

Includes  
**Statistical  
Analysis** of  
papers

**SAMPLE CONTENT**



Includes **17 OMR** Sheets

**PREVIOUS 12 YEARS**

**NEET**

**Question Papers with Solutions**

**2013 - 2024**

As per  
latest syllabus  
prescribed by  
**NMC**

**TOTAL - 17 PREVIOUS EXAM PAPERS\***

- ◆ \*2015 Re-Test
- ◆ 2016 - Phase 2
- ◆ 2019 Odisha
- ◆ 2020 - Phase 2
- ◆ 2023 Manipur

**PHYSICS | CHEMISTRY | BIOLOGY**

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PREVIOUS

12

YEARS

# NEET (UG)

## Question Papers With Solutions

2013 TO 2024

### Salient Features:

- Set of 17 full length Previous Years' Question Papers from year 2013 to 2024 with Answers and Solutions
- Mapping of questions based on the concepts excluded from NEET (UG) 2024 syllabus
- Contains Question Papers from examination given for the second time in:
  - 2015 (Re-Test)                      - 2016 (Phase II)                      - 2019 (Odisha)
  - 2020 (Phase II)                      - 2023 (Manipur)
- NCERT Textbook Page Numbers cited in solutions to map concepts involved in questions
- Smart Key provided to crack questions efficiently
- Includes Self Assessment Score Card to evaluate progress
- Includes 17 Blank OMR Sheets for Practice
- Trend analysis of NEET (UG)/ AIPMT examinations in the form of:
  - Graphs of standard-wise analysis and Conceptual mapping of questions
  - Tables of chapter-wise analysis of each paper

Printed at: **Print to Print**, Mumbai

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## PREFACE

Our latest offering, ‘**NEET-UG Previous Years Questions (PYQ)**’ is a compilation of 17 National Eligibility cum Entrance Test (NEET), formerly known as the All India Pre-Medical Test (AIPMT) Question papers that took place in years 2013-2024 (one paper per year as well as papers for the examination held for the second time in the years 2015, 2016, 2019, 2020, and 2023). The book includes 12 years' Question Papers to offer students conviction of their preparedness from the examination point of view. The book would act as a go-to tool to find all the questions asked in AIPMT/NEET over the past 12 years in one place.

Each question paper is provided with **Answers and Solutions**. The Solutions are provided for difficult questions to assist students in comprehending the underlying concepts and enhance their problem-solving abilities. A **reference page number** of the NCERT textbook into which a question is anchored is provided to facilitate easy conceptual mapping. **Smart Keys** are provided selectively to stimulate lateral thinking by applying shortcuts, tips, and mnemonics to effectively solve a question.

There are 17 blank **OMR Sheets** at the end of the book for students to familiarise themselves with the examination format and improve their speed and accuracy.

The book includes a Self-Assessment Score Card carefully designed to divulge performance of a student taking 17 papers sincerely. It allows a student to plot his ranking graphically across the papers. A sample Self-Assessment Score Card is also added for illustrative purpose.

A **statistical analysis** in tabular form is provided to offer students an insight into the weightage allotted to each chapter in previous examinations. An analysis of the past 12 years papers is given in graphical form at the beginning of the book, to elaborate upon the percentage of straight forward, concept-based, and Higher Order Thinking Questions asked per subject over the span of 12 years. Though there is a possibility of variation in the weightage and percentage attributed to a chapter in the future examination, studying these representations should definitely help students plan the study structure of a particular chapter.

We are confident that this book will comprehensively cater to the needs of students and effectively assist them to achieve their goal.

Publisher

**Edition:** Sixth

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*A book affects eternity; one can never tell where its influence stops.*

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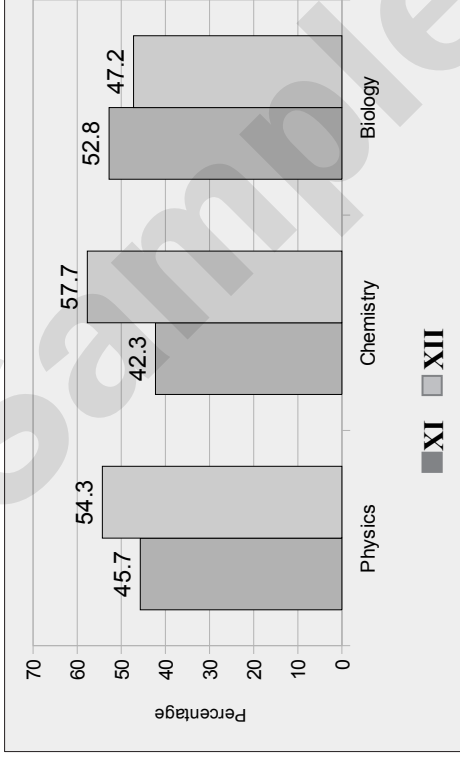
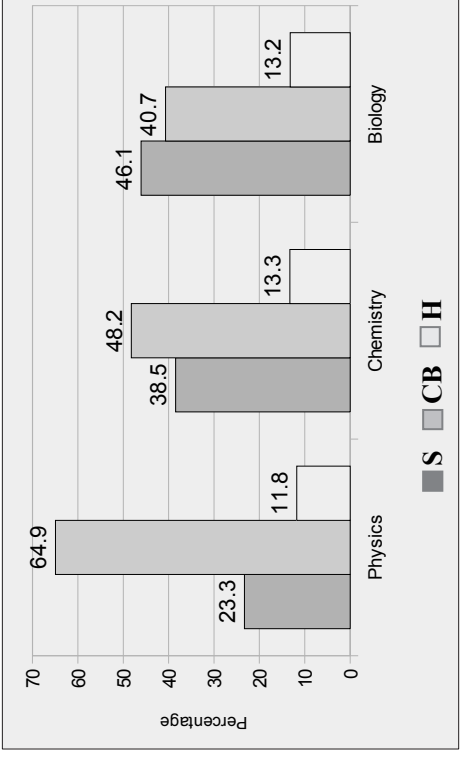
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Statistical analysis of papers  
(2013 to 2024,

Standard wise analysis	Conceptual mapping																								
 <table border="1"> <caption>Standard wise analysis</caption> <thead> <tr> <th>Subject</th> <th>Class XI (%)</th> <th>Class XII (%)</th> </tr> </thead> <tbody> <tr> <td>Physics</td> <td>45.7</td> <td>54.3</td> </tr> <tr> <td>Chemistry</td> <td>42.3</td> <td>57.7</td> </tr> <tr> <td>Biology</td> <td>52.8</td> <td>47.2</td> </tr> </tbody> </table>	Subject	Class XI (%)	Class XII (%)	Physics	45.7	54.3	Chemistry	42.3	57.7	Biology	52.8	47.2	 <table border="1"> <caption>Conceptual mapping</caption> <thead> <tr> <th>Subject</th> <th>S (%)</th> <th>H (%)</th> </tr> </thead> <tbody> <tr> <td>Physics</td> <td>23.3</td> <td>64.9</td> </tr> <tr> <td>Chemistry</td> <td>38.5</td> <td>48.2</td> </tr> <tr> <td>Biology</td> <td>46.1</td> <td>40.7</td> </tr> </tbody> </table>	Subject	S (%)	H (%)	Physics	23.3	64.9	Chemistry	38.5	48.2	Biology	46.1	40.7
Subject	Class XI (%)	Class XII (%)																							
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Subject	S (%)	H (%)																							
Physics	23.3	64.9																							
Chemistry	38.5	48.2																							
Biology	46.1	40.7																							
<p><b>Based on NEET syllabus of class XI and XII</b></p> <p><b>S – Straight forward :</b> Questions whose answers can be directly and easily answered by the information given in NCERT Textbooks.</p> <p><b>CB – Concept Based :</b> These questions require students to identify and apply the appropriate concepts which they studied from NCERT Textbooks.</p> <p><b>H – Higher Order Thinking Skills :</b> The most Challenging Questions that require application of various concepts and encourage students to think beyond the information given in the textbook.</p>																									
<p style="text-align: center;"><b>Analysis</b></p>																									
<ul style="list-style-type: none"> <li>➤ <b>Standard wise analysis</b> shows that in Physics and Chemistry the number of questions asked from class XII are slightly more than that asked from class XI. In Biology the number of questions asked from class XI are more. However, students are suggested to focus equally on the NEET syllabus of class XI and XII.</li> <li>➤ In <b>physics</b>, higher percentage of questions are concept based which shows that the entrance test emphasizes a lot on understanding and application of concepts. Students are advised to focus on the application of formulas, concepts along with thorough revision while preparing for the entrance test.</li> <li>➤ In <b>chemistry</b>, based on the statistics, students should refer NCERT textbooks thoroughly as many questions are directly asked from textbooks.</li> <li>➤ In <b>biology</b>, more number of questions asked are straight forward, to attempt this type of questions students should read the NCERT textbooks thoroughly. For solving concept based and higher order thinking skills type of questions, students are expected to apply the scientific knowledge of the concepts studied.</li> </ul>																									

## Based on the old Syllabus

### PHYSICS Std. XI

## Analysis of NEET (UG) Exam Papers from the year 2013 to 2023

\* **Note:** NEET (UG) exam was conducted twice;

- In year 2015 and 2016, as per Supreme Court's Directive
- In year 2019, due to flood situation in Odisha State
- In year 2020, due to COVID-19 pandemic
- In year 2023, due to law and order situation in Manipur State

Sr. No.	Topic Name	2013	2014	2015	2015* Re-Test	2016 (Phase I)	2016* (Phase II)	2017	2018	2019	2019* Odisha	2020 (Phase I)	2020* (Phase II)	2021	2022	2023	2023* Manipur	Total
1	Physical World	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
2	Units and Measurements	1	1	1	1	0	1	1	1	1	1	2	0	3	2	2	2	20
3	Motion In a Straight Line	1	0	1	0	0	1	1	1	0	2	0	1	2	2	4	0	16
4	Motion In a Plane	1	2	2	3	3	0	1	1	2	1	1	0	1	1	1	4	24
5	Laws of Motion	3	3	2	2	3	3	2	2	4	5	1	3	1	1	1	2	38
6	Work, Energy and Power	1	1	4	4	1	2	1	1	2	1	1	0	1	1	1	2	24
7	System of Particles and Rotational Motion	2	2	3	3	3	3	3	4	2	1	2	1	2	3	2	2	38
8	Gravitation	2	2	1	2	2	2	2	2	2	2	1	1	3	2	2	2	30
9	Mechanical Properties of Solids	1	1	1	1	1	0	1	1	1	1	2	1	0	1	1	1	15
10	Mechanical Properties of Fluids	1	1	1	2	1	2	1	1	2	2	1	2	1	2	2	1	23
11	Thermal Properties of Matter	1	2	2	1	2	2	2	1	2	2	1	0	1	0	0	0	19
12	Thermodynamics	2	2	3	2	2	1	2	2	1	1	1	2	0	1	1	1	24
13	Kinetic Theory	3	1	1	2	1	2	1	2	1	1	3	2	1	1	1	1	24
14	Oscillations	0	1	2	1	0	1	2	1	3	2	1	1	2	1	1	1	20
15	Waves	3	3	1	2	3	2	2	2	0	1	1	1	0	1	1	1	24
<b>Total</b>		<b>22</b>	<b>22</b>	<b>25</b>	<b>26</b>	<b>22</b>	<b>22</b>	<b>22</b>	<b>22</b>	<b>23</b>	<b>23</b>	<b>18</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>	<b>20</b>	<b>341</b>

## Based on the new Syllabus

### PHYSICS Std. XI

## Analysis of NEET (UG) Exam Papers from the year 2013 to 2024

\* Note: NEET (UG) exam was conducted twice;

- In year 2015 and 2016, as per Supreme Court's Directive
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- In year 2023, due to law and order situation in Manipur State

