

# KARACHI EDU

## XII - CHEMISTRY SUPPLY PREPARATION PAPER

Subject: Chemistry

Class: XII

Date: \_\_\_\_\_

Duration: \_\_\_\_\_

Max. Marks: \_\_\_\_\_

### SECTION A

#### INORGANIC - GENERAL CHEMISTRY

Q2. i. Write down the chemical formula, uses, properties, and preparation of the product obtained from the Hasen-Clever Process.

OR

ii. What are VOCs? Describe the chemistry involved due to the presence of oxides of carbon and nitrogen in the troposphere.

Q3. ii. Give scientific reasons for any FOUR of the following:

- Alkali metals cannot be used in a voltaic cell.
- Multi-dentate ligands are known as chelating agents.
- The boiling point of halogens decreases down the group.
- Gallium has a smaller atomic radius than aluminum.
- Transition metals show variable oxidation states.
- Fluorine is the strongest oxidizing agent.
- Group IIIA elements exhibit an irregular pattern of ionization potential.

OR

ii. Discuss the general group trends of ionization energy, melting point, boiling point, and electrical conductivity in the periodic table.

Q4. iii. Write a note on any ONE of the following:

- The Greenhouse Effect
- Flame Test of Group I-A and II-A Elements

- **Diagonal Relationship**

OR

iii. Write the chemical formula and a significant use of Washing Soda, Baking Soda, Borax, and Alum.

**Q5. iv. Give I.U.P.A.C. names of:**

- $[\text{Cu}(\text{en})_2]^{2+}$
- $[\text{AlF}_6]^{3-}$
- $\text{NH}_4[\text{Cu}(\text{NCS})_4(\text{NH}_3)_2]$
- $[\text{Cr}(\text{NH}_3)_6]\text{Cl}_3$

OR

iv. Define ligands and coordination number. Draw a chart for the classification of ligands with examples.

**Q6. v. What are catalytic converters and industrial smog? What are the main pollutants targeted by a catalytic converter?**

OR

v. What are halogens? Discuss the chemical behavior of halogens. Explain the auto-oxidizing and reducing properties of chlorine.

**Q7. vi. Write down three properties of beryllium that show its unique behavior in Group II-A.**

OR

vi. What are pesticides? Write the names of three types of pesticides along with their specific uses.

**Q8. vii. Distinguish between thermoplastic and thermosetting plastic. Write the equation for the preparation of PVC.**

OR

vii. Define any FOUR of the following: Slag, Binding Energy, Analgesics, Antipyretic Drug, Synthetic Fiber, Chelates, Alloy, Denticity.

## ORGANIC CHEMISTRY

**Q9. viii. Define any FOUR of the following: Functional Group, Ozonolysis, Enantiomers, Octane Number, Chiral Carbon, Catenation, Aromaticity.**

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OR

viii. The structures of three organic compounds "A", "B", and "C" are:

"A":  $\text{H}-\text{C}\equiv\text{C}-\text{H}$

"B":  $\text{CH}_3\text{CHO}$

"C":  $\text{H}_2\text{C}=\text{CH}_2$

- Draw the hybrid orbital structure of "A" showing all bonds.
- Write an equation for the preparation of "B" from Ethanol.
- Write the equation for the reaction of "C" with ozone.
- Draw the structure of cyclopropane.

**Q10. ix. (a) Define Isomerism and name its types. Draw the possible functional group isomers of  $\text{C}_3\text{H}_6\text{O}$  and  $\text{C}_3\text{H}_6\text{O}_2$ .**

**(b) Define optical activity. Draw the cis-isomer and trans-isomer of 1,2-dichloroethene.**

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OR

ix. Write a note on any ONE of the following:

- Types and Destructive Distillation of Coal
- Reforming of Petrol
- Bucky Balls

**Q11. x. Name four derivatives of carboxylic acids and write the equations for their preparation.**

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OR

x. Why does benzene show stability towards addition reactions? Write the mechanism for the sulfonation or alkylation of benzene.

**Q12. xi. Define a Free Radical. Give the stepwise mechanism for the free radical reaction between methane and chlorine.**

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OR

xi. Describe the basicity of amines or the acidity of phenol. How is a primary amine converted into a 2° and 3° amine?

(xii) Give equations for the following reactions:

- i. Methyl iodide is treated with sodium acetate.
- ii. Reaction of chlorine with acetylene.
- iii. Ethene burnt in air in the presence of peracetic acid.
- iv. Hydrolysis of a diazonium salt.

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OR

Differentiate between aldehydes and ketones.

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(xiii) How would you distinguish chemically between acetylene and ethylene? Or between alcohol and phenol?

OR

State Markovnikov's rule. Give the equation for the reaction between vinyl bromide and hydrogen bromide.

(xiv) Elaborate on the classification of R-X (Alkyl Halides) or R-OH (Alcohols).

OR

Draw the orbital structure of  $\text{CH}_3\text{Cl}$  or Ethyne.

## INORGANIC - GENERAL CHEMISTRY

Q3.

(a) What is metallurgy and matte? Describe the metallurgy of blister copper from concentrated pyrite ore.

