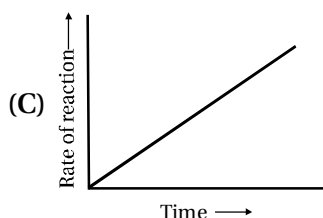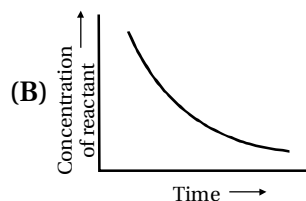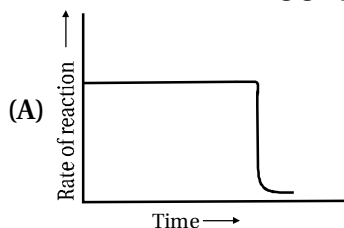
   (C) Assertion[A] is correct but reason [R] is incorrect.

(D) Both assertion [A] and reason [R] are incorrect.

9. Assertion [A] : Order and molecularity are same.

   Reason [R] : Order is determined experimentally and molecularity is the sum of the stoichiometric coefficient of rate determining elementary step.

   (A) Both assertion [A] and reason [R] are correct and the reason [R] is correct explanation of assertion [A].

   (B) Both assertion [A] and reason [R] are correct but reason [R] does not explain assertion [A].

   (C) Assertion[A] is correct but reason [R] is incorrect.

   (D) Assertion [A] is incorrect but reason [R] is correct.

10. Which of the following graphs is correct for a first order reaction ?



(A) $t_{1/2}$ vs $[R]_0$

(B) $t_{1/2}$ vs $[R]_0$

(C) Molar Concentration [P] vs Time

(D) $\log \dfrac{[R]_0}{[R]}$ vs Time, Slope $= \dfrac{k}{2.303}$

11. Which of the following graphs is correct for a zero order reaction ?



(A) Rate of reaction vs Time

(B) Concentration of reactant vs Time

(C) Rate of reaction vs Time

(D) Concentration of reactant vs Time, Slope $= -k$

12. According to Maxwell, Boltzmann distribution of energy .........

   (A) the fraction of molecules with most probable kinetic energy decreases at higher temperatures.

   (B) the fraction of molecules with most probable kinetic energy increases at higher temperatures.

   (C) most probable kinetic energy increases at higher temperatures.

   (D) most probable kinetic energy decreases at higher temperatures.

13. Which of the following graphs represents exothermic reaction ?
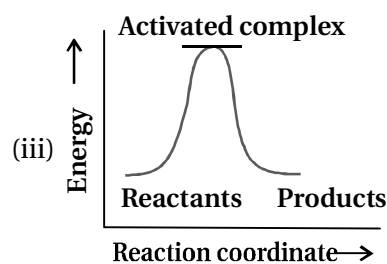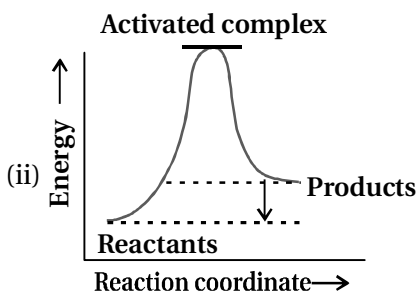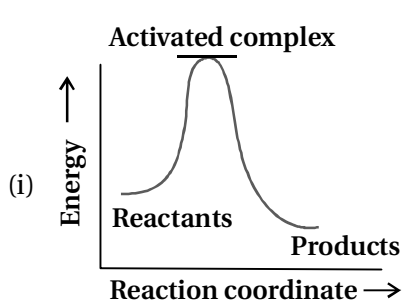


(A) only (i)          (B) only (ii)          (C) only (iii)          (D) (i) and (ii)

14. Which of the following expressions is correct for the rate of reaction given below ?

$5Br^-_{(aq)} + BrO^-_{3(aq)} + 6H^+_{(aq)} \rightarrow 3Br_{2(aq)} + 3H_2O_{(l)}$
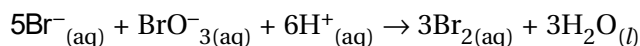
(A) $\dfrac{\Delta[Br^-]}{\Delta t} = 5\dfrac{\Delta[H^+]}{\Delta t}$ 　　(B) $\dfrac{\Delta[Br^-]}{\Delta t} = \dfrac{6}{5}\dfrac{\Delta[H^+]}{\Delta t}$ 　　(C) $\dfrac{\Delta[Br^-]}{\Delta t} = \dfrac{5}{6}\dfrac{\Delta[H^+]}{\Delta t}$ 　　(D) $\dfrac{\Delta[Br^-]}{\Delta t} = 6\dfrac{\Delta[H^+]}{\Delta t}$