Sr. No.	Topic Name	2013	2014	2015	2015* Re-Test	2016 (Phase I)	2016* (Phase II)	2017	2018	2019	2019* Odisha	2020 (Phase I)	2020* (Phase II)	2021	2022	2023	2023* Manipur	2024	Total
1	Units and Measurements	0	1	1	1	0	1	1	1	1	1	2	2	3	2	2	2	3	24
2	Motion In a Straight Line	1	0	1	0	1	1	1	1	0	2	0	0	2	2	3	0	1	16
3	Motion In a Plane	1	2	1	2	2	0	1	1	3	1	1	0	1	1	2	4	2	25
4	Laws of Motion	3	3	2	2	2	3	2	2	2	4	0	3	1	1	1	2	1	34
5	Work, Energy and Power	1	1	3	5	2	2	1	1	3	2	1	0	1	1	1	2	2	29
6	System of Particles and Rotational Motion	1	2	3	3	3	3	3	4	2	1	2	1	2	3	2	1	2	38
7	Gravitation	2	1	2	2	2	2	2	1	2	1	1	1	3	2	2	2	2	30
8	Mechanical Properties of Solids	1	2	1	1	0	0	1	2	0	2	1	0	0	1	1	0	2	15
9	Mechanical Properties of Fluids	1	1	1	2	1	2	1	1	2	2	2	2	1	2	2	1	1	25
10	Thermal Properties of Matter	0	1	0	1	2	1	1	0	2	1	1	0	0	0	0	0	0	10
11	Thermodynamics	2	1	3	1	1	0	1	1	1	1	1	1	0	1	0	1	2	18
12	Kinetic Theory	3	2	1	2	1	1	1	2	1	1	3	3	1	1	1	1	0	25
13	Oscillations	0	1	2	1	0	2	2	1	3	0	1	0	2	1	1	1	2	20
14	Waves	3	3	1	1	3	2	2	2	0	3	1	2	0	1	1	1	0	26
	<b>Total</b>	<b>19</b>	<b>21</b>	<b>22</b>	<b>24</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>22</b>	<b>22</b>	<b>17</b>	<b>15</b>	<b>17</b>	<b>19</b>	<b>19</b>	<b>18</b>	<b>20</b>	<b>335</b>

Based on the old Syllabus

PHYSICS Std. XII

Analysis of NEET (UG) Exam Papers from the year 2013 to 2023

Sr. No.	Topic Name	2013	2014	2015	2015* Re-Test	2016 (Phase I)	2016* (Phase II)	2017	2018	2019	2019* Odisha	2020 (Phase I)	2020* (Phase II)	2021	2022	2023	2023* Manipur	Total
1	Electric charges and Fields	1	1	1	1	1	1	2	0	3	2	1	2	0	1	2	2	21
2	Electrostatic potential and Capacitance	1	2	1	1	1	1	1	2	0	1	3	2	7	3	2	2	30
3	Current Electricity	3	3	3	3	2	2	2	3	2	2	4	4	4	4	5	4	50
4	Moving charges and Magnetism	2	2	2	2	2	2	2	2	3	2	1	0	4	3	2	2	33
5	Magnetism and Matter	1	1	0	0	1	1	1	1	1	1	1	1	0	1	1	1	13
6	Electromagnetic Induction	1	1	1	1	1	1	1	1	2	2	0	2	1	2	0	1	18
7	Alternating Current	1	1	1	1	2	3	1	1	0	1	2	1	3	2	4	5	29
8	Electromagnetic Waves	1	1	1	1	1	0	1	1	2	0	2	2	1	3	2	1	20
9	Ray optics and Optical instruments	2	2	2	2	3	3	2	2	3	3	1	4	4	3	3	4	43
10	Wave Optics	2	2	2	2	2	2	3	3	1	2	3	1	0	1	1	0	27
11	Dual nature of radiation and matter	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	2	31
12	Atoms	1	1	1	1	1	1	1	1	1	1	1	1	0	1	2	3	18
13	Nuclei	2	2	1	0	1	1	1	1	1	1	2	2	3	2	1	0	21
14	Semiconductor electronics: materials, devices and simple circuits	3	2	2	2	3	3	3	3	2	2	4	4	3	3	3	3	45
	Total	23	23	20	19	23	23	23	23	22	22	27	28	32	31	30	30	399

Based on the new Syllabus

PHYSICS Std. XII

Analysis of NEET (UG) Exam Papers from the year 2013 to 2024

Sr. No.	Topic Name	2013	2014	2015	2015* Re-Test	2016 (Phase I)	2016* (Phase II)	2017	2018	2019	2019* Odisha	2020 (Phase I)	2020* (Phase II)	2021	2022	2023	2023* Manipur	2024	Total
1	Electric charges and Fields	1	1	1	1	1	1	2	0	3	2	1	2	0	1	2	2	2	23
2	Electrostatic potential and Capacitance	1	2	1	1	1	1	1	2	0	1	3	1	6	3	2	2	2	30
3	Current Electricity	3	2	2	2	1	2	1	2	2	2	3	4	4	4	4	3	3	44
4	Moving charges and Magnetism	2	2	2	2	2	2	2	2	3	2	1	0	4	3	2	2	1	34
5	Magnetism and Matter	1	1	0	0	1	1	0	1	0	0	1	1	0	1	1	1	3	13
6	Electromagnetic Induction	1	1	1	1	1	1	1	0	2	2	0	2	1	2	0	1	2	19
7	Alternating Current	1	1	1	1	2	3	1	1	0	1	3	1	2	2	3	5	2	30
8	Electromagnetic Waves	1	1	1	1	1	2	1	1	3	0	1	3	2	3	2	1	2	26
9	Ray optics and Optical instruments	1	2	2	2	3	0	2	2	2	3	1	3	4	3	3	4	2	39
10	Wave Optics	2	2	2	2	2	2	2	2	1	2	2	2	0	1	1	0	2	27
11	Dual nature of radiation and matter	2	2	2	2	2	2	2	2	1	2	3	1	2	2	2	2	2	33
12	Atoms	1	1	1	1	2	1	1	1	1	1	1	1	0	1	2	3	2	21
13	Nuclei	1	1	1	0	0	0	0	0	0	0	2	0	1	1	0	0	1	8
14	Semiconductor electronics: materials, devices and simple circuits	2	2	2	1	2	2	2	2	2	2	3	3	3	3	3	2	4	40
Total		20	21	19	17	21	20	18	18	20	20	25	24	29	30	27	28	30	387



Based on the old Syllabus

**CHEMISTRY Std. XI**

**Analysis of NEET (UG) Exam Papers from the year 2013 to 2023**

Sr. No.	Topic Name	2013	2014	2015	2015* Re-Test	2016 (Phase I)	2016* (Phase II)	2017	2018	2019	2019* Odisha	2020 (Phase I)	2020* (Phase II)	2021	2022	2023	2023* Manipur	Total
1	Some Basic Concepts of Chemistry	0	3	1	3	0	1	0	2	1	0	1	1	1	1	1	0	16
2	Structure of Atom	3	3	1	1	1	2	1	1	2	2	1	1	1	2	2	2	26
3	Classification of Elements and Periodicity in Properties	0	1	1	1	1	0	0	0	1	0	1	1	1	1	1	1	11
4	Chemical Bonding and Molecular Structure	3	3	5	1	2	2	3	1	1	2	2	2	3	2	2	2	36
5	States of Matter	2	0	0	1	1	0	0	2	1	1	0	1	2	2	2	2	17
6	Thermodynamics	0	2	1	1	1	1	2	1	2	2	3	2	2	1	1	1	23
7	Equilibrium	3	3	2	3	3	3	3	3	3	3	2	2	1	2	2	2	40
8	Redox Reactions	0	0	0	0	0	1	0	1	2	1	1	1	1	0	1	1	10
9	Hydrogen	0	1	0	0	1	0	0	0	1	1	0	1	1	1	1	1	09
10	The s-Block Elements	0	0	2	1	1	2	1	3	2	2	1	2	2	2	2	2	25
11	The p-Block Elements (group 13 and 14)	4	0	0	1	0	1	2	2	2	2	2	1	0	1	2	2	22
12	Organic Chemistry - Some basic Principle and techniques	2	1	4	1	0	0	3	3	0	1	2	2	2	1	2	2	26
13	Hydrocarbons	4	0	3	3	3	6	3	1	5	2	2	2	3	1	2	1	41
14	Environmental Chemistry	0	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	11
	<b>Total</b>	<b>21</b>	<b>18</b>	<b>20</b>	<b>17</b>	<b>14</b>	<b>19</b>	<b>19</b>	<b>21</b>	<b>24</b>	<b>20</b>	<b>19</b>	<b>20</b>	<b>21</b>	<b>18</b>	<b>22</b>	<b>20</b>	<b>313</b>

Based on the new Syllabus

**CHEMISTRY Std. XI**

**Analysis of NEET (UG) Exam Papers from the year 2013 to 2024**

Sr. No.	Topic Name	2013	2014	2015	2015*	2016	2016*	2017	2018	2019	2019*	2020	2020*	2021	2022	2023	2023*	2024	Total
					Re-Test	(Phase I)	(Phase II)				Odisha	(Phase I)	(Phase II)				Manipur		
1	Some Basic Concepts of Chemistry	0	3	1	3	0	1	0	2	1	0	1	1	1	1	1	0	3	19
2	Structure of Atom	3	2	1	1	1	2	1	1	2	2	0	1	1	2	1	2	2	25
3	Classification of Elements and Periodicity in Properties	0	1	1	1	1	0	0	0	1	0	1	1	1	1	1	1	2	13
4	Chemical Bonding and Molecular Structure	3	3	5	1	2	2	3	1	1	2	2	2	3	2	2	2	2	38
5	Thermodynamics	0	2	1	1	1	1	2	1	2	2	3	2	2	1	1	1	3	26
6	Equilibrium	3	3	2	3	3	3	3	3	3	3	2	2	1	2	2	2	3	43
7	Redox Reactions	0	0	0	0	0	1	0	1	2	1	1	1	1	0	1	1	1	11
8	The p-Block Elements (group 13 and 14)	1	0	0	1	0	0	2	2	2	1	0	1	0	0	1	2	0	13
9	Organic Chemistry - Some basic Principle and techniques	2	1	4	1	0	0	3	3	0	1	2	2	2	1	2	2	3	29
10	Hydrocarbons	4	0	3	3	3	6	3	1	5	2	2	2	3	1	2	1	3	44
	<b>Total</b>	16	15	18	15	11	16	17	15	19	14	14	15	15	11	14	14	22	261

Based on the old Syllabus

CHEMISTRY Std . XII

Analysis of NEET (UG) Exam Papers from the year 2013 to 2023

Sr. No.	Topic Name	2013	2014	2015	2015* Re-Test	2016 (Phase I)	2016* (Phase II)	2017	2018	2019	2019* Odisha	2020 (Phase I)	2020* (Phase II)	2021	2022	2023	2023* Mamipur	Total
1	The Solid State	2	1	1	2	2	1	1	1	1	1	1	1	2	3	2	2	24
2	Solutions	2	1	3	2	2	2	2	0	2	3	3	2	2	1	0	2	29
3	Electrochemistry	3	3	1	1	1	5	1	1	2	2	2	2	2	3	2	2	33
4	Chemical Kinetics	2	0	2	1	2	1	2	2	2	2	2	2	2	2	2	2	28
5	Surface Chemistry	0	2	1	0	2	1	1	1	1	1	1	1	1	1	2	1	17
6	General Principles and Processes of Isolation of Elements	1	0	1	1	1	1	1	1	1	1	1	1	2	1	1	1	16
7	The p-Block Elements (group 15 to 18)	3	1	1	4	6	2	3	3	4	4	3	3	3	2	2	2	46
8	The d- and f-block elements	2	4	3	2	2	1	2	2	1	2	2	2	2	2	2	2	33
9	Coordination Compounds	2	2	3	4	1	2	3	3	1	1	1	1	2	2	2	2	32
10	Haloalkanes and Haloarenes	0	2	2	3	2	1	2	1	0	1	1	1	2	2	1	3	24
11	Alcohols, Phenols and Ethers	1	3	1	2	1	0	2	3	1	3	2	2	2	3	3	2	31
12	Aldehydes, Ketones and Carboxylic Acids	2	1	3	2	3	3	2	2	1	0	2	2	2	5	4	4	38
13	Amines	1	2	1	3	1	2	2	1	1	1	1	1	2	2	2	2	25
14	Biomolecules	0	2	0	0	3	3	1	2	1	1	2	2	1	1	1	1	21
15	Polymers	2	2	1	1	1	1	0	1	1	1	1	1	1	1	1	1	17
16	Chemistry In Everyday Life	1	1	1	0	1	0	1	0	1	1	1	1	1	1	1	1	13
<b>Total</b>		<b>24</b>	<b>27</b>	<b>25</b>	<b>28</b>	<b>31</b>	<b>26</b>	<b>26</b>	<b>24</b>	<b>21</b>	<b>25</b>	<b>26</b>	<b>25</b>	<b>29</b>	<b>32</b>	<b>28</b>	<b>30</b>	<b>427</b>