OR

(a) Complete and balance any EIGHT of the following equations:

- $\text{Cl}_2 + \text{H}_2\text{O} \rightarrow$
- $\text{Mn} + \text{H}_2\text{SO}_4 \rightarrow$
- $\text{H}_2\text{S}_2\text{O}_7 + \text{H}_2\text{O} \rightarrow$
- $\text{Na/Hg} + \text{H}_2\text{O} \rightarrow$
- Carbon is heated with nitrogen  $\rightarrow$
- Reaction of nitric acid with copper  $\rightarrow$
- Reaction of bleaching powder with water  $\rightarrow$
- Potassium is put into ethyl alcohol  $\rightarrow$
- A piece of chromium is put into dilute hydrochloric acid  $\rightarrow$
- Manganese is burned in air  $\rightarrow$

(b) Discuss the processes involved in the production and destruction of ozone in the stratosphere. What is meant by the ozone hole?

Q4.

(a) Describe the manufacture of  $\text{H}_2\text{SO}_4$  by the Contact Process and show with equations how it acts as an oxidizing agent, a dehydrating agent, and an acid.

OR

(a) Describe the manufacture of sodium carbonate by the Solvay process.

## ORGANIC CHEMISTRY

Q5.

(a) Draw the structures of any EIGHT of the following: Adipic acid, Pyrogallol, Cyclopentane, Isobutyraldehyde, Isopropyl butanoate, 1,2,3 benzenetriol, Picric Acid, diethyl acetylene,  $\alpha$ -naphthol, Glyoxal, Hydroquinone, p-cresol, Butanoyl iodide.

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OR

(a) Complete and balance any EIGHT of the following equations:

- $\text{CH}_3\text{CH}_2\text{OH} + \text{SOCl}_2 \rightarrow$
- $\text{CH}_3\text{CHO} + \text{H}_2\text{CrO}_4 \rightarrow$
- $\text{CH}_3\text{COCl} + \text{NH}_3 \rightarrow$
- $\text{CH}_3\text{CONH}_2 + \text{H}_2\text{O} \rightarrow$
- Reaction between Bromomethane and Caustic Soda.
- Reaction between NaCN and 2-chloro-2methyl propane.

(b) What are organometallic compounds? How is a Grignard Reagent prepared? Write down the reactions of this reagent with formaldehyde, acetaldehyde, and carbon dioxide.

Q6.

(a) State Huckel's rule. Illustrate and explain the molecular orbital structure of benzene using appropriate diagrams.

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OR

(a) Define activating and deactivating groups. Convert benzene to m-nitrotoluene and toluene to ortho/para-nitrobenzoic acid.

(b) Define glycosidic and peptide linkages. Define proteins and amino acids. Classify various types of proteins and amino acids. Write the biological importance of proteins. Define a zwitterion. How is a zwitterion formed?

### XII-BOTANY SUPPLY PREPARATION PAPER

Date: \_\_\_\_\_

Duration: \_\_\_\_\_

Total Marks: \_\_\_\_\_

#### SECTION A

1. Why are  $\text{Amp}^S$  and  $\text{Lac}^Z$  genes used as selectable markers in the construction of a plasmid vector?

*OR*

How does energy flow between trophic levels in an ecosystem?

2. Write a short note on any TWO of the following:

Tissue Culture

The Human Genome Project

Chromosomal Theory of Inheritance

*OR*

Define any THREE of the following: Karyotype, Test Cross, Transgenic Animal, Neo-Darwinism, Micropropagation, Gene Flow, Multiple Alleles.

3. Write down the factors affecting the Hardy-Weinberg equilibrium.

*OR*

What are palindromic sequences in DNA? What is their significance?

4. A man with blood group AB marries a woman with blood group AA. What are the possible blood groups of their offspring?

*OR*

Discuss incomplete dominance with reference to *Mirabilis jalapa* (Four o'clock plant).

5. List the enzymes used in recombinant DNA technology, along with their functions.

*OR*

Write a note on speciation or genetic drift.

6. What is Erythroblastosis Fetalis? How can it be prevented?

**OR**

What type of genetic cross can determine the homozygosity or heterozygosity of a dominant allele?

7. List the chemical composition of chromosomes and classify them on the basis of the centromere's position.

**OR**

What is meant by dichromacy and monochromacy?

8. Why is a person with an O-negative blood group considered a universal donor?

**OR**

State the Law of Segregation (Purity of Gametes) and illustrate it using a monohybrid cross.

9. What are the leading and lagging strands in DNA replication?

**OR**

Discuss dominant epistasis with respect to *Digitalis purpurea*.

10. What are introns? Are introns transcribed and translated?

**OR**

Write a brief note on sex determination in humans.

11. Why is the Endosymbiotic Theory important in eukaryotic evolution? Discuss its key points.

**OR**

Define mutation. How does ionizing radiation damage DNA? Are all mutations harmful?

12. Why can Rh-incompatibility be a danger to the developing fetus and mother?

**OR**

What is sickle cell anemia? Name a different genetic syndrome and briefly discuss it.

13. List the seven contrasting characters in pea plants selected by Mendel. State Mendel's Law of Segregation.

**OR**

Why is the Endosymbiotic Theory a powerful explanation for the evolution of eukaryotes?



14. Differentiate between any TWO of the following pairs:

Co-dominance & Incomplete Dominance

Homologous & Analogous Structures

Autosomes & Sex Chromosomes

Linkage & Crossing Over

*OR*

Describe different types of chemical mutagens.

15. What is ecological succession? Describe in detail the processes of Xerarch and Hydrarch succession.

*OR*

Describe the experiments conducted by Griffith, and later by Avery, MacLeod, & McCarty, that proved DNA is the genetic material.

16. Describe the process of gene amplification through the Polymerase Chain Reaction (PCR) and discuss its applications.

*OR*

What is a biogeochemical cycle? Describe the nitrogen cycle in detail.