## Section B

● **Write the answer of the following questions.**

1. The three experimental data for determine the differential rate of reaction $2NO_{(g)} + Cl_{2(g)} \rightarrow 2NOCl_{(g)}$ at definite temperature are given below. Calculate order of reaction.

| Experiment Order | Concentration of Reactant mol L$^{-1}$ | | Actual rate of reaction $= \dfrac{d[Cl_2]}{dt}$ mol L$^{-1}$s$^{-1}$ |
|---|---|---|---|
| | [NO] | [Cl$_2$] | |
| (i) | 0.01 | 0.02 | $3.50 \times 10^{-4}$ |
| (ii) | 0.02 | 0.02 | $1.40 \times 10^{-3}$ |
| (iii) | 0.01 | 0.04 | $7.0 \times 10^{-4}$ |

2. Draw the plot of following : In $\ln k \rightarrow \dfrac{1}{T}$

3. In plot $\ln k \rightarrow \dfrac{1}{T}$, the slope and intercept give which value ?

4. Write log form of Arrhenius equation $k = A\,e^{-\frac{E_a}{RT}}$.

## Section C

● **Write the answer of the following questions.**

5. A first order reaction takes 40 minutes for 30% decomposition. Calculate $t_{\frac{1}{2}}$.

6. State two differences between molecularity and order of reaction.

7. $2NH_{3(g)} \rightarrow N_{2(g)} + 3H_{2(g)}$ the rate of disapperance of NH$_3$ is $1.2 \times 10^{-3}$ mol L$^{-1}$ s$^{-1}$. What is the rate of formation of N$_2$ and H$_2$ ?

8. What is threshold energy ?

9. Calculate the overall order of a reaction which has the rate expression.

(a) Rate $= k\,[A]^{\frac{1}{2}}\,[B]^{\frac{3}{2}}$ 　(b) Rate $= k\,[A]^{\frac{3}{2}}\,[B]^{-1}$

10. Show that in a first order reaction, time required for completion of 99.9% is 10 times of half-life $\left(t_{\frac{1}{2}}\right)$ of the reaction.

11. Give definition.
    (i) Rate of Reaction
    (ii) Average rate of reaction
    (iii) Instantaneous rate

12. Give figure of following graph.
    (i) Concentration of reactant $\rightarrow$ Time
    (ii) Concentration of product $\rightarrow$ Time

13. The rate constant of a reaction is $2 \times 10^{-3}$ min$^{-1}$ at 300 K temperature. By increase in temperature by 20 K, its value becomes three time; then calculate the energy of activation of the reaction. What will be its rate constant at 310 K temperature ?
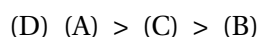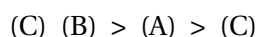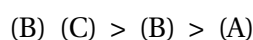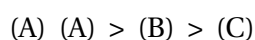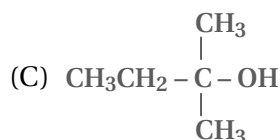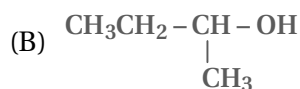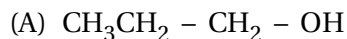
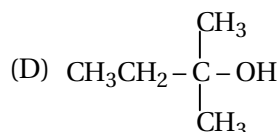# HALOALKANES & ARENES
## CHEMISTRY
## CLASS 12

Section A

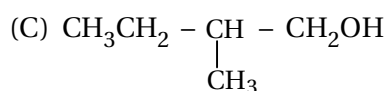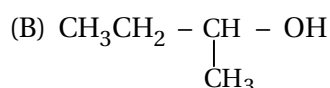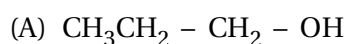● **Choose correct answer from the given options.** [Each carries 1 Mark]                                    [30]

**1.** The order of reactivity of following alcohols with halogen acids is .........

(A) $CH_3CH_2 - CH_2 - OH$

(B) $\underset{\qquad\;\; CH_3}{CH_3CH_2 - \overset{|}{CH} - OH}$

(C) $\underset{\qquad\;\; CH_3}{\overset{CH_3}{CH_3CH_2 - \overset{|}{\underset{|}{C}} - OH}}$

(A) (A) > (B) > (C)                                    (B) (C) > (B) > (A)