Based on the new Syllabus

CHEMISTRY Std . XII

Analysis of NEET (UG) Exam Papers from the year 2013 to 2024

Sr. No.	Topic Name	20	2014	2015	2015*	2016	2016*	2017	2018	2019	2019*	2020	2020*	2021	2022	2023	2023*	2024	Total
		I3			Re-Test	(Phase I)	(Phase II)		Odisha	(Phase I)	(Phase II)		Manipur						
1	Solutions	2	1	3	2	2	2	2	0	2	3	3	2	2	1	0	2	2	31
2	Electrochemistry	3	3	1	1	1	5	1	1	2	2	2	2	2	3	2	2	2	35
3	Chemical Kinetics	2	0	2	1	2	1	2	2	2	2	2	2	2	2	2	2	3	31
4	The p-Block Elements (group 15 to 18)	1	1	0	1	0	0	0	1	1	0	0	0	2	1	0	0	3	11
5	The d- and f-block elements	2	4	3	2	2	1	2	2	1	2	2	2	2	2	2	2	2	35
6	Coordination Compounds	2	2	3	4	1	2	3	3	1	1	1	1	2	2	2	2	4	36
7	Haloalkanes and Haloarenes	0	2	2	3	2	1	2	1	0	1	1	1	2	2	1	3	2	26
8	Alcohols, Phenols and Ethers	1	3	1	2	1	0	2	3	1	3	2	2	2	3	3	2	3	34
9	Aldehydes, Ketones and Carboxylic Acids	2	1	3	2	3	3	2	2	1	0	2	2	2	5	4	4	1	39
10	Amines	1	2	1	3	1	2	2	1	1	1	1	1	2	2	2	2	2	27
11	Biomolecules	0	2	0	0	3	3	1	2	1	1	2	2	1	1	1	1	1	22
12	Principles Related to Practical Chemistry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	03
<b>Total</b>		16	21	19	21	18	20	19	18	13	16	18	17	21	24	19	22	28	330

## Based on the old Syllabus

### BIOLOGY Std. XI

## Analysis of NEET (UG) Exam Papers from the year 2013 to 2023

Sr. No.	Topic Name	2013	2014	2015	2015* Re-Test	2016 (Phase I)	2016* (Phase II)	2017	2018	2019	2019* Odisha	2020 (Phase I)	2020* (Phase II)	2021	2022	2023	2023* Manipur	Total
1	The Living World	1	0	0	0	1	3	1	1	1	2	0	0	1	1	0	2	14
2	Biological Classification	1	6	2	7	5	3	3	5	2	3	1	1	1	2	0	0	42
3	Plant Kingdom	4	4	4	0	2	2	5	2	1	0	3	3	5	3	3	3	44
4	Animal Kingdom	4	4	4	3	4	1	3	3	2	2	4	4	4	3	3	2	50
5	Morphology of Flowering Plants	3	4	4	5	5	5	5	3	1	3	3	4	2	4	3	3	57
6	Anatomy of Flowering Plants	3	2	3	1	1	2	3	4	3	2	2	2	3	3	3	3	40
7	Structural organisation in Animals	1	2	1	2	2	2	1	1	2	1	3	3	4	4	5	4	38
8	Cell: The Unit of Life	4	5	6	6	3	3	2	4	4	4	2	4	4	2	3	2	58
9	Biomolecules	4	2	1	2	2	3	2	1	3	3	4	1	4	2	4	4	42
10	Cell Cycle and Cell Division	2	3	2	1	3	3	3	1	2	2	4	4	5	4	6	5	50
11	Transport in Plants	1	0	3	2	1	1	2	0	3	3	1	1	1	3	2	4	28
12	Mineral Nutrition	2	1	2	2	1	1	0	2	1	1	2	2	2	2	2	1	24
13	Photosynthesis in Higher Plants	0	1	0	2	4	2	2	3	0	2	2	2	3	3	3	3	32
14	Respiration in Plants	2	1	1	0	0	2	1	2	3	1	1	1	0	2	2	2	21
15	Plant Growth and Development	1	3	2	1	1	1	1	0	2	2	3	4	3	3	3	3	33
16	Digestion and Absorption	1	2	2	2	2	0	3	2	2	2	2	2	2	2	2	1	29
17	Breathing and Exchange of Gases	1	1	1	1	3	2	1	3	2	2	2	2	2	2	1	1	27
18	Body Fluids and Circulation	2	2	3	3	2	2	3	2	2	2	2	2	2	3	2	2	36
19	Excretory Products and Their Elimination	0	1	2	1	0	1	2	2	2	2	2	2	0	1	2	2	22
20	Locomotion and Movement	3	2	2	2	1	2	2	2	1	2	1	1	3	2	2	1	29
21	Neural Control and Coordination	2	2	2	2	1	1	3	3	2	2	1	1	0	1	2	2	27
22	Chemical Coordination and Integration	4	2	2	2	4	4	3	1	2	4	2	2	1	1	2	2	38
	<b>Total</b>	46	50	49	47	48	46	51	47	43	47	47	48	52	53	55	52	781

## Based on the new Syllabus

### BIOLOGY Std. XI

## Analysis of NEET (UG) Exam Papers from the year 2013 to 2024

Sr. No.	Topic Name	2013	2014	2015	2015* Re-Test	2016 (Phase I)	2016* (Phase II)	2017	2018	2019	2019* Odisha	2020 (Phase I)	2020* (Phase II)	2021	2022	2023	2023* Manipur	2024	Total
1	The Living World	0	0	0	0	1	2	1	0	1	1	0	0	1	1	0	2	0	10
2	Biological Classification	1	6	2	7	5	3	3	5	2	3	1	1	1	2	0	0	2	44
3	Plant Kingdom	4	4	4	0	2	2	4	2	1	0	3	3	5	3	3	3	1	44
4	Animal Kingdom	4	4	4	3	4	1	3	3	2	2	4	4	4	3	2	2	4	53
5	Morphology of Flowering Plants	2	4	3	5	4	4	5	3	1	2	3	3	1	4	2	2	4	52
6	Anatomy of Flowering Plants	3	2	3	1	1	2	3	4	3	2	2	2	3	3	3	3	3	43
7	Structural organisation in Animals	0	2	0	2	1	1	1	0	1	0	2	1	3	3	3	2	3	25
8	Cell: The Unit of Life	4	5	6	6	3	3	2	4	4	4	2	4	4	2	3	2	4	62
9	Biomolecules	4	2	1	2	2	3	2	1	3	3	4	1	4	2	4	4	6	48
10	Cell Cycle and Cell Division	2	3	2	1	3	3	3	1	2	2	4	4	5	4	6	5	4	54
11	Photosynthesis in Higher Plants	0	1	0	2	4	2	2	2	0	2	2	2	3	3	3	3	3	34
12	Respiration in Plants	2	1	1	0	0	2	1	2	3	1	1	1	0	2	2	2	2	23
13	Plant Growth and Development	1	3	2	1	1	1	1	0	1	2	2	3	2	3	3	3	3	32
14	Breathing and Exchange of Gases	1	1	1	1	3	2	1	3	2	2	2	2	2	2	1	1	2	29
15	Body Fluids and Circulation	2	2	3	3	2	2	3	2	2	2	2	2	2	3	2	2	2	38
16	Excretory Products and Their Elimination	0	1	2	1	0	1	2	2	2	2	2	2	0	1	2	2	2	24
17	Locomotion and Movement	3	2	2	2	1	2	2	2	1	2	1	1	3	2	2	1	3	32
18	Neural Control and Coordination	1	1	0	1	0	0	2	2	1	0	0	0	0	1	1	1	2	13
19	Chemical Coordination and Integration	4	2	2	2	4	4	3	1	2	4	2	2	1	1	2	2	2	40
<b>Total</b>		<b>38</b>	<b>46</b>	<b>38</b>	<b>40</b>	<b>41</b>	<b>40</b>	<b>44</b>	<b>39</b>	<b>34</b>	<b>36</b>	<b>39</b>	<b>38</b>	<b>44</b>	<b>45</b>	<b>44</b>	<b>42</b>	<b>52</b>	<b>700</b>

## Based on the old Syllabus

### BIOLOGY Std. XII

## Analysis of NEET (UG) Exam Papers from the year 2013 to 2023

Sr. No.	Topic Name	2013	2014	2015	2015* Re-Test	2016 (Phase I)	2016* (Phase II)	2017	2018	2019	2019* Odisha	2020 (Phase I)	2020* (Phase II)	2021	2022	2023	2023* Manipur	Total
1	Reproduction in Organisms	3	0	0	1	0	2	0	2	1	1	0	1	0	0	0	0	11
2	Sexual Reproduction in Flowering Plants	4	5	4	5	5	3	4	4	3	3	3	1	3	3	3	3	56
3	Human Reproduction	3	3	4	4	2	3	1	4	2	2	3	3	3	3	3	2	45
4	Reproductive Health	3	3	2	1	2	3	3	1	3	2	2	2	3	2	3	4	39
5	Principles of Inheritance and Variation	5	3	7	6	6	3	5	3	6	4	4	3	2	6	5	5	73
6	Molecular Basis of Inheritance	2	4	2	4	4	5	6	7	5	6	4	5	8	7	8	9	86
7	Evolution	5	3	2	2	3	4	1	3	4	3	4	4	2	2	1	1	44
8	Human Health and Diseases	2	2	3	3	3	2	2	3	4	2	3	2	1	2	3	3	40
9	Strategies for Enhancement in Food Production	1	1	2	2	1	2	1	0	1	2	1	1	4	1	1	1	22
10	Microbes in Human Welfare	2	1	1	1	1	1	3	1	5	3	2	3	1	1	0	1	27
11	Biotechnology Principles and Processes	3	3	0	2	3	4	5	1	3	5	6	4	6	5	4	5	59
12	Biotechnology and its Application	1	2	3	2	2	1	0	4	2	3	3	3	6	3	2	2	39
13	Organisms and Populations	2	1	1	2	3	4	2	4	0	2	2	2	5	3	4	5	42
14	Ecosystem	3	3	5	3	3	0	2	1	1	0	2	3	3	3	2	2	36
15	Biodiversity and Conservation	2	4	2	1	1	4	3	1	3	2	2	3	0	3	2	2	35
16	Environmental Issues	3	2	3	4	3	3	1	4	4	3	2	2	1	3	4	3	45
<b>Total</b>		<b>44</b>	<b>40</b>	<b>41</b>	<b>43</b>	<b>42</b>	<b>44</b>	<b>39</b>	<b>43</b>	<b>47</b>	<b>43</b>	<b>43</b>	<b>42</b>	<b>48</b>	<b>47</b>	<b>45</b>	<b>48</b>	<b>699</b>

Based on the new Syllabus

**BIOLOGY Std. XII**

**Analysis of NEET (UG) Exam Papers from the year 2013 to 2024**

Sr. No.	Topic Name	2013	2014	2015	2015* Re-Test	2016 (Phase I)	2016* (Phase II)	2017	2018	2019	2019* Odisha	2020 (Phase I)	2020* (Phase II)	2021	2022	2023	2023* Manipur	2024	Total
1	Sexual Reproduction in Flowering Plants	4	5	4	5	5	2	4	4	3	3	3	1	3	3	3	3	3	58
2	Human Reproduction	3	3	4	4	2	3	1	4	2	2	3	3	3	3	3	2	4	49
3	Reproductive Health	3	3	2	1	2	3	3	1	3	2	2	2	3	2	3	4	2	41
4	Principles of Inheritance and Variation	5	3	7	6	6	3	5	3	6	4	4	3	2	6	5	5	6	79
5	Molecular Basis of Inheritance	2	4	2	4	4	5	6	7	5	6	4	5	8	7	8	9	6	92
6	Evolution	5	3	2	2	3	4	1	3	4	3	4	4	2	2	1	1	4	48
7	Human Health and Diseases	2	2	3	3	3	2	2	3	4	2	3	2	1	2	3	3	5	45
8	Microbes in Human Welfare	2	1	1	1	1	1	3	1	5	3	2	3	1	1	0	0	1	27
9	Biotechnology Principles and Processes	3	3	0	2	3	4	5	1	3	5	6	4	6	5	4	5	5	64
10	Biotechnology and its Application	1	2	3	2	2	1	0	3	2	3	3	3	6	3	2	2	4	42
11	Organisms and Populations	1	1	1	2	2	4	2	4	0	2	2	2	5	3	4	3	2	40
12	Ecosystem	2	2	4	1	2	0	2	1	1	0	1	2	2	3	2	0	1	26
13	Biodiversity and Conservation	2	4	2	1	1	4	3	1	3	2	2	3	0	3	2	2	5	40
	<b>Total</b>	<b>35</b>	<b>36</b>	<b>35</b>	<b>34</b>	<b>36</b>	<b>36</b>	<b>37</b>	<b>36</b>	<b>41</b>	<b>37</b>	<b>39</b>	<b>37</b>	<b>42</b>	<b>43</b>	<b>40</b>	<b>39</b>	<b>48</b>	<b>651</b>



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**Note:** The symbol \* represents the Questions which are excluded from the latest syllabus issued by NMC on 6th October, 2023. The purpose of providing these questions is to display various question types and their level of difficulty that have been asked in previous examinations.