17. Explain sex-linked inheritance in humans using a suitable genetic cross (e.g., for hemophilia or color blindness).

*OR*

Describe Darwin's theory of natural selection.

18. Explain in detail the process of recombinant DNA technology with the help of a labelled diagram.

*OR*

Define Tissue Culture and explain the process of animal tissue culture along with its applications.

19. State Mendel's Law of Independent Assortment. Explain it with the help of a dihybrid cross and a checkerboard (Punnett Square).

*OR*

The process of DNA replication is described as semi-conservative. Justify this statement with a detailed explanation and reference to a supporting experiment.

XII-COMPUTER SUPPLY PREPARATION PAPER

Date: \_\_\_\_\_

Duration: \_\_\_\_\_

Max Marks: \_\_\_\_\_

SECTION A

Q2.

(i) Define the basic structure of a C program. What are structures? Give an example of structure declaration and usage.

OR

(i) Write a program to find the largest element in an array.

(ii) Convert any THREE of the following mathematical expressions into C language:

a.  $9 + 5x - 4$

b.  $x = (-b \pm \sqrt{b^2 - 4ac}) / (2a)$

c.  $3x^2 - 2xy + c$

OR

(ii) What is a C preprocessor directive? Define any one of them.

(iii) What are arrays? How do you declare and initialize them? Define a 2D array with syntax.

OR

(iii) Explain the difference between "call by value" and "call by reference".

(iv) Write a program that reads a number and prints its multiplication table.

OR

(iv) Write a program to swap two numbers using pointers.

(v) Discuss the following with syntax and example:

- continue statement

- if-else statement
- switch-case statement

**OR**

(v) Describe the purpose of header files in C. Give two examples.

(vi) Write a program that inputs a number and prints its factorial.

**OR**

(vi) Write a program to check if a number is prime or not.

(vii) What are data types? Name the basic data types used in C language.

**OR**

(vii) What are command line arguments? How are they used in C programs?

(viii) Write a short program to demonstrate file reading and writing.

**OR**

(viii) Why is C language called a "Case-sensitive language"? Give any two examples.

(ix) Write the output of the following program.

```
for(i = 1; i <= 5; i++) {
    if (i == 3)
        continue;
    else
        printf("%d", i);
}
```

**OR**

(ix) Define any four Standard Library/Built-in functions.

(x) What is a Pointer in C? How is it initialized? Explain the concept with a simple example.

**OR**

(x) Define the rules for declaring an identifier in C.

(xi) Rewrite the following statements after removing the errors:

```
Printf('Hello World')

for(i <= 5, i++);
```

```
scan %d, a);
```

**OR**

(xi) Define sqrt(), pow(), and abs() functions with examples.

(xii) What is a string? Define string handling functions in C. Give examples of any three.

**OR**

(xii) Differentiate between any TWO of the following pairs:

- Assignment (=) & Equal To (==)
- switch & if-else
- while & do-while
- break & continue

(xiii) What are reserved words? Name any three.

**OR**

(xiii) What is an IDE? Write any three benefits of using an IDE.

(xiv) Write a program to implement a recursive function to calculate the Fibonacci series.

**OR**

(xiv) Explain the unconditional control transfer statement (goto).

(xv) Explain the conditional structure (if-else) with syntax and example.

**OR**

(xv) Write a C program that takes an integer N as input and prints all even or odd numbers from 1 to N based on the user's choice.

**Q3.** Explain data types in the C programming language with examples.

**OR**

**Q4.** What are escape sequences? Define each with an example.

**Q5.** Explain the basic operators in C programming with examples.

**OR**

**Q6.** What are format specifiers? How are they used in the C language? Provide examples.

**Q7.** Define a function in C. Explain function prototype, function call, return value, and function definition with a suitable example.

**OR**

**Q8.** Explain the concept of dynamic memory allocation in C. Why is it important?

**Q9.** Write a program that prints the following output using nested loops:

1	2	4	8	16
2	4	8	16	32
3	6	12	24	48
4	8	16	32	64
5	10	20	40	80

**OR**

**Q10.** Write a program in C that calculates the area of a triangle.

**Q11.** What is a Loop? Explain its different types in the C programming language.

**OR**

**Q12.** Write down any four I/O functions used in C. Mention the purpose of using each of them.

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## XII-ENGLISH SUPPLY PREPARATION PAPER

Date: \_\_\_\_\_

Duration: \_\_\_\_\_

Total Marks: \_\_\_\_\_

### SECTION A

#### SUB-SECTION-I (PROSE)

1. Why did the gentleman kill Mrs. Oakentubb in the play "The Star and the Canary"?

OR

*What advice does Bertrand Russell give to Eastern nations in "The Future of Mankind"?*

2. Why does the author consider it useless to resist industrialization in "The Man Who Was a Machine"?

OR

*Briefly discuss whether the Magistrate gives Jones a fair trial in "The Courtin' of Mace Jones".*

3. What is Einstein's opinion about property, outward success, and luxury as expressed in "The World As I See It"?

OR

*Explain the importance of the label on the suitcase in "The Star and the Canary".*

4. What was the supreme manifestation of the Miller's selfishness that caused Hans to lose his life in "The Devoted Friend"?