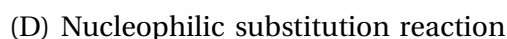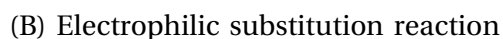(C) (B) > (A) > (C)                                    (D) (A) > (C) > (B)

**2.** Which of the following alcohols will yield the corresponding alkyl chloride on reaction with concentrated HCl at room temperature ?
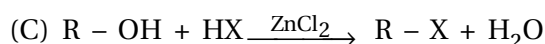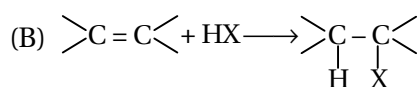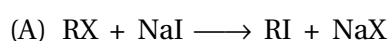
(A) $CH_3CH_2 - CH_2 - OH$

(B) $\underset{\qquad\;\; CH_3}{CH_3CH_2 - \overset{|}{CH} - OH}$

(C) $\underset{\qquad\; CH_3}{CH_3CH_2 - \overset{|}{CH} - CH_2OH}$

(D) $\underset{\qquad\;\; CH_3}{\overset{CH_3}{CH_3CH_2 - \overset{|}{\underset{|}{C}} - OH}}$

**3.** Identify the compound Y in the following reaction.
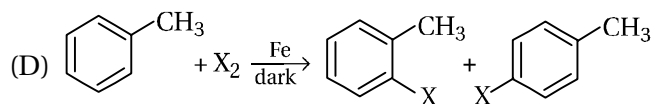


(A)           (B)           (C)           (D) 
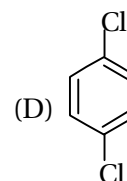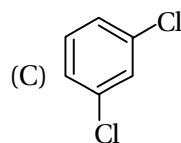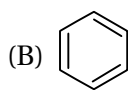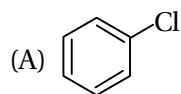
**4.** Toluene reacts with a halogen in the presence of iron (III) chloride giving ortho and para halo compounds. The reaction is

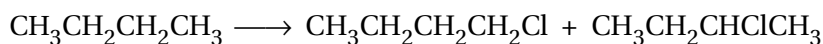(A) Electrophilic elimination reaction                (B) Electrophilic substitution reaction

(C) Free radical addition reaction                    (D) Nucleophilic substitution reaction

**5.** Which of the following is halogen exchange reaction ?

(A) $RX + NaI \longrightarrow RI + NaX$

(B) $\underset{\qquad\qquad\qquad\; H \;\; X}{>C = C< + HX \longrightarrow >\overset{|}{C} - \overset{|}{C}<}$

(C) $R - OH + HX \xrightarrow{\;ZnCl_2\;} R - X + H_2O$

(D)  $+ X_2 \xrightarrow[\text{dark}]{\text{Fe}}$  $+$ 

6. Which reagent will you use for the following reaction ?

$CH_3CH_2CH_2CH_3 \longrightarrow CH_3CH_2CH_2CH_2Cl + CH_3CH_2CHClCH_3$

(A) $Cl_2$ / UV light
(B) $NaCl + H_2SO_4$
(C) $Cl_2$ gas in dark
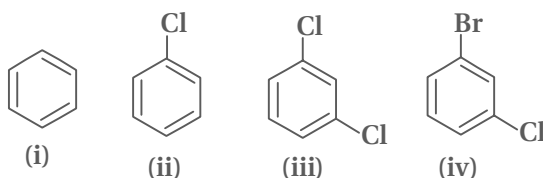(D) $Cl_2$ gas in the presence of iron in dark

7. Arrange the following compounds in the increasing order of their densities.
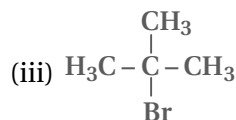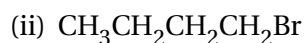
(A) (i) < (ii) < (iii) < (iv)
(B) (i) < (iii) < (iv) < (ii)
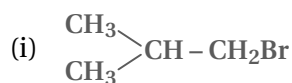(C) (iv) < (iii) < (ii) < (i)
(D) (ii) < (iv) < (iii) < (i)



(i)    (ii)    (iii)    (iv)

8. Arrange the following compounds in increasing order of their boiling points.

(i) 

(ii) $CH_3CH_2CH_2CH_2Br$

(iii) 

(A) (ii) < (i) < (iii)    (B) (i) < (ii) < (iii)    (C) (iii) < (i) < (ii)    (D) (iii) < (ii) < (i)
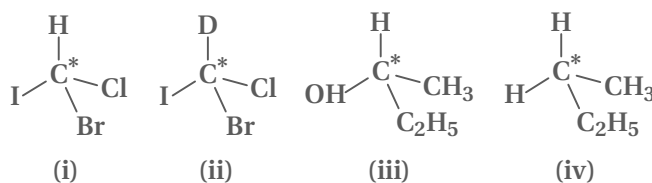
9. In which of the following molecules carbon atom marked with asterisk (*) is asymmetric ?