The symbol \* is not present in NEET (UG) - 2024 question paper as the paper is based on the latest syllabus.

Page no. **1** to 436 are purposely left blank.

To see complete chapter buy **Target Notes** or **Target E-Notes**



## NEET (UG) - 2024

Time: 3 Hours 20 Minutes

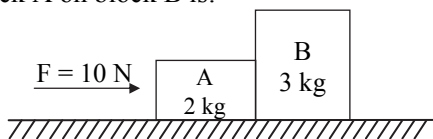
Total Marks: 720

## Section – A (Physics)

1. A bob is whirled in a horizontal plane by means of a string with an initial speed of  $\omega$  rpm. The tension in the string is  $T$ . If speed becomes  $2\omega$  while keeping the same radius, the tension in the string becomes:

- (1)  $\frac{T}{4}$  (2)  $\sqrt{2} T$   
 (3)  $T$  (4)  $4T$

2. A horizontal force 10 N is applied to a block A as shown in figure. The mass of blocks A and B are 2 kg and 3 kg, respectively. The blocks slide over a frictionless surface. The force exerted by block A on block B is:

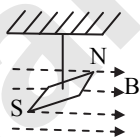


- (1) 6 N (2) 10 N  
 (3) zero (4) 4 N

3. The maximum elongation of a steel wire of 1 m length if the elastic limit of steel and its Young's modulus, respectively, are  $8 \times 10^8 \text{ N m}^{-2}$  and  $2 \times 10^{11} \text{ N m}^{-2}$  is:

- (1) 40 mm (2) 8 mm  
 (3) 4 mm (4) 0.4 mm

4. In a uniform magnetic field of 0.049 T, a magnetic needle performs 20 complete oscillations in 5 seconds as shown. The moment of inertia of the needle is  $9.8 \times 10^{-6} \text{ kg m}^2$ . If the magnitude of magnetic moment of the needle is  $x \times 10^{-5} \text{ Am}^2$ ; then the value of 'x' is:



- (1)  $50 \pi^2$  (2)  $1280 \pi^2$   
 (3)  $5 \pi^2$  (4)  $128 \pi^2$

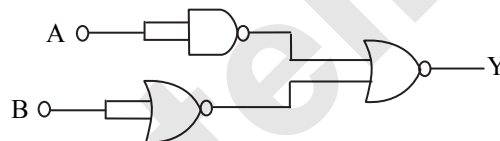
5. If  $c$  is the velocity of light in free space, the correct statements about photon among the following are:

- I. The energy of a photon is  $E = hv$ .  
 II. The velocity of a photon is  $c$ .  
 III. The momentum of a photon,  $p = \frac{hv}{c}$   
 IV. In a photon-electron collision, both total energy and total momentum are conserved.  
 V. Photon possesses positive charge.

Choose the correct answer from the options given, below:

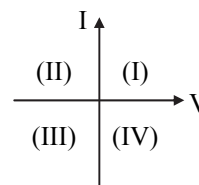
- (1) I, III and IV only  
 (2) I, II, IV and V only  
 (3) I and II only  
 (4) I, II, III and IV only

6. The output (Y) of the given logic gate is similar to the output of an/a:



- (1) OR gate (2) AND gate  
 (3) NAND gate (4) NOR gate

7. Consider the following statements A and B and identify the correct answer:

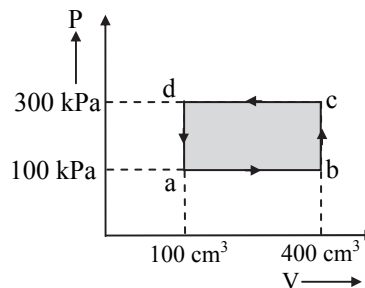


- P. For a solar-cell, the I-V characteristics lies in the IV quadrant of the given graph.

- Q. In a reverse biased pn junction diode, the current measured in ( $\mu\text{A}$ ), is due to majority charge carriers.

- (1) Both P and Q are correct.  
 (2) Both P and Q are incorrect.  
 (3) P is correct but Q is incorrect.  
 (4) P is incorrect but Q is correct.

8. A thermodynamic system is taken through the cycle abcda. The work done by the gas along the path bc is:



- (1) -90 J (2) -60 J  
 (3) zero (4) 30 J



9. A thin flat circular disc of radius 4.5 cm is placed gently over the surface of water. If surface tension of water is  $0.07 \text{ Nm}^{-1}$ , then the excess force required to take it away from the surface is:

- (1) 1.98 mN (2) 99 N  
(3) 19.8 mN (4) 198 N

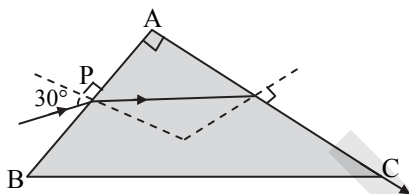
10. At any instant of time  $t$ , the displacement of any particle is given by  $2t - 1$  (SI unit) under the influence of force of 5N. The value of instantaneous power is (in SI unit):

- (1) 7 (2) 6  
(3) 10 (4) 5

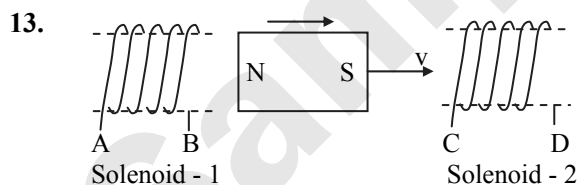
11.  ${}_{82}^{290}\text{X} \xrightarrow{\alpha} \text{Y} \xrightarrow{\text{e}^+} \text{Z} \xrightarrow{\beta^-} \text{P} \xrightarrow{\text{e}^-} \text{Q}$   
In the nuclear emission stated above, the mass number and atomic number of the product Q respectively, are:

- (1) 288, 82 (2) 286, 81  
(3) 280, 81 (4) 286, 80

12. A light ray enters through a right angled prism at point P with the angle of incidence  $30^\circ$  as shown in figure. It travels through the prism parallel to its base BC and emerges along the face AC. The refractive index of the prism is:



- (1)  $\frac{\sqrt{3}}{4}$  (2)  $\frac{\sqrt{3}}{2}$   
(3)  $\frac{\sqrt{5}}{4}$  (4)  $\frac{\sqrt{5}}{2}$



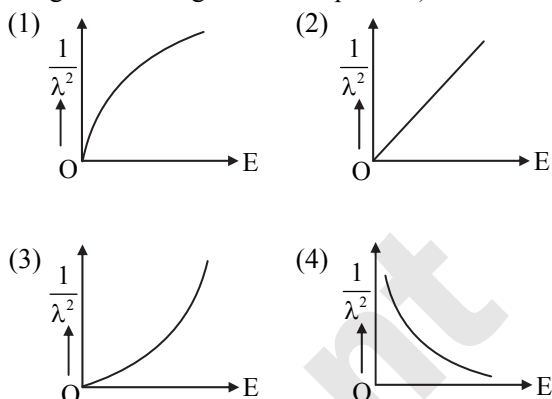
In the above diagram, a strong bar magnet is moving towards solenoid-2 from solenoid-1. The direction of induced current in solenoid-1 and that in solenoid-2, respectively, are through the directions:

- (1) AB and CD (2) BA and DC  
(3) AB and DC (4) BA and CD

14. In an ideal transformer, the turns ratio is  $\frac{N_P}{N_S} = \frac{1}{2}$ . The ratio  $V_S : V_P$  is equal to (the symbols carry their usual meaning):

- (1) 1 : 1 (2) 1 : 4  
(3) 1 : 2 (4) 2 : 1

15. The graph which shows the variation of  $\left(\frac{1}{\lambda^2}\right)$  and its kinetic energy,  $E$  is (where  $\lambda$  is de Broglie wavelength of a free particle):



16. If the monochromatic source in Young's double slit experiment is replaced by white light, then

- (1) there will be a central bright white fringe surrounded by a few coloured fringes.  
(2) all bright fringes will be of equal width.  
(3) interference pattern will disappear.  
(4) there will be central dark fringe surrounded by a few coloured fringes.

17. Given below are two statements: one is labelled as **Assertion A** and the other is labelled as **Reason R**.

**Assertion A:** The potential ( $V$ ) at any axial point, at 2 m distance ( $r$ ) from the centre of the dipole of dipole moment vector  $\vec{P}$  of magnitude,  $4 \times 10^{-6} \text{ C m}$ , is  $\pm 9 \times 10^3 \text{ V}$ .

(Take  $\frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ SI units}$ )

**Reason R:**  $V = \pm \frac{2P}{4\pi\epsilon_0 r^2}$ , where  $r$  is the distance of any axial point, situated at 2 m from the centre of the dipole.

In the light of the above statements, choose the correct answer from the options given below:

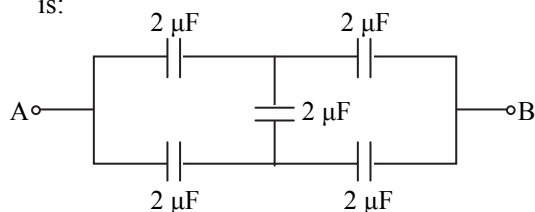
- (1) A is true but R is false.  
(2) A is false but R is true.  
(3) Both A and R are true and R is the correct explanation of A.  
(4) Both A and R are true and R is NOT the correct explanation of A.

18. Two bodies A and B of same mass undergo completely inelastic one dimensional collision. The body A moves with velocity  $v_1$  while body B is at rest before collision. The velocity of the system after collision is  $v_2$ . The ratio  $v_1 : v_2$  is:

- (1) 4 : 1 (2) 1 : 4  
(3) 1 : 2 (4) 2 : 1



19. In the following circuit, the equivalent capacitance between terminal A and terminal B is:



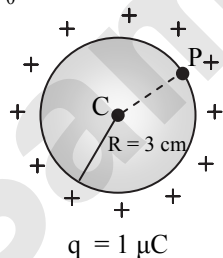
- (1)  $0.5 \mu\text{F}$                       (2)  $4 \mu\text{F}$   
 (3)  $2 \mu\text{F}$                          (4)  $1 \mu\text{F}$
20. The quantities which have the same dimensions as those of solid angle are:
- (1) strain and arc  
 (2) angular speed and stress  
 (3) strain and angle  
 (4) stress and angle
21. A logic circuit provides the output Y as per the following truth table:

A	B	Y
0	0	1
0	1	0
1	0	1
1	1	0

The expression for the output Y is:

- (1)  $\bar{B}$   
 (2) B  
 (3)  $A \cdot B + \bar{A}$   
 (4)  $A \cdot \bar{B} + \bar{A}$
22. A thin spherical shell is charged by some source, The potential difference between the two points C and P (in V) shown in the figure is:

(Take  $\frac{1}{4\pi\epsilon_0} = 9 \times 10^9$  SI units)



- (1)  $0.5 \times 10^5$                       (2) zero  
 (3)  $3 \times 10^5$                          (4)  $1 \times 10^5$
23. Given below are two statements:
- Statement I:** Atoms are electrically neutral as they contain equal number of positive and negative charges.
- Statement II:** Atoms of each element are stable and emit their characteristic spectrum.
- In the light of the above statements, choose the most appropriate answer from the options given below:

- (1) Statement I is correct but Statement II is incorrect.  
 (2) Statement I is incorrect but Statement II is correct.  
 (3) Both Statement I and Statement II are correct.  
 (4) Both Statement I and Statement II are incorrect.