OR

*According to Liaquat Ali Khan in "Pakistan and the Modern World", what responsibilities does our freedom impose upon us?*

#### SUB-SECTION II (POEM)

5. What is the central message of the poem "Say not the Struggle naught availeth"?

OR

*What examples does John Keats give in "A Thing of Beauty" to prove that beauty is eternal?*

6. Who was the solitary reaper and what was the source of her song?

OR

*Highlight at least three qualities of "The Man of Life Upright" as described in the poem.*

7. Analyze Ulysses' character in light of his famous words: "To strive, to seek, to find, and not to yield."

OR

*In what way is death a great teacher in Alexander Pope's "The Dying Christian to His Soul"?*

8. How did Ulysses inspire his sailors to embark on a new journey in Tennyson's poem?

OR

*Why has God kept the future hidden from all of his creatures according to the poem "Samson"?*

### SUB-SECTION III (NOVEL: The Prisoner of Zenda)

9. What is the importance of the coronation ball in the novel?

OR

*Compare the qualities of Elphberg and Rassendyll.*

10. How did Princess Flavia sacrifice her love for the sake of her country?

OR

*Explain Rassendyll's use of the iron-topped table to save himself from Rupert of Hentzau.*

11. Why was Black Michael not eligible to be the king of Ruritania?

OR

*Briefly explain the coronation ceremony in the novel.*

12. Where and why was Rudolf Elphberg imprisoned?

OR

*What was the purpose of the "gang of six"?*

### SUB-SECTION IV (GRAMMAR)

13. Use any TWO of the following pairs of words in your own sentences (four sentences total):

College, Collage

Duel, Dual

Prey, Pray

Desert, Dessert

Peace, Piece

14. Use any TWO of the following phrasal verbs/idioms in your own sentences:

Look into

Take off

Give up

A burning question

Capital punishment

15. Match any FOUR of the following words in Column 'A' with their meanings in Column 'B':

Column A	Column B
Shank	Leg
Jeopardy	Danger
Yon	There
Oriental	Eastern
Strain	Song

Q.3 Write an essay of approximately 250-300 words on any ONE of the following topics: (10 Marks)

1. Dangers of AI and Deep Fake Technology
2. Inflation in Pakistan
3. Street Crimes, Traffic Hazards & Accidents in Karachi
4. Role of Technology in Modern Communication
5. Global Climate Change
6. Necessity of Tolerance in Society
7. Importance of Muslim Unity
8. ICC Champions Trophy 2025

Q.4 Change the narration of the following sentences:

(10 Marks)

1. The teacher said to her class, "Do you try to speak English?"
2. Luqman said, "Life is not an empty dream."
3. My teacher said to me, "What do you want to become in your future?"



4. The notice in the shopping mall says, "Beware of pickpockets."

5. "What lovely weather it is!" said Anna to her friend.

**Q.5 Write a character-sketch of any ONE of the following characters from The Prisoner of Zenda:**

**(10 Marks)**

1. Princess Flavia
2. Rudolf Rassendyll
3. Black Michael

OR

**Give the critical appreciation of any ONE of the following poems:**

1. "Music When Soft Voices Die"
2. "Ulysses"
3. "The Solitary Reaper"

**Q.6 Read the following passage and answer the questions that follow:**

**(10 Marks)**

*"The fairest thing we can experience is the mysterious. It is the fundamental emotion which stands at the cradle of true art and true science. He who knows it not and can no longer wonder, no longer feel amazement, is as good as dead, a snuffed-out candle. It was the experience of mystery that engendered religion. A knowledge of the existence of something we cannot penetrate, of the manifestations of the profoundest reason and the most radiant beauty, which are only accessible to our reason in their most elementary forms - it is this knowledge and this emotion that constitute the truly religious attitude; in this sense, and in this alone, I am a deeply religious man."*

1. What role does the experience of mystery play in the creation of true art, science, and religion?
2. How does the author describe the connection between the experience of wonder and a person's religious attitude?
3. What does the author mean by saying that a person who can no longer feel amazement is "as good as dead, a snuffed-out candle"?
4. Give the meaning of the underlined words in sequence: mysterious, engendered, profoundest, radiant.
5. What is the name of the writer and the essay from which this passage is taken?

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## XII-MATHS SUPPLY PREPARATION PAPER

Date: \_\_\_\_\_

Duration: \_\_\_\_\_

Total Marks: \_\_\_\_\_

### SECTION A

Q2.

i. (i) Given  $f(x)=x+2$  and  $g(x)=3x-2$ , show that  $(g \circ f)=(f \circ g)$ .

OR

Find the value of  $k$  if  $f(x)=\begin{cases} \frac{k \ln(1+x)}{x}, & x \neq 0 \\ 2, & x=0 \end{cases}$  is continuous at  $x=0$ .

ii. (ii) Evaluate the limit:  $\lim_{x \rightarrow 0} \frac{1-\cos mx}{x^2}$

OR

Evaluate the limit:  $\lim_{x \rightarrow 0} \frac{(1+2x)^{1/2}-1}{x}$

iii. (iii) Find the derivative of  $f(x)=\sin 4x$  from first principles.

OR

If  $y=\sqrt{\tan x + \sqrt{\tan x + \sqrt{\tan x + \dots}}}$ , prove that  $(2y-1)\frac{dy}{dx}=\sec^2 x$ .

iv. (iv) Obtain the first three terms of the McLaurin's series for  $f(x)=e^x$ .

OR

Find the first four terms of the Taylor's series for  $f(x)=\sin x$  centered at  $a=\frac{\pi}{2}$ .

v. (v) The path of a particle is given by  $x=t^2-3t$  and  $y=\frac{2}{3}t^3$ . Find the magnitude of velocity and acceleration at  $t=5$ .

