

A  
**PRIMER**

on the DOST-SEI  
Science and Technology

**UNDERGRADUATE SCHOLARSHIP  
EXAMINATION**





## FOREWORD

The Science Education Institute (SEI) of the Department of Science and Technology (DOST) provides scholarships to deserving and talented young people who wish to pursue lifetime careers in Science and Technology through its undergraduate scholarship programs.



A highly competitive science and technology scholarship examination is being administered annually wherein applicants should pass it as one of the eligibility requirements for the awarding of the DOST-SEI Undergraduate Scholarships. This examination shall be made available to incoming college freshmen who shall come from batch of the graduating students of the DepEd Senior High School.

Thus, this Primer will help the applicants prepare themselves for the Science and Technology Scholarship Examination. With sample test items covering the different domains presented in this Primer, the applicants will get familiar about the nature of the examination so that they can give their optimum performance in answering the actual test. They are encouraged to try answering the test items and compare their responses in the Answer Key at the end of this Primer.

It is hoped that the test takers will find this Primer beneficial to prepare for the examination and pass to qualify for the S&T Scholarships.

  
JOSETTE T. BIYO  
Director

## **ABOUT THE EXAMINATION**

The DOST-SEI Undergraduate Science and Technology Scholarship Examination is continuously being developed to identify who among you would most probably be successful in the pursuit of careers in science and technology in line with the objectives of the country's scientific human resource development plans.

Taking this examination can be a time of great stress and anxiety for students like you. This is specially true if you do not know what to expect or if you are unfamiliar with the type of test items you will have to answer. This is why this Primer was prepared — to familiarize you with the nature of the examination and the type of items it contains.

First, let us look at the basic make-up of the examination. It is primarily a multiple-choice type of test consisting of sub-parts which are separately timed. If you finish one part before the end of the allotted time, you will not be allowed to proceed to the next part nor go back to answer the previous test. You can use your time wisely by reviewing your answers for that particular part.

The actual examination will last for approximately four and a half hours including the reading of instructions and filling-out of forms. It is designed to be taken in one sitting. Bring snacks. You may eat your snacks while taking the test but make sure not to smear any of the test materials. You may also be allowed to go to the comfort room upon seeking permission from the Examiner.

Following are the different parts of the scholarship examination:

Part I : Verbal and Non-Verbal Reasoning

Part II : English, Science, Mathematics, and Mechanical-Technical

Part III: Self-Inventory

The examination consists of multiple-choice items with four answer choices, only one of which is correct. You will indicate your answer by shading the circle in the answer sheet that corresponds to the letter of your choice.

Part I Test consists of two sub-parts: Verbal Reasoning and Non-Verbal Reasoning. For this part, what would matter most is your mental alertness, precision, and accuracy of your thoughts and actions.

Part II Test has relatively difficult test items because they require you to do mental computation or critical analysis before arriving to a probable answer. Since you would be actually taking sub-tests for this part, you are advised to manage your time well. Do not spend too much time on any particular item that you find difficult. Answer all the items you know first while skipping the more difficult ones. Then if you still have extra time, you may go back to the items you have previously skipped for that particular part only.

Part III Test does not have right or wrong answers; you will encounter test items asking you to describe yourself, your family, your peers and schoolmates, and your past education and other activities as honestly and as accurately as you can. Some examinees in the past were not serious with their answers in Part III. You are well advised to answer this part seriously and honestly because it is still a vital part of the test.

For the following sections of this Primer, you will have the chance to take a closer look at the components of the Examination and answer sample test items to better prepare you for what you will encounter on the actual examination.

## VERBAL REASONING

Verbal Reasoning tests your ability to understand, analyze and interpret information. It also measures your ability to extract meaning from complex information and to think logically and analytically.