24. Match List I with List II.

List – I (Spectral Lines of Hydrogen for transitions from)		List – II (Wavelengths (nm))	
i.	$n_2 = 3$ to $n_1 = 2$	a.	410.2
ii.	$n_2 = 4$ to $n_1 = 2$	b.	434.1
iii.	$n_2 = 5$ to $n_1 = 2$	c.	656.3
iv.	$n_2 = 6$ to $n_1 = 2$	d.	486.1

Choose the correct answer from the options given below:

- (1) i – d, ii – c, iii – a, iv – b  
 (2) i – a, ii – b, iii – c, iv – d  
 (3) i – b, ii – a, iii – d, iv – c  
 (4) i – c, ii – d, iii – b, iv – a
25. If  $x = 5\sin\left(\pi t + \frac{\pi}{3}\right)$  m represents the motion of a particle executing simple harmonic motion, the amplitude and time period of motion, respectively, are:
- (1) 5 cm, 1 s                      (2) 5 m, 1 s  
 (3) 5 cm, 2 s                      (4) 5 m, 2 s

26. Match List-I with List-II.

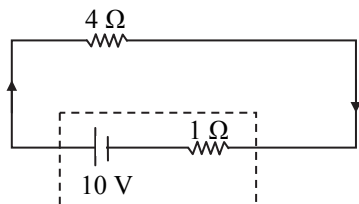
List – I (Material)		List – II (Susceptibility ( $\chi$ ))	
i.	Diamagnetic	a.	$\chi = 0$
ii.	Ferromagnetic	b.	$0 > \chi > -1$
iii.	Paramagnetic	c.	$\chi \gg 1$
iv.	Non-magnetic	d.	$0 < \chi < \epsilon$ (a small positive number)

Choose the correct answer from the options given below:

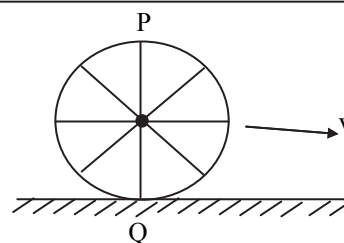
- (1) i – c, ii – b, iii – a, iv – d  
 (2) i – d, ii – c, iii – b, iv – a  
 (3) i – b, ii – c, iii – d, iv – a  
 (4) i – b, ii – a, iii – c, iv – d
27. A wire of length 'l' and resistance  $100 \Omega$  is divided into 10 equal parts. The first 5 parts are connected in series while the next 5 parts are connected in parallel. The two combinations are again connected in series. The resistance of this final combination is:
- (1)  $55 \Omega$                               (2)  $60 \Omega$   
 (3)  $26 \Omega$                               (4)  $52 \Omega$



28. The terminal voltage of the battery, whose emf is 10 V and internal resistance  $1 \Omega$ , when connected through an external resistance of  $4 \Omega$  as shown in the figure is:



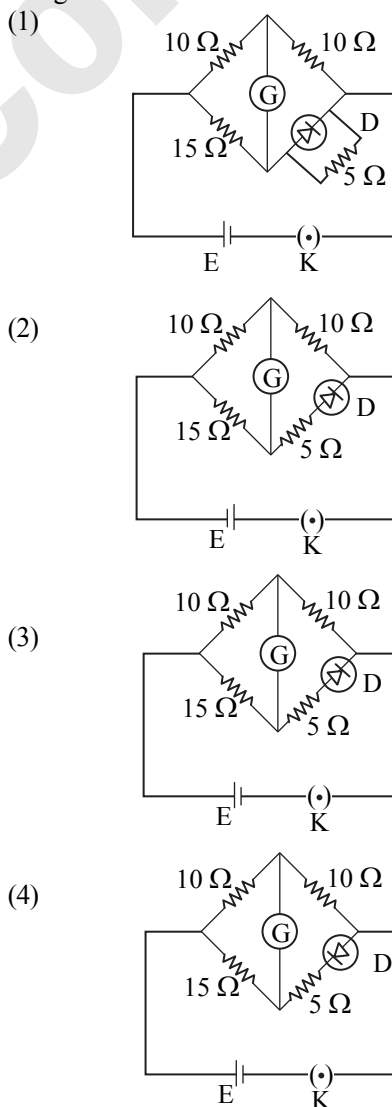
- (1) 8 V                      (2) 10 V  
(3) 4 V                      (4) 6 V
29. A particle moving with uniform speed in a circular path maintains:
- (1) constant velocity but varying acceleration.  
(2) varying velocity and varying acceleration.  
(3) constant velocity.  
(4) constant acceleration.
30. A tightly wound 100 turns coil of radius 10 cm carries a current of 7 A. The magnitude of the magnetic field at the centre of the coil is (Take permeability of free space as  $4\pi \times 10^{-7}$  SI units):
- (1) 4.4 mT                      (2) 44 T  
(3) 44 mT                      (4) 4.4 T
31. In a vernier calipers,  $(N + 1)$  divisions of vernier scale coincide with  $N$  divisions of main scale. If 1 MSD represents 0.1 mm, the vernier constant (in cm) is:
- (1)  $100N$                       (2)  $10(N + 1)$   
(3)  $\frac{1}{10N}$                       (4)  $\frac{1}{100(N+1)}$
32. An unpolarised light beam strikes a glass surface at Brewster's angle. Then
- (1) both the reflected and refracted light will be completely polarised.  
(2) the reflected light will be completely polarised but the refracted light will be partially polarised.  
(3) the reflected light will be partially polarised.  
(4) the refracted light will be completely polarised.
33. The mass of a planet is  $\frac{1}{10}$  th that of the earth and its diameter is half that of the earth. The acceleration due to gravity on that planet is :
- (1)  $4.9 \text{ m s}^{-2}$                       (2)  $3.92 \text{ m s}^{-2}$   
(3)  $19.6 \text{ m s}^{-2}$                       (4)  $9.8 \text{ m s}^{-2}$
34. A wheel of a bullock cart is rolling on a level road as shown in the figure below. If its linear speed is  $v$  in the direction shown, which one of the following options is correct (P and Q are any highest and lowest points on the wheel, respectively)?



- (1) Both the points P and Q move with equal speed  
(2) Point P has zero speed.  
(3) Point P moves slower than point Q.  
(4) Point P moves faster than point Q.
35. The moment of inertia of a thin rod about an axis passing through its mid point and perpendicular to the rod is  $2400 \text{ g cm}^2$ . The length of the 400 g rod is nearly:
- (1) 20.7 cm                      (2) 72.0 cm  
(3) 8.5 cm                      (4) 17.5 cm

**Section – B (Physics)**

36. Choose the correct circuit which can achieve the bridge balance.

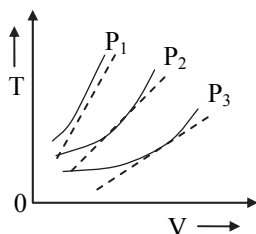




37. A parallel plate capacitor is charged by connecting it to a battery through a resistor. If  $I$  is the current in the circuit, then in the gap between the plates:

- (1) displacement current of magnitude equal to  $I$  flows in a direction opposite to that of  $I$ .
- (2) displacement current of magnitude greater than  $I$  flows but can be in any direction.
- (3) there is no current.
- (4) displacement current of magnitude equal to  $I$  flows in the same direction as  $I$ .

38. The following graph represents the T-V curves of an ideal gas (where  $T$  is the temperature and  $V$  the volume) at three pressures  $P_1$ ,  $P_2$  and  $P_3$  compared with those of Charles' law represented as dotted lines.



Then the correct relation is:

- (1)  $P_2 > P_1 > P_3$
- (2)  $P_1 > P_2 > P_3$
- (3)  $P_3 > P_2 > P_1$
- (4)  $P_1 > P_3 > P_2$

39. If the mass of the bob in a simple pendulum is increased to thrice its original mass and its length is made half its original length, then the new time period of oscillation is  $\frac{x}{2}$  times its original time period. Then the value of  $x$  is:

- (1)  $2\sqrt{3}$
- (2) 4
- (3)  $\sqrt{3}$
- (4)  $\sqrt{2}$

40. Two heaters A and B have power rating of 1 kW and 2 kW, respectively. Those two are first connected in series and then in parallel to a fixed power source. The ratio of power outputs for these two cases is:

- (1) 1 : 2
- (2) 2 : 3
- (3) 1 : 1
- (4) 2 : 9

41. If the plates of a parallel plate capacitor connected to a battery are moved close to each other, then

- I. the charge stored in it, increases.
- II. the energy stored in it, decreases.
- III. its capacitance increases.
- IV. the ratio of charge to its potential remains the same.
- V. the product of charge and voltage increases.

Choose the most appropriate answer from the options given below:

- (1) II, IV and V only
- (2) I, II and III only
- (3) I, II and V only
- (4) I, III and V only

42. A small telescope has an objective of focal length 140 cm and an eye piece of focal length 5.0 cm. The magnifying power of telescope for viewing a distant object is:

- (1) 17
- (2) 32
- (3) 34
- (4) 28

43. A sheet is placed on a horizontal surface in front of a strong magnetic pole. A force is needed to :

- I. hold the sheet there if it is magnetic.
- II. hold the sheet there if it is non-magnetic.
- III. move the sheet away from the pole with uniform velocity if it is conducting.
- IV. move the sheet away from the pole with uniform velocity if it is both, non-conducting and non-polar.

Choose the correct statement(s) from the options given below:

- (1) I, III and IV only
- (2) III only
- (3) II and IV only
- (4) I and III only

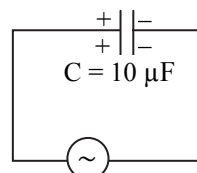
44. A metallic bar of Young's modulus,  $0.5 \times 10^{11} \text{ Nm}^{-2}$  and coefficient of linear thermal expansion  $10^{-5} \text{ }^\circ\text{C}^{-1}$ , length 1 m and area of cross-section  $10^{-3} \text{ m}^2$  is heated from  $0^\circ\text{C}$  to  $100^\circ\text{C}$  without expansion or bending. The compressive force developed in it is:

- (1)  $100 \times 10^3 \text{ N}$
- (2)  $2 \times 10^3 \text{ N}$
- (3)  $5 \times 10^3 \text{ N}$
- (4)  $50 \times 10^3 \text{ N}$

45. The minimum energy required to launch a satellite of mass  $m$  from the surface of earth of mass  $M$  and radius  $R$  in a circular orbit at an altitude of  $2R$  from the surface of the earth is:

- (1)  $\frac{GmM}{2R}$
- (2)  $\frac{GmM}{3R}$
- (3)  $\frac{5 GmM}{6R}$
- (4)  $\frac{2 GmM}{3R}$

46. A  $10 \mu\text{F}$  capacitor is connected to a 210 V, 50 Hz source as shown in figure. The peak current in the circuit is nearly ( $\pi = 3.14$ ):



210 V, 50 Hz

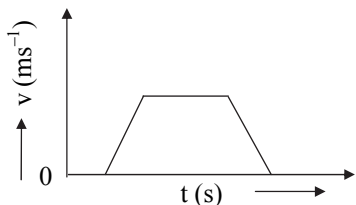
- (1) 1.20 A
- (2) 0.35 A
- (3) 0.58 A
- (4) 0.93 A



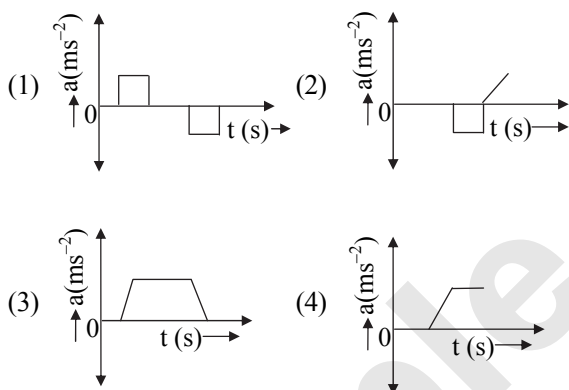
47. An iron bar of length  $L$  has magnetic moment  $M$ . It is bent at the middle of its length such that the two arms make an angle  $60^\circ$  with each other. The magnetic moment of this new magnet is:

- (1)  $2M$                       (2)  $\frac{M}{\sqrt{3}}$   
 (3)  $M$                         (4)  $\frac{M}{2}$

48. The velocity ( $v$ ) - time ( $t$ ) plot of the motion of a body is shown below:



The acceleration ( $a$ ) - time ( $t$ ) graph that best suits this motion is:



49. The property which is not of an electromagnetic wave travelling in free space is that:

- (1) they travel with a speed equal to  $\frac{1}{\sqrt{\mu_0 \epsilon_0}}$   
 (2) they originate from charges moving with uniform speed.  
 (3) they are transverse in nature.  
 (4) the energy density in electric field is equal to energy density in magnetic field.