OR

A particle moves along the curve  $x=2t^2$ ,  $y=4t$ . Find the component of velocity and acceleration at  $t=2$  in the direction of  $\vec{d}=2\hat{i}+\hat{j}$ .

vi. (vi) Compute the definite integral:  $\int_{-\pi/2}^{\pi/2} \sin^2 x \cos^2 x \, dx$

OR

Compute the definite integral:  $\int_{-2}^2 (x^4+2x^2) \, dx$

vii. (vii) Find the area above the  $x$ -axis under the curve  $y=3\sin x$ , between  $x=-\pi$  and  $x=\pi$ .

OR

Find the area above the x-axis for the circle  $x^2 + y^2 = 36$ , between  $x = -1$  and  $x = 1$ .

- viii. (viii) The vertices of a triangle PQR are (2, 1), (5, 2), and (3, 4). Find the coordinates of the circumcenter.

OR

Find the equation of the line which passes through (-2, -4) and where the sum of its intercepts is 3.

- ix. (ix) Find the equation of a line through the intersection of  $2x + 3y + 1 = 0$  and  $3x - 4y = 5$ , and passing through (2, 1).

OR

Find the equation of a line through the intersection of  $x + 7y - 8 = 0$  and  $3x + 2y + 5 = 0$ , making a  $45^\circ$  angle with  $2x + 3y - 7 = 0$ .

- x. (x) Find the equation of the circle passing through (5, 0) and (0, 5) with a radius of 5 units.

OR

Find the equation of the circle passing through the origin with x and y-intercepts of 6 and 8, respectively.

- xi. (xi) Find the standard equation of the parabola whose latus rectum and vertex are the diameter and center of the circle  $x^2 + y^2 - 4x - 8y - 5 = 0$ , respectively.

OR

Find the equation of the circle whose diameter is the latus rectum of the parabola  $x^2 = 12y$  and whose center is at the focus of the parabola.

- xii. (xii) Find the equation of the ellipse with center at (5, -3), one vertex at (10, -3), and one focus at (9, -3).

OR

Find the eccentricity of an ellipse if its latus rectum is equal to half of its major axis.

- xiii. (xiii) Obtain the differential equation from the relation  $y = A \cos x + B \sin x$  by eliminating arbitrary constants.

OR

Find the particular solution of  $\frac{dy}{dx} = \frac{1 + \cos y}{\sin y}$ , given that  $x + 2\sqrt{1 + \cos y} + c = 0$  is the general solution and  $y(3) = \frac{\pi}{2}$ .

- xiv. (xiv) Verify Euler's theorem for the homogeneous function  $f(x, y) = xy - x$ .

OR

If  $u = x^2(y - x) + y^2(x - y)$ , show that  $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = -2(x - y)^2$ .

**Q3. (Compulsory)** Evaluate any TWO of the following integrals:

- a.  $\int x e^{4x} \, dx$
- b.  $\int \frac{\sec^2 x}{(1 + \tan x)(2 + \tan x)} \, dx$
- c.  $\int_2^{\sqrt{3}} \frac{x^3}{\sqrt{x^2 + 4}} \, dx$
- d.  $\int x^2 \operatorname{arccot}(x) \, dx$

**Q4. Differentiate any TWO of the following with respect to x:**

- a.  $y = (\tan^{-1} x)^{\sin x + \cos x}$
- b.  $\ln(xy) = x^2 + y^2$
- c.  $y = x \cosh^{-1} x - \sqrt{x^2 - 1}$

**Q5.**

Find the maximum and minimum values of the function  $f : \mathbb{R} \rightarrow \mathbb{R}$  for any ONE of the following:

- a)  $f(x) = x^2 - 2x + 3$
- b)  $f(x) = e^x \sin x$
- c)  $f(x) = 2e^x + e^{-x}$

OR

Find the right-angled triangle of maximum area with a hypotenuse of length  $h$ .

**Q6.**

If  $A(2,5)$ ,  $B(3,7)$ , and  $C(0,8)$  are the vertices of a triangle, find the equation of the median through vertex A.

OR

If  $A(-1,5)$ ,  $B(2,3)$ , and  $C(7,6)$  are the vertices of a triangle, show that the altitudes of the triangle are concurrent.

**Q7.**

Show that the circles  $x^2 + y^2 - 6x - 6y + 10 = 0$  and  $x^2 + y^2 = 2$  touch externally. Also, find the point of contact.

OR

Prove that the two circles  $x^2 + y^2 + 2gx + c = 0$  and  $x^2 + y^2 + 2fy + c = 0$  touch each other if  $\frac{1}{f^2} + \frac{1}{g^2} = \frac{1}{c}$ .

**Q8.**

Find the center, foci, eccentricity, vertices, and equations of directrices for any ONE of the following:

- a)  $25x^2 - 150x - 9y^2 + 72y + 306 = 0$
- b)  $9x^2 - 4y^2 + 36x + 8y - 4 = 0$

OR

Show that the eccentricities  $e_1$  and  $e_2$  of two conjugate hyperbolas satisfy  $e_1^{-2} + e_2^{-2} = 1$ .

**Q9.**

Solve any ONE of the following differential equations:

- a)  $\frac{dy}{dx} = \frac{y}{x} + \sin\left(\frac{y}{x}\right)$
- b)  $(2x + y + 1)dx + (2x + y - 1)dy = 0$

OR

The population of a town grows at a rate proportional to the square root of the present population. If the initial population is 20,000 and it doubles after 5 years:

- i. What is the population after 10 years?
- ii. After how much time will the population be five times the original?

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## XII-PHYSICS SUPPLY PREPARATION PAPER

Date: \_\_\_\_\_

Duration: \_\_\_\_\_

Subject: Physics

Total Marks: \_\_\_\_\_

### SECTION A

Q2. Attempt any TEN parts. All parts carry equal marks.

