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CLASS VII

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Publisher's Note

Sometimes the understanding of fundamental concepts alone does not help the students to crack the competitive exams as most of them are objective in structure. Students need rigorous training to familiarize themselves to the style of the exams they are attempting. The board exams which are of qualifying, but not competitive, nature do not completely address the needs of students in testing them in objective type format.

To bridge this gap and to enable the students to face the reality of competitive exams, Brain Mapping Academy, brought out an all-objective questions reference book.

A crisp summary of the topics and useful equations were provided at the beginning of each chapter so that the students can memorize the important points.

Care has been taken to design thought-provoking questions. These should help students to attain a deeper understanding of principles. The questions have been reviewed to fill the gaps in problem coverage and to build the confidence in the students. They have also been expanded to impart reasoning/logical/analytical skills.

This book will cater all the requirements of the students who are approaching national/state level talent search examinations and all Olympiad exams. This book also complements the additional preparation needs of the students for the regular board exams.

We took utmost care to make this the best resource book available for the Talent & Olympiad exams aspirants. We welcome criticism from the students, teacher community and educators, especially concerning any errors and deficiencies which may have remained in this edition and the suggestions for improvement for the next edition.

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For Your Information

nstse
Test • Assess • Achieve

NATIONAL LEVEL SCIENCE TALENT SEARCH EXAMINATION

Aim of this examination

The focus on fundamentals is so important that without a firm understanding of them, a child cannot be expected to face the reality of the competitive world once he/she finishes the formal education. Even while opting for higher studies the student has to go through a complete scan of what he/she knows. Exams like IIT-JEE, AIEEE, AIIMS, AFMC, CAT, SAT, GRE, GMAT, etc. are so designed to test the fundamental strength of a student. Hence the need of the hour is building the fundamental base as strong as possible.

A successful life emerges out from healthy and sound competition. Competition is the only way for the students to shake lethargy. It's the only way to get introduced for manly worthiness. Firm standards in education and competition are the tonic for a promising and talented future.

This exactly is the philosophy behind the Unified Council's NSTSE.

Organisation

National Science Talent Search Examination is conducted by Unified Council. Unified Council is India's first ISO 9001 certified organisation in the educational testing and assessment. Since its inception, Unified Council has put together the best brains in an endeavour to make the younger generation fundamentally stronger and nourish their brains for a bright and enterprising future.

Eligibility: Students of classes 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 & 12 are eligible to participate in this examination.

Medium & Syllabus: This exam is conducted in only English medium and is suitable for all the students following CBSE/ICSE/State Board Syllabi.

Examination Pattern

There will be a separate question paper for each class. All questions are objective-type multiple choice with no negative marking for wrong answers.

Duration: 90 minutes

Date : Conducted every year on the last Sunday of January.

Test Centres : Spread across the country.

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DIVISION OF MARKS

FOR CLASS I		
Mathematics	:	25 marks
General Science	:	15 Marks
FOR CLASS II		
Mathematics	:	25 marks
General Science	:	25 Marks
FOR CLASS III		
Mathematics	:	40 marks
General Science	:	35 Marks
FOR CLASSES IV & V		
Mathematics	:	45 marks
General Science	:	45 Marks
General Questions	:	10 marks

FOR CLASSES VI TO X		
Mathematics	:	25 marks
Physics	:	25 marks
Chemistry	:	20 marks
Biology	:	20 marks
General Questions	:	10 marks
FOR CLASS XI & XII(PCM)		
Mathematics	:	40 marks
Physics	:	25 marks
Chemistry	:	25 marks
General Questions	:	10 marks
FOR CLASS XI & XII(PCB)		
Biology	:	40 marks
Physics	:	25 marks
Chemistry	:	25 marks
General Questions	:	10 marks

Infrastructure

*The Council makes use of ultra-modern equipment such as **Optical Mark Recognition (OMR)** equipment to evaluate the answer papers to proficiently assess student's performance. The examination procedure is **completely computerised.***

Unique Service from Unified Council

Unique analysis reports like Student's Performance Report for students, General School Report & Individual School Report for schools provided. These reports are very much helpful for students & schools to analyse their strengths and weaknesses.