50. A force defined by  $F = \alpha t^2 + \beta t$  acts on a particle at a given time  $t$ . The factor which is dimensionless, if  $\alpha$  and  $\beta$  are constants, is:

- (1)  $\alpha\beta t$                       (2)  $\frac{\alpha\beta}{t}$   
 (3)  $\frac{\beta t}{\alpha}$                         (4)  $\frac{\alpha t}{\beta}$

### Section - A (Chemistry)

51. In which of the following processes entropy increases?

- I. A liquid evaporates to vapour.  
 II. Temperature of a crystalline solid lowered from 130 K to 0 K.  
 III.  $2\text{NaHCO}_3(\text{s}) \longrightarrow \text{Na}_2\text{CO}_3(\text{s}) + \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{g})$   
 IV.  $\text{Cl}_2(\text{g}) \longrightarrow 2\text{Cl}(\text{g})$

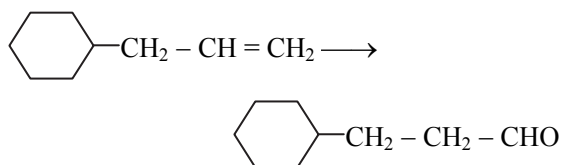
Choose the correct answer from the options given below:

- (1) I, III and IV              (2) III and IV  
 (3) I and III                    (4) I, II and IV

52. On heating, some solid substances change from solid to vapour state without passing through liquid state. The technique used for the purification of such solid substances based on the above principle is known as

- (1) Distillation  
 (2) Chromatography  
 (3) Crystallization  
 (4) Sublimation

53. Identify the correct reagents that would bring about the following transformation.



- (1) i.  $\text{BH}_3$   
 ii.  $\text{H}_2\text{O}_2/\text{OH}^-$   
 iii. alk.  $\text{KMnO}_4$   
 iv.  $\text{H}_3\text{O}^+$   
 (2) i.  $\text{H}_2\text{O}/\text{H}^+$   
 ii. PCC  
 (3) i.  $\text{H}_2\text{O}/\text{H}^+$   
 ii.  $\text{CrO}_3$   
 (4) i.  $\text{BH}_3$   
 ii.  $\text{H}_2\text{O}_2/\text{OH}^-$   
 iii. PCC

54. The energy of an electron in the ground state ( $n = 1$ ) for  $\text{He}^+$  ion is  $-x$  J, then that for an electron in  $n = 2$  state for  $\text{Be}^{3+}$  ion in J is:

- (1)  $-4x$                       (2)  $-\frac{4}{9}x$   
 (3)  $-x$                         (4)  $-\frac{x}{9}$





55. Match List I with List II.

List I (Molecule)		List II (Number and types of bond/s between two carbon atoms)	
i.	Ethane	a.	One $\sigma$ -bond and two $\pi$ -bonds
ii.	Ethene	b.	Two $\pi$ -bonds
iii.	Carbon molecule, $C_2$	c.	One $\sigma$ -bonds
iv.	Ethyne	d.	One $\sigma$ -bond and one $\pi$ -bond

Choose the correct answer from the options given below:

- (1) i - c, ii - d, iii - b, iv - a
- (2) i - c, ii - d, iii - a, iv - b
- (3) i - a, ii - d, iii - b, iv - c
- (4) i - d, ii - c, iii - b, iv - a

56. For the reaction  $2A \rightleftharpoons B + C$ ,  $K_c = 4 \times 10^{-3}$ . At a given time, the composition of reaction mixture is:  $[A] = [B] = [C] = 2 \times 10^{-3}$  M. Then, which of the following is correct?

- (1) Reaction has a tendency to go in backward direction.
- (2) Reaction has gone to completion in forward direction.
- (3) Reaction is at equilibrium.
- (4) Reaction has a tendency to go in forward direction.

57. The  $E^\circ$  value for the  $Mn^{3+}/Mn^{2+}$  couple is more positive than that of  $Cr^{3+}/Cr^{2+}$  or  $Fe^{3+}/Fe^{2+}$  due to change of

- (1)  $d^4$  to  $d^5$  configuration
- (2)  $d^3$  to  $d^5$  configuration
- (3)  $d^5$  to  $d^4$  configuration
- (4)  $d^5$  to  $d^2$  configuration

58. Given below are two statements:

**Statement I:** The boiling point of hydrides of Group 16 elements follow the order  $H_2O > H_2Te > H_2Se > H_2S$

**Statement II:** On the basis of molecular mass,  $H_2O$  is expected to have lower boiling point than the other members of the group but due to the presence of extensive H-bonding in  $H_2O$ , it has higher boiling point.

In the light of the above statements, choose the correct answer from the options given below:

- (1) Statement I is true but Statement II is false.
- (2) Statement I is false but Statement II is true.
- (3) Both Statement I and Statement II are true.
- (4) Both Statement and Statement II are false.

59. Match List I with List II.

List I (Process)		List II (Conditions)	
i.	Isothermal process	a.	No heat exchange
ii.	Isochoric process	b.	Carried out at constant temperature
iii.	Isobaric process	c.	Carried out at constant volume
iv.	Adiabatic process	d.	Carried out at constant pressure

Choose the correct answer from the options given below:

- (1) i - a, ii - b, iii - c, iv - d
- (2) i - b, ii - c, iii - d, iv - a
- (3) i - d, ii - c, iii - b, iv - a
- (4) i - d, ii - b, iii - c, iv - a

60. 1 gram of sodium hydroxide was treated with 25 mL of 0.75 M HCl solution, the mass of sodium hydroxide left unreacted is equal to

- (1) Zero mg
- (2) 200 mg
- (3) 750 mg
- (4) 250 mg

61. Match List I with List II.

List I (Complex)		List II (Type of isomerism)	
i.	$[Co(NH_3)_5(NO_2)]Cl_2$	a.	Solvate isomerism
ii.	$[Co(NH_3)_5(SO_4)]Br$	b.	Linkage isomerism
iii.	$[Co(NH_3)_6][Cr(CN)_6]$	c.	Ionization isomerism
iv.	$[Co(H_2O)_6]Cl_3$	d.	Coordination isomerism

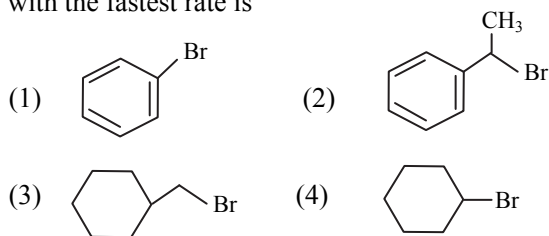
Choose the correct answer from the options given below:

- (1) i-a, ii-d, iii-c, iv-b
- (2) i-b, ii-d, iii-c, iv-a
- (3) i-b, ii-c, iii-d, iv-a
- (4) i-a, ii-c, iii-d, iv-b

62. Among Group 16 elements, which one does NOT show -2 oxidation state?

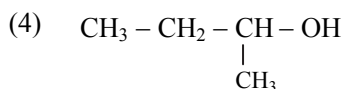
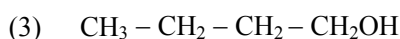
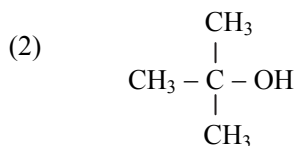
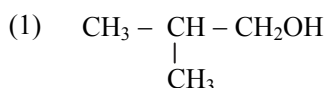
- (1) Te
- (2) Po
- (3) O
- (4) Se

63. The compound that will undergo  $S_N1$  reaction with the fastest rate is





64. Which one of the following alcohols reacts instantaneously with Lucas reagent?



65. Match List I with List II.

List I (Conversion)		List II (Number of Faraday required)	
i.	1 mol of $\text{H}_2\text{O}$ to $\text{O}_2$	a.	3F
ii.	1 mol of $\text{MnO}_4^-$ to $\text{Mn}^{2+}$	b.	2F
iii.	1.5 mol of Ca from molten $\text{CaCl}_2$	c.	1F
iv.	1 mol of $\text{FeO}$ to $\text{Fe}_2\text{O}_3$	d.	5F

Choose the correct answer from the options given below:

- (1) i-b, ii-c, iii-a, iv-d  
 (2) i-c, ii-d, iii-b, iv-a  
 (3) i-b, ii-d, iii-a, iv-c  
 (4) i-c, ii-d, iii-a, iv-b

66. The highest number of helium atoms is in

- (1) 4 g of helium  
 (2) 2.271098 L of helium at STP  
 (3) 4 mol of helium  
 (4) 4 u of helium

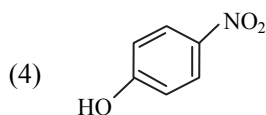
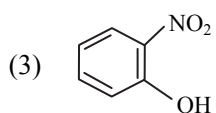
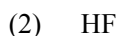
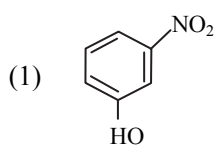
67. 'Spin only' magnetic moment is same for which of the following ions?

- i.  $\text{Ti}^{3+}$                       ii.  $\text{Cr}^{2+}$   
 iii.  $\text{Mn}^{2+}$                     iv.  $\text{Fe}^{2+}$   
 v.  $\text{Sc}^{3+}$

Choose the most appropriate answer from the options given below:

- (1) ii and iii only            (2) i and iv only  
 (3) ii and iv only            (4) i and v only

68. Intramolecular hydrogen bonding is present in



69. Fehling's solution 'A' is

- (1) alkaline solution of sodium potassium tartrate (Rochelle's salt)  
 (2) aqueous sodium citrate  
 (3) aqueous copper sulphate  
 (4) alkaline copper sulphate

70. Match List I with List II.

List I		List II	
Quantum Number		Information provided	
i.	$m_l$	a.	Shape of orbital
ii.	$m_s$	b.	Size of orbital
iii.	$l$	c.	Orientation of orbital
iv.	$n$	d.	Orientation of spin of electron

Choose the correct answer from the options given below:

- (1) i-c, ii-d, iii-b, iv-a  
 (2) i-b, ii-a, iii-d, iv-c  
 (3) i-a, ii-c, iii-b, iv-d  
 (4) i-c, ii-d, iii-a, iv-b

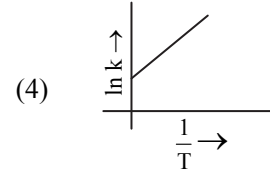
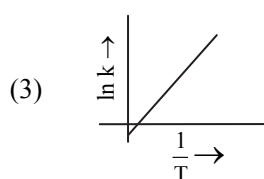
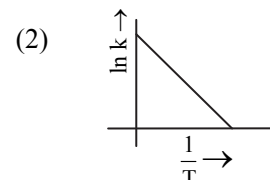
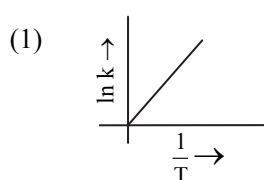
71. Arrange the following elements in increasing order of first ionization enthalpy:

Li, Be, B, C, N

Choose the correct answer from the options given below:

- (1)  $\text{Li} < \text{Be} < \text{C} < \text{B} < \text{N}$   
 (2)  $\text{Li} < \text{Be} < \text{N} < \text{B} < \text{C}$   
 (3)  $\text{Li} < \text{Be} < \text{B} < \text{C} < \text{N}$   
 (4)  $\text{Li} < \text{B} < \text{Be} < \text{C} < \text{N}$

72. Which plot of  $\ln k$  vs  $\frac{1}{T}$  is consistent with Arrhenius equation?



73. Arrange the following elements in increasing order of electronegativity:

N, O, F, C, Si

Choose the correct answer from the options given below:

- (1)  $\text{O} < \text{F} < \text{N} < \text{C} < \text{Si}$   
 (2)  $\text{F} < \text{O} < \text{N} < \text{C} < \text{Si}$   
 (3)  $\text{Si} < \text{C} < \text{N} < \text{O} < \text{F}$   
 (4)  $\text{Si} < \text{C} < \text{O} < \text{N} < \text{F}$



74. Match List I with List II.

List I (Reaction)		List II (Reagents/Condition)	
i.		a.	
ii.		b.	CrO <sub>3</sub>
iii.		c.	KMnO <sub>4</sub> /KOH, Δ
iv.		d.	(i) O <sub>3</sub> (ii) Zn/H <sub>2</sub> O

Choose the correct answer from the options given below:

- (1) i-d, ii-a, iii-b, iv-c
- (2) i-a, ii-d, iii-b, iv-c
- (3) i-d, ii-a, iii-c, iv-b
- (4) i-c, ii-a, iii-b, iv-d

75. Given below are two statements:

**Statement I:** Aniline does not undergo Friedel-Crafts alkylation reaction.

**Statement II:** Aniline cannot be prepared through Gabriel synthesis.

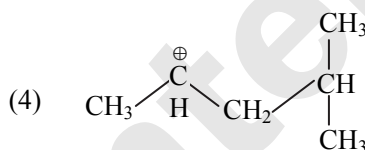
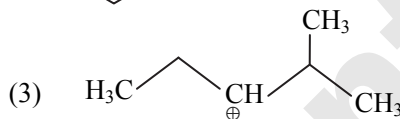
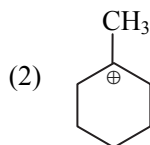
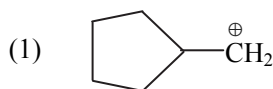
In the light of the above statements, choose the correct answer from the options given below:

- (1) Statement I is correct but Statement II is false.
- (2) Statement I is incorrect but Statement II is true.
- (3) Both Statement I and Statement II are true.
- (4) Both Statement I and Statement II are false.