(1)

Show that the average translational kinetic energy of gas molecules is directly proportional to its absolute temperature.

OR

Explain the process of pair production and annihilation of matter with nuclear equations.

(2)

What are black body radiations? Write down their characteristics. Define Rayleigh-Jeans Law and the ultraviolet catastrophe.

OR

What is meant by the Curie point? Differentiate between ferromagnetic, diamagnetic, and paramagnetic substances.

(3)

State the first law of thermodynamics and describe any two of its applications.

OR

Prove that

$$C_p - C_v = R$$

for an ideal gas.

(4)

Describe the law of radioactivity and write down its exponential form.

OR

What is a refrigerator? Describe its working and derive the equation for its coefficient of performance.

(5)

Define motional E.M.F. and derive its mathematical expression.

OR

Define rectification and its types. Explain the working of a semiconductor diode as a half-wave rectifier.

(6)

Define stress and strain. Derive the relation for Young's Modulus.

OR

Define valence and conduction bands. Describe the energy bands in solids and classify solids on this basis.

(7)

What are logic gates? Construct a truth table for a 2-input AND gate and a 3-input OR gate.

OR

How can a galvanometer be converted into a voltmeter or an ammeter? Derive the necessary formulas.

(8)

Find the mass of the air within a car tyre, given that it holds  $0.020 \text{ m}^3$  of air at  $27^\circ\text{C}$  and a pressure of  $3.0 \times 10^5 \text{ N/m}^2$ . The molecular mass of air is  $28.8 \text{ g/mol}$ .

OR

Calculate the root mean square speed of hydrogen molecules at  $0^\circ\text{C}$  and  $1.0 \text{ atm}$  pressure, assuming hydrogen to be an ideal gas. The density of hydrogen is  $8.99 \times 10^{-2} \text{ kg/m}^3$ .

(9)

What is the coefficient of performance (COP) of a refrigerator that operates between temperatures  $-3.00^\circ\text{C}$  and  $+27.0^\circ\text{C}$ ?

OR

A heat engine works at the rate of  $500 \text{ kW}$ . The efficiency of the engine is  $30\%$ . Calculate the heat lost per hour.

(10)

In an RL circuit, the resistance (R) is  $30 \text{ ohms}$ , and the inductance (L) is  $0.2 \text{ H}$ . Calculate the total impedance at a frequency of  $60 \text{ Hz}$ .

OR

In an RLC circuit, the resistance (R) is 50 ohms, the inductance (L) is 0.1 H, and the capacitance (C) is 50  $\mu\text{F}$ . Calculate the resonance frequency.

(11)

A solenoid has length  $L = 1.23 \text{ m}$  and inner diameter  $d = 3.55 \text{ cm}$ , and it carries a current  $I = 5.57 \text{ A}$ . It consists of five close-packed layers, each with 850 turns along length  $L$ . What is  $B$  at its center?

OR

A 50g piece of copper at  $100^\circ\text{C}$  is placed in 200g of water at  $20^\circ\text{C}$ . If the final temperature of the system is  $21.8^\circ\text{C}$ , calculate the specific heat capacity of copper. (Specific heat capacity of water is  $4.18 \text{ J/g}^\circ\text{C}$ )

(12)

At what velocity is the kinetic energy of a particle equal to its rest mass energy?

OR

The elastic limit of copper is  $1.5 \times 10^8 \text{ N/m}^2$ . A 10 kg load is to be suspended from a copper wire. Find the minimum diameter of the wire required so that the elastic limit is not exceeded.

(13)

A light source of wavelength  $\lambda$  ejects photoelectrons with a maximum kinetic energy of 1.0 eV. A second light source with half the wavelength ejects photoelectrons with a maximum kinetic energy of 4.0 eV. Determine the work function of the metal.

OR

X-rays with an energy of 300 keV undergo Compton scattering. If the scattered X-rays are detected at  $30^\circ$  relative to the incident beam, determine the Compton shift at this angle.

(14)

Calculate the mass defect and binding energy of a deuteron ( $^2\text{H}^1$ ), which contains one proton and one neutron. (Mass of deuteron = 2.0136 u, mass of proton = 1.0073 u, mass of neutron = 1.0087 u)

OR

The half-life of  $^{210}\text{Po}$  is 140 days. By what percentage does its activity decrease per week?

Q3.

(a) What is a Carnot engine? Explain the Carnot cycle. Derive an expression for the OR efficiency of a Carnot engine.

Define Compton's effect. Derive the formula for Compton's shift in the wavelength of an X-ray photon.



- (b) What is the photoelectric effect? State its experimental observations. Write down OR Einstein's photoelectric equation and define work function, threshold frequency, and stopping potential.

Describe J.J. Thomson's experiment for the determination of the specific charge ( $e/m$ ) of an electron.

**Q4.**

- (a) Prove that the pressure of an ideal gas is proportional to its density and the mean square OR speed of its molecules.

What is electromagnetic induction? State Faraday's and Lenz's laws. Explain the phenomenon of mutual induction and obtain an expression for the mutual inductance of two coils.

- (b) State Ampere's law. Use it to derive the expression for the magnetic field inside a OR solenoid.

Define a galvanometer. Show that the current measured by a moving coil galvanometer is directly proportional to the deflection produced by its pointer, i.e.,

$$\theta \propto I$$

**Q5.**

- (a) What is a transformer? Describe its working principle, construction, and working. OR Derive the formula for the induced EMF. Differentiate between step-up and step-down transformers.

