TEST CODE :

NGSE

CLASS 9   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.

INSTRUCTIONS TO THE CANDIDATE

1.   **DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO.**
2.   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.
3.   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.
4.   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.
5.   Use black/blue ball point pen only for writing the answers.
6.   Use of mathematical instruments/compass box is allowed. Standalone calculators are also allowed.
7.   All questions are compulsory. Each question carries 10 marks. Negative marks are not awarded.
8.   Each answer should not be more than 150 words. You may demand additional Answer sheets if required.
9.   Staple all the answer sheets together, page wise.
10. 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. (a) Monica has a piece of canvas whose area is 551 m^2. She uses it to have a conical tent made, with a base radius of 7 m. Assuming that all the stitching margins and the wastage incurred while cutting, amounts to approximately 1 m^2, find the volume of the tent that can be made with it.

   (b) Fifty seeds were selected at random from each of 5 bags of seeds, and were kept under standardized conditions favourable to germination. After 20 day, the number of seeds which had germinated in each collection were counted and recorded as follows:

Bag	1	2	3	4	5
Number of seeds germinated	40	48	42	39	41

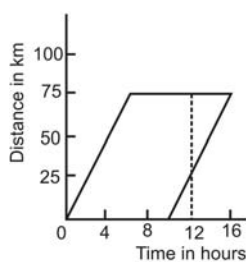   What is the probability of germination of
       (i) more than 40 seeds in a bag?
       (ii) 49 seeds in a bag?
       (iii)more than 35 seeds in a bag?

2. 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

3. Answer the following. Support your answer with explanations.
   (a) Are all fractions rational numbers?
   (b) Is an improper fraction a rational number?
   (c) Why π is an irrational number?
   (d) What are rational numbers?

4. The teacher asked you to introduce Pythagoras theorem to a lower class where students have no idea about the theorem but are conceptually clear about area and dimensions. Explain, how do you perform the task?

5. *Elements is* divided into thirteen chapters. It mainly deals with definitions, axioms and postulates in geometry.
   (a) Who wrote *Elements*? What do you mean by an abstract model?
   (b) What is known as a definition?
   (c) Explain the concept axiom
   (d) What are postulates?
   (e) What is called a dimension?
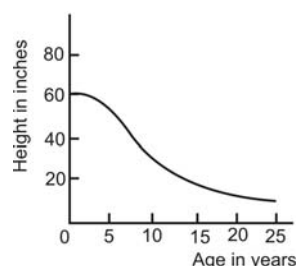
SECTION – 1: SCIENCE

6. What is wrong with the following graphs? Explain why each graph is wrong or right?
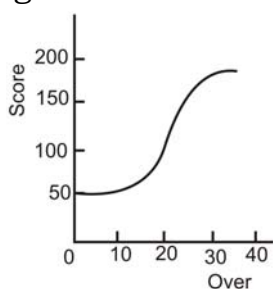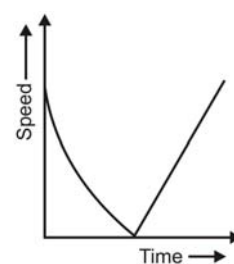

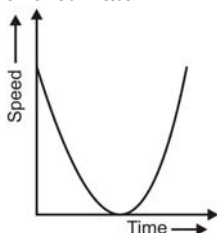Score-over graph in a one-day cricket match   Distance-time graph for an object   Height-age graph for a person   Speed and time graph

Speed and time graph

7. (a) A motorcar is moving with a velocity of 108 km/h and it takes 4 s to stop after the brakes are applied. Calculate the force exerted by the brakes on the motorcar if its mass along with the passengers is 1000 kg.

(b) Speed is a scalar quantity while Velocity is a vector quantity. Explain the terms scalar quantity and vector quantity. Under what conditions, speed is velocity?

(a) The molecular mass of H_2SO_4 is 98 amu. Calculate the number of moles of each element in 294 g of H_2SO_4.

(c) The valency of hydrogen is 1, magnesium 2, aluminium 3 and carbon 4. can you see any connection between the valency of an element and the number of electrons it has in its outermost electron shell? What would you predict about the valencies of helium (He), phosphorus (P), sulphur (S) and neon (Ne) to be?

8. What is Anthrax? What are the symptoms and the forms of anthrax? How it is controlled and prevented?

9. Explain the Carbon Cycle. How Carbon Credits help save the environment?

10. We hear different kinds of sound. But we love to hear music. What ensures quality and pleasantness of musical sound? Explain briefly in terms of the physics you have learned.

END OF DOCUMENT
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