76. In which of the following equilibria,  $K_p$  and  $K_c$  are **NOT** equal?

- (1)  $\text{CO}_{(g)} + \text{H}_2\text{O}_{(g)} \rightleftharpoons \text{CO}_{2(g)} + \text{H}_{2(g)}$
- (2)  $2\text{BrCl}_{(g)} \rightleftharpoons \text{Br}_{2(g)} + \text{Cl}_{2(g)}$
- (3)  $\text{PCl}_{5(g)} \rightleftharpoons \text{PCl}_{3(g)} + \text{Cl}_{2(g)}$
- (4)  $\text{H}_{2(g)} + \text{I}_{2(g)} \rightleftharpoons 2\text{HI}_{(g)}$

77. The most stable carbocation among the following is:



78. The reagents with which glucose does not react to give the corresponding tests/products are

- i. Tollen's reagent
- ii. Schiff's reagent
- iii. HCN
- iv. NH<sub>2</sub>OH
- v. NaHSO<sub>3</sub>

Choose the correct options from the given below:

- (1) ii and v
- (2) v and iv
- (3) ii and iii
- (4) i and iv

79. Given below are two statements

**Statement I:** Both  $[\text{Co}(\text{NH}_3)_6]^{3+}$  and  $[\text{CoF}_6]^{3-}$  complexes are octahedral but differ in magnetic behaviour.

**Statement II:**  $[\text{Co}(\text{NH}_3)_6]^{3+}$  is diamagnetic whereas  $[\text{CoF}_6]^{3-}$  is paramagnetic.

In the light of the above statements, choose *correct* answer from the options given below:

- (1) Statement I is true but Statement II is false.
- (2) Statement I is false but Statement II is true
- (3) Both Statement I and Statement II are true.
- (4) Both Statement I and Statement II are false.

80. Activation energy of any chemical reaction be calculated if one knows the value of

- (1) orientation of reactant molecules during collision
- (2) rate constant at two different temperatures
- (3) rate constant at standard temperature
- (4) probability of collision



81. A compound with a molecular formula of  $C_6H_{14}$  has two tertiary carbons. Its IUPAC name is

- (1) 2,3-dimethylbutane
- (2) 2,2-dimethylbutane
- (3) n-hexane
- (4) 2-methylpentane

82.

List I (Compound)		List II (Shape/Geometry)	
i.	$NH_3$	a.	Trigonal pyramidal
ii.	$BrF_5$	b.	Square planar
iii.	$XeF_4$	c.	Octahedral
iv.	$SF_6$	d.	Square pyramidal

Choose the correct answer from the options given below:

- (1) i - c, ii - d, iii - a, iv - b
- (2) i - b, ii - c, iii - d, iv - a
- (3) i - a, ii - d, iii - b, iv - c
- (4) i - b, ii - d, iii - c, iv - a

83. The Henry's law constant ( $K_H$ ) values of three gases (A, B, C) in water are 145,  $2 \times 10^{-5}$  and 35 kbar, respectively. The solubility of these gases in water follows the order:

- (1)  $A > C > B$
- (2)  $A > B > C$
- (3)  $B > A > C$
- (4)  $B > C > A$

84. Which reaction is **NOT** a redox reaction?

- (1)  $H_2 + Cl_2 \longrightarrow 2HCl$
- (2)  $BaCl_2 + Na_2SO_4 \longrightarrow BaSO_4 + 2NaCl$
- (3)  $Zn + CuSO_4 \longrightarrow ZnSO_4 + Cu$
- (4)  $2KClO_3 + I_2 \longrightarrow 2KIO_3 + Cl_2$

85. **Statement I:** The boiling point of three isomeric pentanes follows the order n-pentane > isopentane > neopentane

**Statement II:** When branching increases, the molecule attains a shape of sphere. This results in smaller surface area for contact, due to which the intermolecular forces between the spherical molecules are weak, thereby lowering the boiling point

In the light of the above statements, choose the most appropriate answer from the options given

- (1) Statement I is correct but Statement II is incorrect.
- (2) Statement I is incorrect but Statement II is correct.
- (3) Both Statement I and Statement II are correct.
- (4) Both Statement I and Statement II are incorrect.

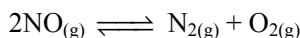
### Section – B (Chemistry)

86. The rate of a reaction quadruples when temperature changes from  $27^\circ C$  to  $57^\circ C$ . Calculate the energy of activation.

Given:  $R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$ ,  $\log 4 = 0.6021$

- (1) 3.80 kJ/mol
- (2) 3804 kJ/mol
- (3) 38.04 kJ/mol
- (4) 380.4 kJ/mol

87. Consider the following reaction in a sealed vessel at equilibrium with concentrations of  $N_2 = 3.0 \times 10^{-3} \text{ M}$ ,  $O_2 = 4.2 \times 10^{-3} \text{ M}$  and  $NO = 2.8 \times 10^{-3} \text{ M}$ .



If  $0.1 \text{ mol L}^{-1}$  of  $NO(g)$  is taken in a closed vessel, what will be degree of dissociation ( $\alpha$ ) of  $NO(g)$  at equilibrium?

- (1) 0.8889
- (2) 0.717
- (3) 0.00889
- (4) 0.0889

88. During the preparation of Mohr's salt solution (ferrous ammonium sulphate), which of the following acid is added to prevent hydrolysis  $Fe^{2+}$  ion?

- (1) dilute nitric acid
- (2) dilute sulphuric acid
- (3) dilute hydrochloric acid
- (4) concentrated sulphuric acid

89. A compound X contains 32% of A, 20% of B and remaining percentage of C. Then, the empirical formula of X is:

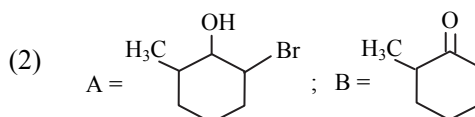
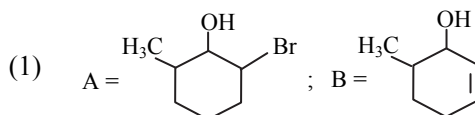
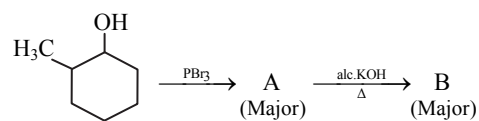
(Given atomic masses of  $A = 64$ ;  $B = 40$ ,  $C = 32 \text{ u}$ )

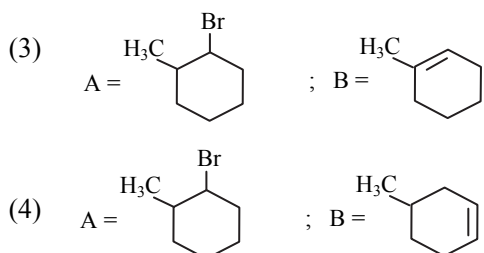
- (1)  $AB_2C_2$
- (2)  $ABC_4$
- (3)  $A_2BC_2$
- (4)  $ABC_3$

90. The pair of lanthanoid ions which are diamagnetic is

- (1)  $Gd^{3+}$  and  $Eu^{3+}$
- (2)  $Pm^{3+}$  and  $Sm^{3+}$
- (3)  $Ce^{4+}$  and  $Yb^{2+}$
- (4)  $Ce^{3+}$  and  $Eu^{2+}$

91. Major products A and B formed in the following reaction sequence are





92. The plot of osmotic pressure ( $\pi$ ) vs concentration ( $\text{mol L}^{-1}$ ) for a solution gives a straight line with slope  $25.73 \text{ L bar mol}^{-1}$ . The temperature at which the osmotic pressure measurement is done is:

(Use  $R = 0.083 \text{ L bar mol}^{-1} \text{ K}^{-1}$ )

- (1)  $25.73 \text{ }^\circ\text{C}$                       (2)  $12.05 \text{ }^\circ\text{C}$   
(3)  $37 \text{ }^\circ\text{C}$                               (4)  $310 \text{ }^\circ\text{C}$

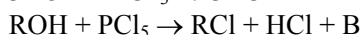
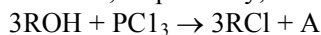
93. Given below are certain cations. Using inorganic qualitative analysis arrange them in increasing group number from 0 to VI.

- i.  $\text{Al}^{3+}$                                       ii.  $\text{Cu}^{2+}$   
iii.  $\text{Ba}^{2+}$                                     iv.  $\text{Co}^{2+}$   
v.  $\text{Mg}^{2+}$

Choose the correct answer from the options given below:

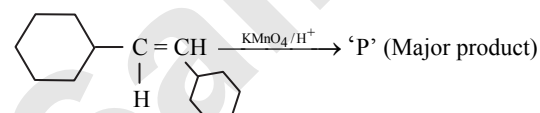
- (1) v, iii, iv, ii, i  
(2) v, i, ii, iii, iv  
(3) ii, i, iv, iii, v  
(4) ii, iii, i, iv, v

94. The products A and B obtained in the following reactions, respectively, are

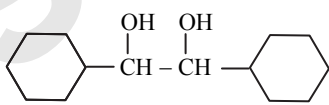
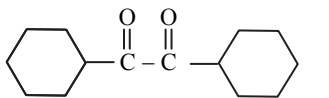




- (1)  $\text{H}_3\text{PO}_4$  and  $\text{POCl}_3$   
(2)  $\text{H}_3\text{PO}_3$  and  $\text{POCl}_3$   
(3)  $\text{POCl}_3$  and  $\text{H}_3\text{PO}_3$   
(4)  $\text{POCl}_3$  and  $\text{H}_3\text{PO}_4$

95. For the given reaction:



'P' is

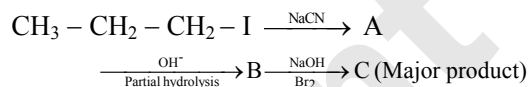
- (1) 
- (2) 
- (3) 
- (4) 

96. The work done during reversible isothermal expansion of one mole of hydrogen gas at  $25 \text{ }^\circ\text{C}$  from pressure of 20 atmospheres to 10 atm is:

(Given  $R = 2.0 \text{ cal K}^{-1} \text{ mol}^{-1}$ )

- (1) 413.14 calories  
(2) 100 calories  
(3) 0 calorie  
(4)  $-413.25$  calories

97. Identify the major product C formed following reaction sequence:



- (1) butanamide  
(2)  $\alpha$ -bromobutanoic acid  
(3) propylamine  
(4) butylamine

98. Identify the correct answer.

- (1) Dipole moment of  $\text{NF}_3$  is greater than that of  $\text{NH}_3$ .  
(2) Three canonical forms can be drawn for  $\text{CO}_3^{2-}$  ion.  
(3) Three resonance structures can be drawn for ozone.  
(4)  $\text{BF}_3$  has nonzero dipole moment.

99. Mass in grams of copper deposited by passing 9.6487 A current through a voltmeter containing copper sulphate solution for 100 seconds is:

(Given: Molar mass of Cu:  $63 \text{ g mol}^{-1}$ ,  $1 \text{ F} = 96487 \text{ C}$ )

- (1) 31.5 g  
(2) 0.0315 g  
(3) 3.15 g  
(4) 0.315 g

100. Given below are two statements:

**Statement I:**  $[\text{Co}(\text{NH}_3)_6]^{3+}$  is a homoleptic complex whereas  $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$  is a heteroleptic complex.

**Statement II:** Complex  $[\text{Co}(\text{NH}_3)_6]^{3+}$  has only one kind of ligands but  $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$  has more than one kind of ligands.