Define an RLC series circuit. When connected to an AC source:

- Derive the formula for impedance.
- Draw the impedance triangle.
- Prove that at resonant frequency, the RLC circuit behaves like a purely resistive circuit.

- (b) What does LASER stand for? Define optical pumping, metastable state, stimulated OR emission, and population inversion. Describe the working principle of a He-Ne gas laser.

Define nuclear fission. What is the source of energy in a fission reaction? Explain why fission is a chain reaction.

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**XII-PST SUPPLY PREPARATION PAPER**

**Date:** \_\_\_\_\_

**Duration:** \_\_\_\_\_

**Total Marks:** \_\_\_\_\_

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**SECTION A**

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## Q.2 Attempt any FIVE parts. (8)

1. (i) Explain the Two-Nation Theory.

OR

(i) Write a note on the Indus Basin Treaty.

2. (ii) Differentiate between the Rural and Urban population of Pakistan.

OR

(ii) Write a brief note on the Gandhara Civilization.

3. (iii) Write the objectives of the Khilafat Movement.

OR

(iii) Enlist the key elements of a Nation State.

4. (iv) Write four lines on the importance of Agriculture in the economy of Pakistan.

OR

(iv) Write a few key points of the Pakistan Resolution (1940).

5. (v) Write three important features of the Constitution of 1973.

OR

(v) Match the following important events with their correct years:

1916	
1956	
1973	
1998	
1906	
1930	

6. (vi) Describe the initial problems faced by Pakistan after its creation in 1947.

OR

(vi) Write the names of any two major dams and two barrages in Pakistan along with their locations.

7. (vii) Write the basic objectives of the United Nations (UNO). Name any four of its main organs.

OR

(vii) Explain the geographical and political significance of Pakistan's location.

8. (viii) Write the importance of any one regional language of Pakistan and mention the names of any two Sufi Poets associated with it.

OR

(viii) Write any four points from the Fourteen Points of Quaid-e-Azam Muhammad Ali Jinnah.

**Q.3.** Write the aims and objectives of the establishment of Pakistan.

OR

Discuss the Kashmir issue, highlighting its impact on Pakistan's relations with India.

**Q.4.** Describe the role of Quaid-e-Azam Muhammad Ali Jinnah in the Freedom Movement of Pakistan.

OR

Describe the important political events that took place between 1940 and 1947.

**Q.5.** Discuss the role of the Urdu language in fostering National Solidarity in Pakistan.

OR

Describe the basic principles of Pakistan's Foreign Policy.

**Q.6.** Describe the salient features of Pakistani culture.

OR

Shed light on the historical buildings and fine arts built by Muslims in the subcontinent before the creation of Pakistan.

# KARACHI EDU

## XII-URDU SUPPLY PREPARATION PAPER

کل نمبر: 75

دورانیہ: 3 گھنٹے

تاریخ: \_\_\_\_\_

### حصہ ب: مختصر جوابات

سوال نمبر 2: درج ذیل میں سے کسی دو اشعار کی تشریح شاعر کے حوالے اور مختصر تعارف کے ساتھ کیجیے۔

(الف)

یہ نیاز بلائے کرم ہے بندہ پرور کے  
تب تو کلیوں سے ہوا چمن آراستہ ہم

(ب)

تجھے بتاؤں کیا میں حال اپنا اور آپ فرمائیے کیا  
مواں گم مشکل و گل کیا جب کھلی دُومر آنکھیں ہوتا

(ج)

مجھ کو عطا ہو رُوئے جاناں کی قسم  
مرنے کی آرزو تھی بس اب اور یاد آئی

(د)

کیا جائے، کیا ہو کیا ارباب جنوں کو  
آب مجھے کون سا پلے کہیے

### سوال نمبر 3: مندرجہ ذیل اقتباسات میں سے کسی ایک کی تشریح کیجیے۔

(الف) منتخب کردہ اقتباس کے مصنف اور سبق کا نام تحریر کیجیے۔

(ب) منتخب کردہ اقتباس کی تشریح کیجیے۔

اقتباس 1:

"ایک بائیں ہاتھ کا بیٹا ہے کہ جب وہ لیفٹیننٹ بن کر آیا تو اس سے تعریف کرنے والی آوازیں آئیں اور کروڑوں مکمل بُری نظروں سے دیکھنے لگیں... وہ تمام اشخاص جو اس نے دیکھے، ان کی قسم اطاعت بھری اور اخلاص بھری تھی۔"

اقتباس 2:

"معجزہ کائنات ہے ربائل سے محبت و خلوص سے ہی برادری کرتا ہے۔ یہی ہے وہ دیدہ ایم..."

### سوال نمبر 4: مندرجہ ذیل نظموں میں سے کسی ایک کا مرکزی خیال تحریر کیجیے۔

(الف) منتخب کردہ نظم کے شاعر کا مختصر تعارف تحریر کیجیے۔

(ب) منتخب کردہ نظم کا مرکزی خیال تحریر کیجیے۔

- "حضرت فاطمہ الزہرا کی رفعت" (علامہ اقبال)
- "جینے اور مرنے کا فن" (احمد ندیم قاسمی)
- "کتاب ہونے لگا ہے" (منیر نیازی)

### سوال نمبر 5: درج ذیل بند کی تشریح شاعر کے مختصر تعارف کے ساتھ کیجیے۔

اسی اعلیٰ تری مرکزی سب سے افضل ہے  
جانی کیاسین وش ہے تمنا، نہ ری نعت ہے تیری خالی  
شامِ کربلا تاراج ہم کا تونے ایجھین ہے  
دیہی یلی آنکھوں ہے

