

TEST CODE :



# NGSE

**CLASS 10**

Time :  
90 Minutes

**National Genius Search  
Examination® : Advanced**

Your NGSE Roll No.  Date of the Test

Student's Name

Signature of the Student	Signature of the Invigilator Check the correctness of the Roll No. with the Answer Sheet.
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### **INSTRUCTIONS TO THE CANDIDATE**

- DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO.**
- Fill and sign this Question Booklet. Fill the information required in first page of the Answer Booklet. Start your answers from the third page of the Answer Sheet. Do not write answers on the second page of the Answer Sheet, which is kept blank. You may carry this booklet with you after the scheduled time of the test.
- Do not seek clarification on any item in the test booklet from anyone including the test invigilator or the center supervisor. Use your best judgement.
- This booklet consists of two sections as given below :  
**SECTION-1: MATHEMATICS – 5 Questions** and **SECTION - 2: SCIENCE – 5 Questions.** In case of any problem with your test booklet, inform the invigilator immediately. You will be provided with a replacement.
- Use black/blue ball point pen only for writing the answers.
- Use of mathematical instruments/compass box is allowed. Standalone calculators are also allowed.
- All questions are compulsory. Each question carries 10 marks. Negative marks are not awarded.
- Each answer should not be more than 150 words. You may demand additional Answer sheets if required.
- Staple all the answer sheets together, page wise.
- Failure to follow instructions and examination norms will lead to disqualification.

**PLEASE WAIT FOR THE SIGNAL TO OPEN THE TEST BOOKLET**

Open from this side →



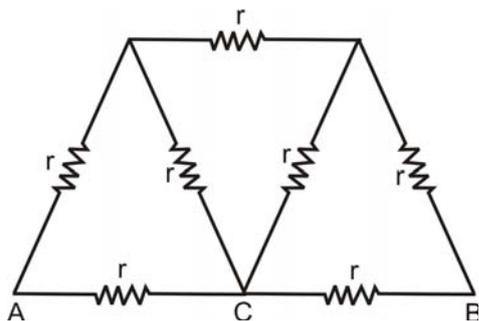
**SECTION – 1: MATHEMATICS**

1. Vidya wonders why numbers one and zero are neither composite numbers nor prime numbers. Could you please explain to Vidya what can happen if they are either composite numbers or prime numbers? Use an example to punch your points
2. (a) There are two buildings with heights of 10 meter and 70 meter respectively that are 100 meter apart on a level surface. If a line ran from the top of each building to the bottom of the other, what would be the height of intersection from the ground?  
(b) Determine the values of  $a$  and  $b$  for which the following system of linear equations has infinite solutions:
$$2x - (a - 4)y = 2b + 1$$
$$4x - (a - 1)y = 5b - 1$$
3. Without knowing the height and which sides are parallel, how would you find the area of a trapezium if all sides are given as 1m, 2m, 3m, and 4m? You need to explain the steps you take to solve the question. You need not find the numerical answer.
4. (a) The side of a square exceeds the side of the another square by 4 cm and the sum of the areas of the two squares is 400 sq. cm. Find the dimensions of the squares.  
  
(b) If the vertices of a triangle have integral coordinates, prove that the triangle cannot be equilateral.
5. Can you prove that  $1/a$ ,  $1/b$  and  $1/c$  are in arithmetic progression when  $(b+c-a)/a$ ,  $(c+a-b)/b$  and  $(a+b-c)/c$  are in arithmetic progression? Show your workings.

**SECTION 2: SCIENCE**

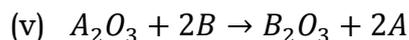
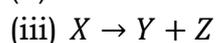
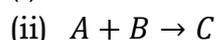
6. (a) A convex lens is used to form real image of an object on a screen. It is observed that even when the positions of the object and that screen are fixed there are two positions of the lens to form real images. If the heights of the images are 4 cm and 9 cm respectively. What will be the height of the object?  
  
(b) A film projector magnifies a  $100 \text{ cm}^2$  film strip on a screen if the linear magnification is 4. What is the area of magnified film on the screen?

7. (a) In the circuit shown, the value of each resistance is  $r$ . What will be the equivalent resistance of the circuit between points A and B?



- (b) A cell of e. m. f.  $E$  is connected with an external resistance  $R$ , then potential difference across cell is  $V$ . What will be the internal resistance of cell?

8. What type of chemical reactions are represented by the following equations?



In each case, explain why the reactions are called so.

9. Briefly explain human digestive system

10. Quana picked up a hot plate without knowing it is hot. She dropped the plate suddenly. Explain how Quana's brain and her central nervous system worked to drop the plate

**END OF DOCUMENT**

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