(A) (i), (ii), (iii), (iv)
(B) (i), (ii), (iii)
(C) (ii), (iii),(iv)
(D) (i), (iii), (iv)



(i)    (ii)    (iii)    (iv)

10. Which of the following is an example of vic-dihalide ?

(A) Dichloromethane    (B) 1, 2-dichloroethane    (C) Ethylidene chloride    (D) Allyl chloride

11. The position of –Br in the compound in $CH_3CH = CHC(Br)(CH_3)_2$ can be classified as ......

(A) Allyl    (B) Aryl    (C) Vinyl    (D) Secondary

12. Chlorobenzene is formed by reaction of chlorine with benzene in the presence of $AlCl_3$. Which of the following species attacks the benzene ring in this reaction ?

(A) $Cl^-$    (B) $Cl^+$    (C) $AlCl_3$    (D) $[AlCl_4]^-$
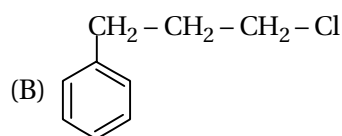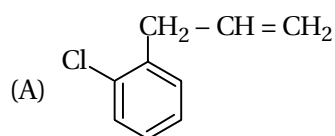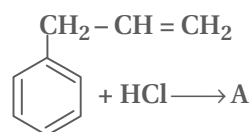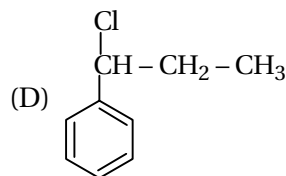
13. Ethylidene chloride is a/an ...........
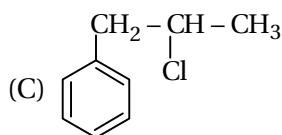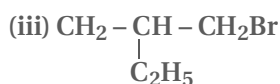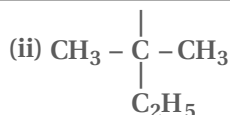
(A) vic-dihalide    (B) gem-dihalide    (C) allylic halide    (D) vinylic halide

14. What is 'A' in the following reaction ?

 $+ HCl \longrightarrow A$

(A)     (B) 

(C) 

$CH_2 - CH - CH_3$
$\quad\quad\quad | $
$\quad\quad\quad Cl$

(benzene ring attached)

(D)

$\quad\quad Cl$
$\quad\quad | $
$CH - CH_2 - CH_3$

(benzene ring attached)

15. A primary alkyl halide would prefer to undergo .......... .

(A) $S_N1$ reaction        (B) $S_N2$ reaction        (C) $\alpha$–Elimination        (D) Racemisation

16. Which of the following alkyl halides will undergo $S_N1$ reaction most readily ?

(A) $(CH_3)_3C - F$        (B) $(CH_3)_3C - Cl$        (C) $(CH_3)_3C - Br$        (D) $(CH_3)_3C - I$

17. Which is the correct IUPAC name for $CH_3 - \underset{\underset{C_2H_5}{|}}{CH} - CH_2 - Br$ ?

(A) 1-Bromo-2-ethylpropane                  (B) 1-Bromo-2-ethyl-2-methylethane
(C) 1-Bromo-2-methylbutane                (D) 2-Methyl-1-bromobutane

18. What should be the correct IUPAC name for diethylbromomethane ?
(A) 1-Bromo-1,1-diethylmethane            (B) 3-Bromopentane
(C) 1-Bromo-1-ethylpropane                (D) 1-Bromopentane

19. The reaction of toluene with chlorine in the presence of iron and in the absence of light yields ..........

(A) $CH_2Cl$ (benzene ring)

(B) $CH_3$ with $Cl$ (ortho position on benzene ring)

(C) $H_3C -\!\!\!\bigcirc\!\!\!- Cl$

(D) Mixture of (B) and (C)

20. Chloromethane on treatment with excess of ammonia yields mainly.

(A) N, N-Dimethylmethanamine $\left[ CH_3 - N \overset{\displaystyle CH_3}{\underset{\displaystyle CH_3}{\diagup}} \right]$

(B) N-methylmethanamine $(CH_3 - NH - CH_3)$
(C) Methanamine $(CH_3NH_2)$
(D) Mixture containing all these in equal proportion