سوال نمبر 6: درج ذیل میں سے کسی ایک سبق کا خلاصہ تحریر کیجیے۔

(الف) منتخب کردہ سبق کے مصنف کا مختصر تعارف تحریر کیجیے۔

(ب) منتخب کردہ سبق کا خلاصہ تحریر کیجیے۔

- "أباؤں زول کی تان" (احمد فراز)
- "حیات الانصار" (مولانا ظفر علی خان)
- "سوئی جو آنکھ مری کھلی" (خواجہ حسن نظامی)

(کل نمبر: 50)

حصہ ج: تفصیلی جوابات

سوال نمبر 7: درج ذیل میں سے کسی پانچ سوالات کے مختصر جوابات تحریر کیجیے۔

1. کن سلاطین و امرا نے دعوتِ اسلام سے خطوط روانہ کیے؟
2. اقبال کے خیال میں اصل خوش طبعی کا نشان کیا ہے؟
3. جولاؤں ہوشوں کے بات نہیں مانے، اس کا کیا انجام ہوا؟
4. یہ اُبول ہے اُبلے سیکھا جاتا ہے؟
5. وانڈیز جیک کب اور کس طرح ملی تھی؟
6. حضرت حاتم طائی کے بیٹے نے اسلام کیوں قبول کیا؟ واقعہ بیان کیجیے۔
7. انشائیہ نگار نے الم کو "یوسف کا کنعان" کیوں کہا؟
8. "بیل تو" ٹھن کے جزیروں میں، مثلِ بزریعہ زینت کے لیے کیا اشارہ ہے؟
9. رات تلبدی کی آیات میں واں والات؟
10. جے رمال دارک شبرک رتھے والی تحقیر؟

سوال نمبر 8: مندرجہ ذیل میں سے کسی ایک نثر نگار کے فن پر روشنی ڈالیے۔

- محتشم ہزاروی
- سید سلیمان ندوی
- رشید احمد صدیقی

سوال نمبر 9: مندرجہ ذیل میں سے کسی ایک موضوع پر مضمون تحریر کیجیے۔

- موسمیاتی تبدیلیاں اور بیماریوں میں اضافہ
- ایک مومن مسلم معاشرے کی پہچان
- پاکستان کی موجودہ مسائل اور ہمارا کردار
- عوام اور حکمرانوں کے درمیان رابطہ
- پاکستان 2025ء: ایک یادگار سال

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# KARACHI EDU

## XII-ZOOLOGY SUPPLY PREPARATION PAPER

Date: \_\_\_\_\_

Total Marks: \_\_\_\_\_

Duration: \_\_\_\_\_

### SECTION A

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## Q2 (a) REASONING QUESTIONS

- i. Why do we shiver in cold temperatures?

OR

Why is a synapse also termed as a motor end plate?

- ii. Why is excretion necessary?

OR

Why do nerve impulses move faster in myelinated neurons?

- iii. Why do skeletal muscles fatigue?

OR

Why is the neurolemma (neuron membrane) polarized at rest?

- iv. Why is calcium essential for cross-bridge formation in muscles?

OR

Why is saltatory conduction faster than continuous conduction?

- v. Why are interneurons called association neurons?

OR

Why is the urethra in males called a urogenital duct?

- vi. Why is the posterior pituitary gland referred to as the neurohypophysis?

OR

How is cartilage useful for our skeletal system?

- vii. Why is only one egg produced per cycle in females while millions of sperm are produced in males?

OR

Why do the testes descend into the scrotum before birth?

- viii. How is the reproductive system different from other body systems?

OR

Why does a freshwater fish excrete dilute urine?

## Q2 (b) NON-REASONING QUESTIONS

i. Differentiate between any ONE of the following pairs:

- Osmoregulators & Osmoconformers
- Estrogen & Progesterone
- CNS & PNS
- Ectotherm & Endotherm animals

OR

What is dialysis? Describe hemodialysis.

ii. Write a note on any ONE of the following:

- In-vitro fertilization (Test Tube Babies)
- CT Scan
- Diabetes

OR

What is Renal failure? Write its causes and a method of treatment.

iii. Discuss the role of cartilage in the skeletal system.

OR

Write the names and functions of hormones that are not secreted by endocrine glands.

iv. Write the names of the hormones of the pancreas and differentiate their functions.

OR

Describe the role of the brain in thermoregulation.

v. Define hypothermia and describe the body's physiological responses to counter it.

OR

Define receptors. State any one type with its function.

vi. Discuss the effects of hyperthyroidism.

OR

What is a joint? Name different types of joints. Explain any one of them.

vii. Write a brief note on any one Sexually Transmitted Disease (STD).

OR

Discuss the mode of action of hydrophilic and lipophilic hormones.

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## Q.3

Describe the functions of the kidneys. Explain the structure of the human kidney with a labeled diagram.

OR

Explain thermoregulation in humans in both hot and cold conditions.

---

**Q.4**

Define the menstrual cycle and discuss its phases in detail. Use a diagram where needed.

OR

Explain vascular, infectious, and degenerative disorders of the central nervous system.

---

**Q.5**

Explain the structure of skeletal muscles and the ultrastructure of a skeletal muscle fiber with a labeled diagram.

OR

Define the sliding filament model of muscle contraction and explain the cross-bridge cycle.

---

**Q.6**

Describe the structure and function of various parts of the human brain.

OR

What are antagonist muscles? Describe the action of antagonist muscles in the movement of the knee joint.

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