### Sample Test Items

1. LIFE BELT : SEA :: AIR : \_\_\_\_\_

- |          |              |
|----------|--------------|
| A. pilot | C. balloon   |
| B. strap | D. parachute |

2. ANTERIOR : POSTERIOR :: FRONT : \_\_\_\_\_

- |         |               |
|---------|---------------|
| A. side | C. head       |
| B. hind | D. midsection |

3. GEO : EARTH :: FERRO : \_\_\_\_\_

- |         |         |
|---------|---------|
| A. air  | C. iron |
| B. fire | D. sand |

4. NEWTON : CALCULUS :: COPERNICUS : \_\_\_\_\_

- |                |                |
|----------------|----------------|
| A. astrology   | C. archaeology |
| B. meteorology | D. astronomy   |

5. HAMMER : CARPENTER :: \_\_\_\_\_

- |                    |                          |
|--------------------|--------------------------|
| A. anchor : sailor | C. blueprint : architect |
| B. brush : painter | D. shaves : barber       |

6. AFFECTION : INFATUATION :: \_\_\_\_\_

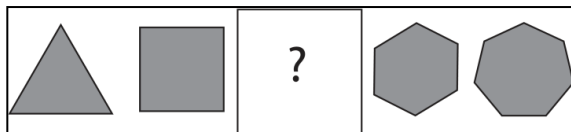
- |                      |                         |
|----------------------|-------------------------|
| A. lenient : forgive | C. timidity : cowardice |
| B. large : gigantic  | D. frankness : candor   |

## NON-VERBAL REASONING

In this test you will be performing tasks that will measure your abilities to: visualize and transform images in your mind; recreate visual experiences and reasoning about shape, measurement, depiction and navigation; and mentally rotate and manipulate two and three dimensional spaces.

### Sample Test Items

1. What shape is needed to complete the series below?



A.



B.



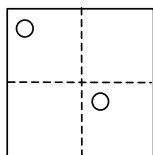
C.



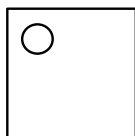
D.



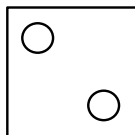
2. If a piece of paper containing two circular holes as shown is folded along the dashed lines, which of the following is the resulting figure?



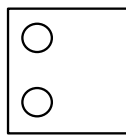
A.



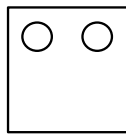
B.



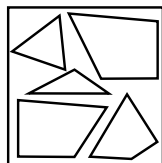
C.



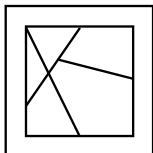
D.



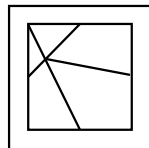
3. Which of the four figures below will show when all the given parts are fitted together?



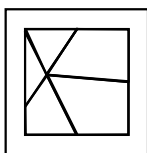
A.



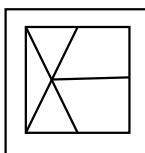
C.



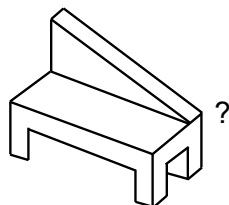
B.



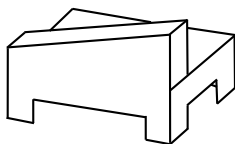
D.



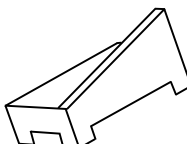
4. Which of the following is a rotation of the solid



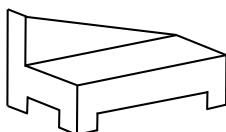
A.



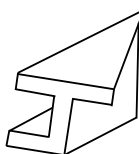
C.



B.



D.





## ENGLISH

This sub-test measures your ability to apply the rules of the English language, specifically on grammar and syntax, vocabulary and reading comprehension.

### Sample Test Items

1. Which underlined part of the sentence shows an ERROR?

The old lady    picked up the struggling puppy

A

B

straightening her hat grimly    and took it to the veterinarian.

C

D

2. Which pair of words does NOT have the same meaning?

A. shy - effusive

C. slim - svelte

B. visible - conspicuous

D. talkative - loquacious

3. We will submit our report \_\_\_\_\_ next month because our computer was damaged by the flood.

A. some time

C. sometime

B. sometimes

D. some times

4. Which is the appropriate response to this sentence?

“Do you mind opening the window?”