In the light of the above statements, choose the correct answer from the options given below:

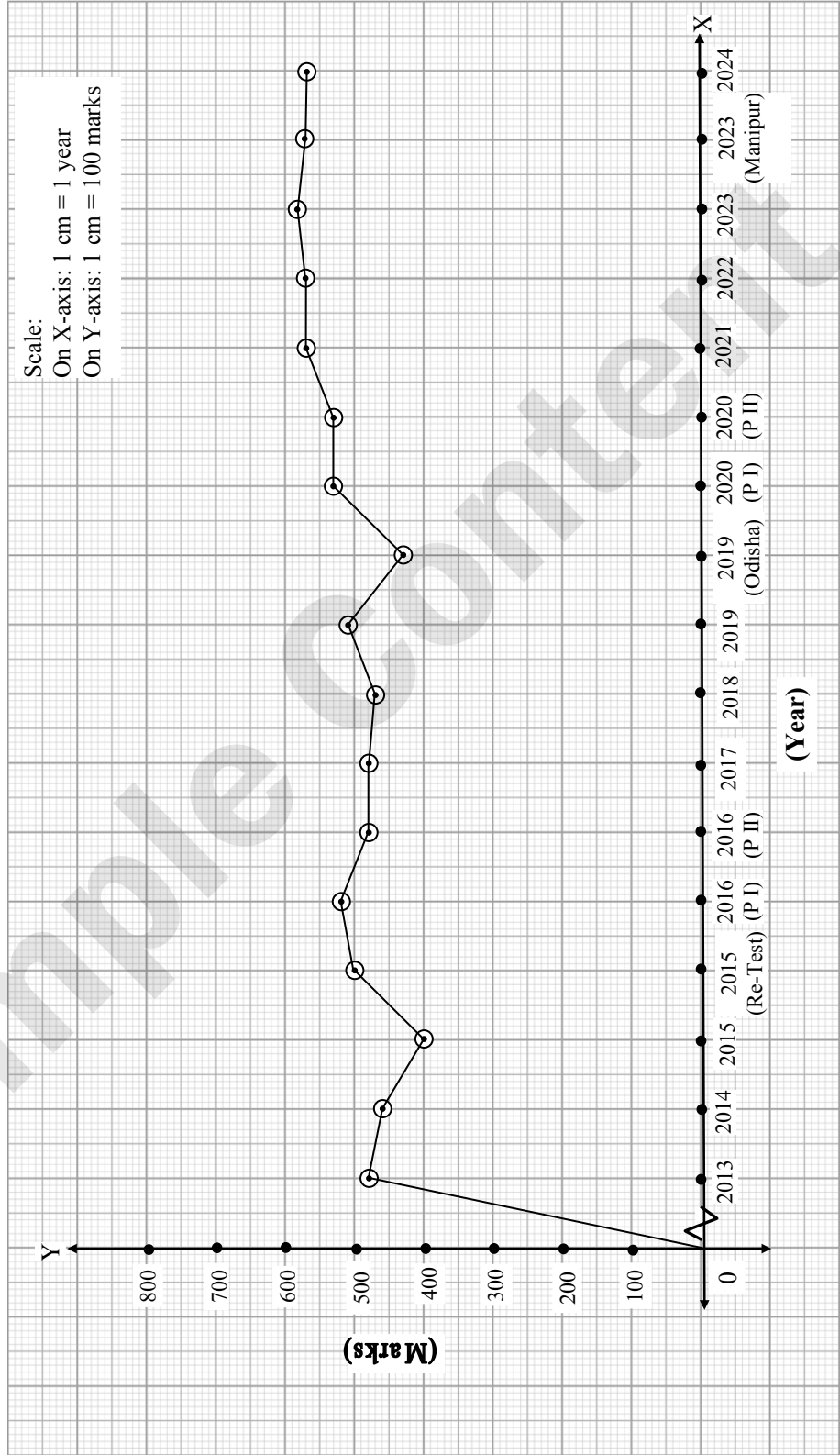
- (1) Statement I is true but Statement II is false.  
(2) Statement I is false but Statement II is true.  
(3) Both Statement I and Statement II are true.  
(4) Both Statement I and Statement II are false.



### Self Assessment Score Card (Sample)

Demo of how to plot the marks on graph paper provided on the next page and assess your performance.

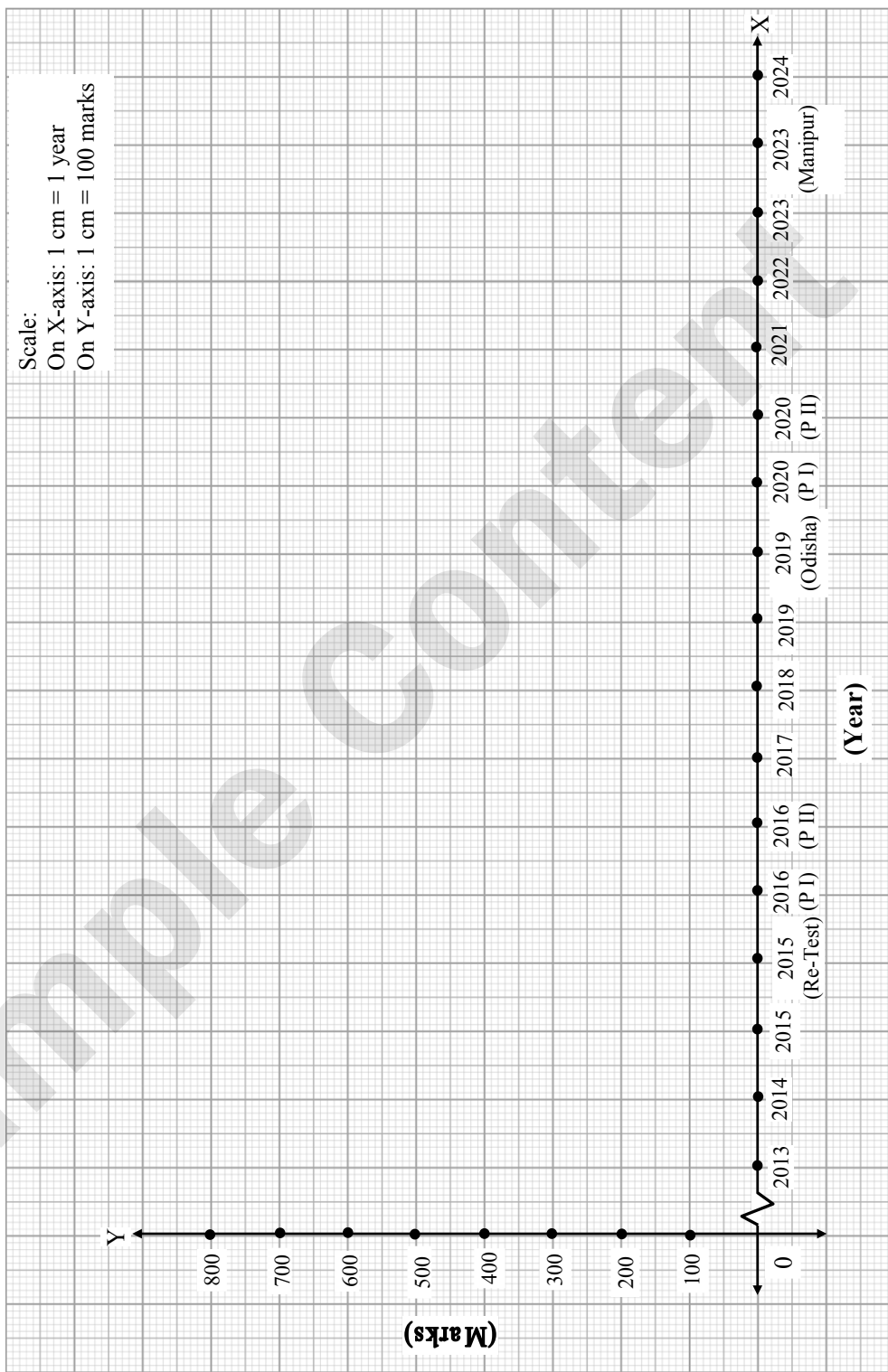
X axis (Year)	2013	2014	2015	2015 (Re-Test)	2016 (P I)	2016 (P II)	2017	2018	2019	2019 (Odisha) (P I)	2020 (P II)	2021	2022	2023	2023 (Manipur)	2024
Y axis (Marks)	480	460	400	500	520	480	482	469	511	431	525	528	570	580	568	564





**Self Assessment Score Card**

X axis (Year)	2013	2014	2015	2015 (Re-Test)	2016 (P I)	2016 (P II)	2017	2018	2019	2019 (Odisha) (P I)	2020 (P II)	2021	2022	2023	2023 (Manipur)	2024
Y axis (Marks)																



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To see complete chapter buy **Target Notes** or **Target E-Notes**



## अनुदेश / Instructions

- इस उत्तर पत्र में दो प्रतियाँ हैं। मूल प्रति और इसके नीचे कार्यालय प्रति। सूचना / उत्तर भरते समय उन्हें अलग करने या हटाने की कोशिश न करें।  
This answer sheet consists of two copies, the Original copy and the Office copy. Do not attempt to separate or displace them while recording information/ answers.
- केवल नीले / काले बाल पेन से सही गोले को गहरे निशान से भरिए।  
Use Only Blue/Black Ball Point Pen to darken the appropriate circle.
- कृपया पूरे गोले को गहरे निशान से भरिए।  
Please darken the complete circle.
- प्रत्येक प्रश्न का उत्तर केवल एक ही पूरे गोले में गहरा निशान लगाकर दीजिए जैसा नीचे दिखाया गया है।  
Darken ONLY ONE CIRCLE for each Question as shown below:  

गलत Incorrect
● 2 3 ●

गलत Incorrect
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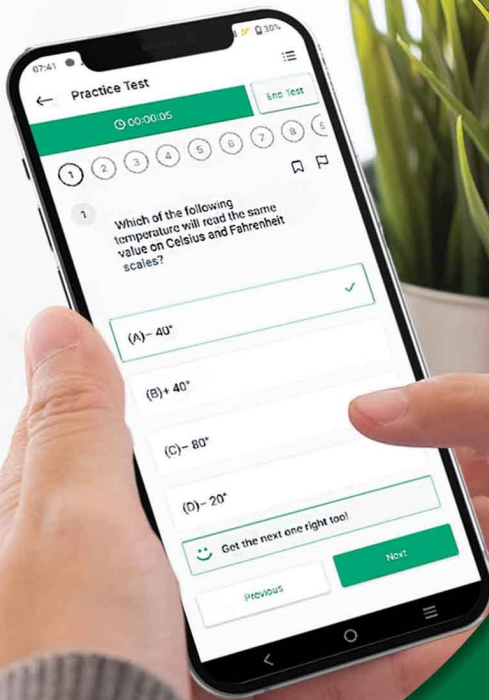
गलत Incorrect
● 2 3 4

सही correct
① ② ③ ●
- एक बार गोले में निशान लगाने के पश्चात कोई परिवर्तन अनुमत्य नहीं है।  
Answer once marked cannot be changed.
- उत्तर पत्रिका पर अन्य कहीं कोई निशान न लगाइए। गलत निशान/ कोई निशान ओ.एम.आर. स्कैनर के द्वारा पढ़ा जा सकता है।  
Please do not make any stray marks on the Answer Sheet. Incorrect Marks/ Stray marks may be read by the OMR scanner.
- इस उत्तर पत्रिका पर कच्चा काम करना मना है।  
Rough work must not be done on the Answer Sheet.
- प्रत्येक प्रश्न का उत्तर, उत्तर-पत्रिका में दिए गए क्रमांक के सामने संगत गोले में निशान लगाकर दीजिए।  
Mark your answer in the appropriate space in the Answer Sheet against the Number corresponding to the question.
- उम्मीदवार को परीक्षा समाप्ति पर ओ.एम.आर. प्रतिक्रिया पत्र की मूल या कार्यालय प्रति अपने साथ ले जाने की अनुमति नहीं है।  
The Candidate is NOT allowed to carry the Original or Office copy of OMR response sheet with him/her on conclusion of the examination.

### EXAMPLES - HOW TO FILL AND MARK ON ORIGINAL COPY ( WITH BLUE/BLACK BALL POINT PEN ONLY)

If your Roll No. 2423753143 Roll No.	If your Test Booklet No. 57 62537 Test Booklet	If your Response to Question No. 0221s (1)																																																																																																																																																																																											
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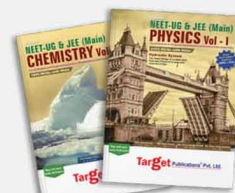
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