General School Report (GSR) analyses the performance of students participating in the exam (subject-wise and class-wise). The report, in graphical format will have Ogive and Histogram Graphs, which are useful to schools that wish to improve their students' performance by benchmarking the areas of weaknesses and building upon them.

Individual School Report (ISR) analyses the performance of a particular school when compared to the rest of the students participating in this examination (subject-wise, class-wise and question-wise). This report acts as a tool for the schools to improve their students' performance in the future by benchmarking the areas of weaknesses and building upon them.

Awards & Scholarships

Top 100 members in each class will be awarded with Awards & Medals etc.

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CHAPTER 1

CHEMISTRY

Physical and Chemical Changes

Synopsis

- Most of the changes occurring around us can be classified into physical and chemical changes.
- Properties like the shape, size, colour and the state of a substance are called physical properties.
- A change in the physical properties of a substance is called a physical change.
- Physical changes are usually reversible and no new substances are formed.
- A change in which one or more new substances are formed is called a chemical change.
- Chemical changes take place because of chemical reactions.
- Exchange of heat, light, sound, smell or colour can be observed in chemical changes.
- Chemical changes are irreversible.
- The process of coating iron with a layer of zinc to protect it from rusting is called galvanization.
- The formation of large crystals of pure substances from their solutions is called crystallization. It is a physical change.
- Differences between physical and chemical changes:

Physical Changes	Chemical Changes
1. Change is temporary 2. It can be reversed.	1. Change is permanent. 2. It cannot be reversed by simple chemical or physical means.
3. No new substances are formed. Only physical properties of the substances change.	3. New substances with different chemical properties are formed
4. No energy change takes place	4. Energy changes take place.

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Multiple Choice Questions

A B C D

1 What kind of change does a glowing electric bulb undergo?

(A) Physical change
(B) Chemical change
(C) Irreversible change
(D) Undesirable change

2 Identify the change undergone by burning of wood.

(A) Reversible change
(B) Physical change
(C) Chemical change
(D) All of the above

3 Which of the following is NOT a chemical change?

(A) Digestion of food
(B) Precipitation of rain and snow
(C) Rusting of iron
(D) Burning of paper

4 Why is the rusting of iron grouped under a chemical change?

(A) It changes its colour.
(B) It becomes powdery.
(C) A new substance is formed.
(D) It changes its shape.

5 Study the reaction given below.

Copper sulphate (soln.) + Iron → Iron sulphate (soln.) + Copper

What kind of a change takes place in the given reaction?

(A) Chemical change
(B) Physical change
(C) Biochemical
(D) Both (A) and (B)

6 What kind of change is undergone when wheat flour is made into a chapati?

(A) Physical change.
(B) Reversible, chemical change.
(C) Irreversible, chemical change.
(D) Change of state.

7 Which of the following is a chemical change?

(A) Food gives out a foul smell
(B) Pollution of air caused due to explosion of fireworks
(C) Change of colour in a cut apple, if left outside
(D) All of the above

8 Some pieces of chalk are mixed with water. In this change, how many new substances is/are formed?

(A) 1
(B) 2
(C) 3
(D) No new substance is formed.

9 Pooja took a candle in a vessel and heated the vessel. Even though the candle did not burn, it changed its shape and state. What kind of change is this?

(A) Neutralisation
(B) Physical change
(C) Chemical change
(D) Irreversible change

10 What kind of change does sodium chloride undergo when it is added to water?

(A) Physical change
(B) Chemical change
(C) Chemical reaction
(D) Temporary change

11 Match the entries in Column-I with those in Column-II.

	Column I		Column II
a.	Burning of wood	1	Physical change
b.	Formation of day and night	2	Slow change
c.	Curdling of milk	3	Periodic change
d.	Melting of ice	4	Chemical change

(A) a-2, b-3, c-4, d-1
(B) a-4, b-3, c-2, d-1
(C) a-4, b-3, c-1, d-2
(D) a-3, b-4, c-2, d-1

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26 Which of the following is a chemical change?