A. Not at all.

C. Why? Do you feel hot?

B. Later. I'm busy.

D. Yes, please. I'd like that.

For item nos. 5-8, read the passage below and choose the best answer for each item.

The koala bear, a marsupial commonly found in Australia, is endangered. Often mistaken as bears, they are, in fact, associated to wombats. Their newborns stay in their mothers' pouches for several months after birth.

Koala bears live on gum trees known as eucalyptus. Being a nocturnal animal, koala bears usually rest during the day and become active only at night.

Koala bears are soft. They have thick, woolly, grey or brown fur. Their fur keeps them warm during the cold season. On their limbs are rough pads, enabling the koala bears to grip the branches of the eucalyptus.

Koala bears are herbivores. They feed on the gum leaves. Having a keen sense of smell, they are able to differentiate between edible and poisonous gum leaves.

Source: ELITE Level 4. First Edition 2011. SAP PTE Ltd.

5. \_\_\_\_\_ belong to the group of mammals known as marsupials.

- A. Koala bears and eucalyptus
- B. Wombats and koala bears
- C. Bears and koala bears
- D. Wombats and bears

6. The word that has the same meaning as "active at night" is "\_\_\_\_\_".

- |               |              |
|---------------|--------------|
| A. endangered | C. nocturnal |
| B. herbivores | D. keen      |

7. The \_\_\_\_\_ keeps the koala bears warm during the cold season.

- |              |              |
|--------------|--------------|
| A. pouch     | C. gum leaf  |
| B. thick fur | D. rough pad |

8. The koala bears use their \_\_\_\_\_ to tell the non-poisonous leaves from the poisonous ones.

- |                   |                     |
|-------------------|---------------------|
| A. thick fur      | C. ability to smell |
| B. ability to see | D. body resistance  |

## SCIENCE

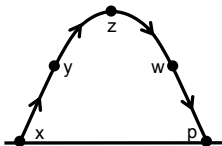
This subtest consists of problem-items in Earth and Environmental Sciences, Biology, Chemistry, and Physics that will test your ability in accomplishing various important scientific tasks.

### Sample Test Items

1. Legumes can be important for agricultural production because bacteria in root nodules fix nitrogen that can then be used by the plant. Which of the following four crop rotation programs would be MOST DESIRABLE to increase soil fertility?

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
A.	Corn	Munggo beans	Corn	Munggo beans	Corn	Munggo beans
B.	Corn	Munggo beans	Corn	Tomato	Corn	Tomato
C.	Rice	Munggo beans	Munggo beans	Corn	Corn	Munggo beans
D.	Munggo beans	Corn	Munggo beans	Munggo beans	Corn	Munggo beans

2. What should be the final temperature of a 25.0 L sample of hydrogen gas at 1.00 atm and 35°C if it is compressed to a volume of 20.0 L and a pressure of 2.00 atm?
- A. 164 °C      B. 220 °C      C. 330 °C      D. 493 °C
3. Consider the projectile shown in the figure below.



Ignoring air resistance, which of the following statements is CORRECT?

- A. Velocity at point Z is zero  
B. Acceleration at point Z is zero  
C. Speed at point X is equal to the speed at point P  
D. Velocity at point Y is equal to the velocity at point W

4. The amount of solar energy reaching the surface of the earth is maximum at the equator and minimum at the poles. Which of the following cause/es the uneven solar heating of the Earth's surface?

- I. Sunlight strikes the earth at a nearly perpendicular angle at the equator
- II. Atmosphere absorbs a certain fraction of the sunlight striking the earth
- III. Amount of solar activity varies in time

- A. I only
- B. II only
- C. I and II only
- D. II and III only

## MATHEMATICS

In this sub-test, you will be performing tasks that will measure your ability to comprehend quantitative relationships and their representations.