21. Molecules whose mirror image is non-superimposable over them are known as chiral. Which of the following molecules is chiral in nature ?
(A) 2-Bromobutane                       (B) 1-Bromobutane
(C) 2-Bromopropane                      (D) 2-Bromopropan-2-ol

22. Reaction of $C_6H_5CH_2Br$ with aqueous sodium hydroxide follows ..........
(A) $S_N1$ mechanism
(B) $S_N2$ mechanism
(C) Any of the above two depending upon the temperature of reaction.
(D) Saytzeff rule

23. Which of the carbon atoms present in the molecule given below are asymmetric ?

$\underset{O}{\overset{HO}{\diagdown}}C \overset{1}{-} \underset{\underset{H}{|}}{\overset{\overset{HO}{|}}{C}} \overset{2}{-} \underset{\underset{OH}{|}}{\overset{\overset{H}{|}}{C}} \overset{3}{-} \overset{4}{C} \overset{\diagup O}{\underset{\diagdown H}{}}$

(A) 1, 2, 3, 4           (B) 2, 3           (C) 1, 4           (D) 1, 2, 3

24. Which of the following compounds will give racemic mixture on nucleophilic substitution by $OH^-$ ion ?

Br

(i) $CH_2 - CH - Br$
        |
        $C_2H_5$

(ii) $CH_3 - \overset{\displaystyle |}{\underset{\displaystyle C_2H_5}{C}} - CH_3$

(iii) $CH_2 - CH - CH_2Br$
          |
          $C_2H_5$
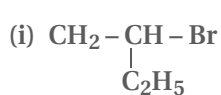
(A) (i)          (B) (i), (ii) and (iii)     (C) (ii) and (iii)     (D) (i) and (ii)

25. Which is the correct increasing order of boiling points of the following compounds ?

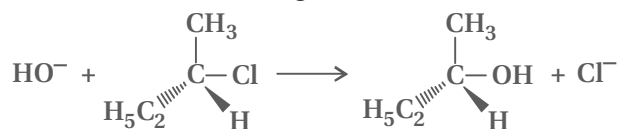   1-Iodobutane, 1-Bromobutane, 1-Chlorobutane, Butane

   (A) Butane < 1-Chlorobutane < 1-Bromobutane < 1-Iodobutane

   (B) 1-Iodobutane < 1-Bromobutane< 1-Chlorobutane < Butane

   (C) Butane < 1-Iodobutane < 1-Bromobutane < 1-Chlorobutane

   (D) Butane < 1-Chlorobutane < 1-Iodobutane < 1-Bromobutane

26. Which is the correct increasing order of boiling points of the following compounds ?
   1-Bromoethane, 1-Bromopropane, 1-Bromobutane, Bromobenzene
   (A) Bromobenzene < 1-Bromobutane< 1-Bromopropane < 1-Bromoethane
   (B) Bromobenzene < 1-Bromoethane< 1-Bromopropane < 1-Bromobutane
   (C) 1-Bromopropane < 1-Bromobutane< 1-Bromoethane < Bromobenzene
   (D) 1-Bromoethane < 1-Bromopropane< 1-Bromobutane < Bromobenzene

27. Which of the following statements are correct about the kinetics of this reaction ?

   $HO^-$ +    $\overset{\displaystyle CH_3}{\underset{\displaystyle H_5C_2^{\backslash\backslash\backslash\backslash}}{C}} - Cl$  $\longrightarrow$  $\overset{\displaystyle CH_3}{\underset{\displaystyle H_5C_2^{\backslash\backslash\backslash\backslash}}{C}} - OH$ + $Cl^-$

    (i)       (ii)           (iii)      (iv)
   (A) The rate of reaction depends on the concentration of only (ii)
   (B) The rate of reaction depends on concentration of both (i) and (ii)
   (C) Molecularity of reaction is one
   (D) Molecularity of reaction is two

28. Ethylene chloride and ethylidene chloride are isomers. Identify the correct statements.
   (A) Both the compounds form same product on treatment with alcoholic KOH.
   (B) Both the compounds form same product on treatment with aq.NaOH.
   (C) Both the compounds form same product on reduction.
   (D) Both the compounds are optically active.

29. Alkyl fluorides are synthesised by alkyl chloride/bromide in presence of ........... or .............
   (A) $CaF_2$            (B) $CoF_2$            (C) $Hg_2F_2$          (D) NaF

30. Alkyl halides are prepared from alcohols by treating with
   (A) $HCl + ZnCl_2$      (B) Red P + $Br_2$      (C) $H_2SO_4 + KI$      (D) All of the above