(A) Explosion of crackers
(B) Magnetisation of iron
(C) Charging of a battery
(D) Both (B) and (C)

27 When an iron bar of length 12 cm is magnetised, its length was found to have increased. What happens to its mass?

(A) It increases.
(B) It decreases.
(C) It remains the same.
(D) It cannot be explained.

28 Which of the following will be *true* of 'ash' that is obtained by burning wood in air?

(A) Some properties of ash will not be similar to wood.
(B) The properties of ash will be similar to wood.
(C) The properties of ash will be different from both wood and air.
(D) The properties of ash will be similar to both wood and air.

29 Which of the following is a physical change?

(A) The rusting of iron nails
(B) The burning of diesel
(C) Breaking of a glass bottle
(D) The heating of iron with sulphur

30 Which of the following changes caused by heating a substance is irreversible?

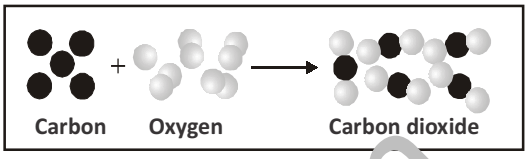
(A) Change in size
(B) Change in state
(C) Change in colour
(D) Change in substance

Previous Contest Questions

1 What change is observed when a piece of magnesium wire is burnt ?

(A) Physical change
(B) Chemical change
(C) Nuclear change
(D) Both (A) and (B)

2 Observe the following figures.



Identify the type of change.

(A) Physical change
(B) Chemical change
(C) Reversible change
(D) Periodic change

3 Which of the following suffers maximum damage due to the rusting of iron?]

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

4 Read the following statements carefully and then select the correct answer.

1. An iron ball which can pass through a ring easily may not do so when heated.
2. When seeds are soaked in water, they absorb water and grow bigger.

(A) Both the statements 1 and 2 indicate physical changes.
(B) Both the statements 1 and 2 indicate chemical changes.
(C) Statement 1 shows a physical change while statement 2 shows a chemical change.
(D) Statement 1 shows a chemical change while statement 2 shows a physical change.

5 What change takes place when a boy kicks a football?

(A) Exothermic reaction
(B) Endothermic reaction
(C) Physical change
(D) Chemical change

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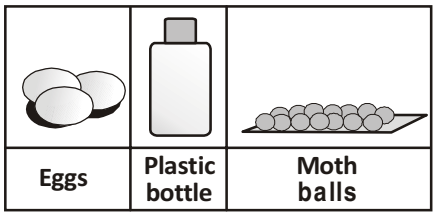
6 Three substances given below are kept in the open for a few days.



Eggs	Plastic bottle	Moth balls

Which of them will undergo a chemical change?

(A) Eggs
(B) Plastic bottle
(C) Both eggs and moth balls
(D) Eggs, plastic bottle and moth balls

7 Karuna wrapped some green gram pulses in a wet cotton cloth and when she observed them after a couple of days, she found small white growths on them. What could be this change?

(A) Physical change
(B) Temporary change
(C) Chemical change
(D) Periodic change

8 On sprinkling salt on an ice cube, it starts melting. What change does the cube of ice undergo?

(A) Physical change
(B) Chemical change
(C) Molecular change
(D) Permanent change

9 Which of the following changes does food in a refrigerator undergo?

(A) Slow, physical change
(B) Slow, chemical change
(C) Fast, chemical change
(D) Fast, physical change

10 Which of the following changes results in the formation of a new substance ?

(A) Physical (B) Chemical
(C) Reversible (D) Periodic

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- Suitable for curricula of major boards like CBSE / ICSE / State Boards.
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- Application / skill / knowledge / understanding oriented questions
- Suitable for International / National / Regional Olympiads and Talent exams like NSTSE, Science Olympiad etc.
- Hundreds of objective questions

UNIQUE FEATURES

- **Synopsis:** To provide the essence of a chapter in a nutshell
- **Previous Contest Problems:** Problems appeared in various talent & olympiad exams
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