### Sample Test Items

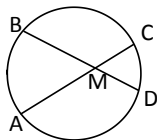
	Math Score	History Score
Joan	100	90
Jose	90	80
Maria	50	40
Marion	70	60
Carmen	80	70
Carlos	60	50

1. If X represents Math test scores while Y represents History test scores, which of the following notations best represents the relationship between math and history scores?
- A.  $X = Y - 10$
  - B.  $Y = X - 10$
  - C.  $X = (Y) 10$
  - D.  $X = (Y) - 10$

2. In how many points do the graphs of  $2(x + 1)^2 + (y - 2)^2 = 25$  and  $4(x + 1)^2 - 3(y - 2)^2 = 15$  intersect?

A. 1                      B. 2                      C. 3                      D. 4

3. Consider the figure below. Arc CD measures  $(x - 3)^\circ$ , while arc AB measures  $(3x + 11)^\circ$ , what is the measure of  $\angle CMD$ ?



A.  $4x + 8$               B.  $2x + 4$               C.  $x + 1$               D.  $2x + 14$

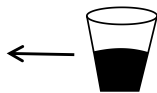
4. Two chips are drawn simultaneously from an urn containing 10 chips numbered from 1 to 10. What is the probability that one of the numbers on the chips is even, and the other is odd?

A.  $2/9$                       B.  $4/9$                       C.  $5/9$                       D.  $5/18$

## MECHANICAL-TECHNICAL

In this sub-test, you will be performing tasks that will measure your ability to acquire information about everyday physics and to comprehend mechanical relationships. It consists of mechanical and electrical problems, as well as items that deal with physical forces.

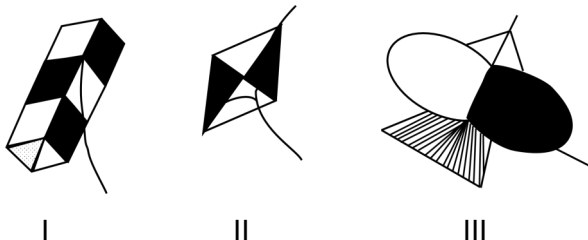
### Sample Test Items



1. If you are carrying this glass of softdrink while riding a bus accelerating in the direction of the arrow, which of the following BEST represents the shape of cross-section of the water surface in the glass?

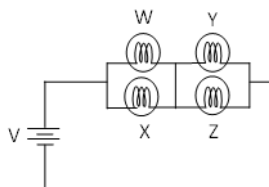


2. Which of the kites illustrated below will fly the highest in the shortest possible time?



- A. I  
B. II  
C. III  
D. There is no difference among I, II, and III
3. Four identical bulbs, W, X, Y, and Z as shown below are initially operating with equal brightness. If bulb Y is busted, which of the following are TRUE?

- I. Bulb Z will be darker than before  
II. Bulb Z will be brighter than before  
III. Bulbs W and X will be darker than before  
IV. Bulbs W and X will be brighter than before



- A. I and III      B. I and IV      C. II and III      D. II and IV

## SELF-INVENTORY

This consists of short statements which you are asked to evaluate or describe yourself. In describing yourself, you are to determine the extent to which each statement closely approximates the way you think, act, and feel. For every statement, you have to choose only one from 5 possible responses below:

- Not true of me  
Rarely true of me  
Sometimes true of me  
Often true of me  
Very often true of me

Sample Test Items
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1. I do not like to tell lies.
2. I am not popular among my peers.
3. What I read I like to keep to myself.
4. Lives of famous scientists interest me.
5. I prefer to stay in the background rather than be an active participant.

-----

**Answer Key:**

*Verbal Reasoning*

1. D
2. B
3. C
4. D
5. B
6. C

*English*

1. C
2. A
3. C
4. A
5. B
6. C
7. B
8. C

*Mechanical-Technical*

1. C
2. B
3. B

*Non-Verbal Reasoning*

1. C
2. B
3. B
4. C

*Science*

1. D
2. B
3. C
4. C

*Math*

1. B
2. D
3. B
4. C



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