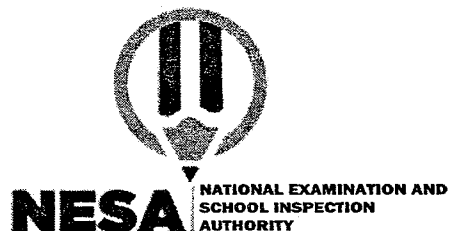


**GENERAL SCIENCE AND
MATHEMATICS
GSM 01**

26/07/2021 2:00 PM – 5:00 PM



TTC NATIONAL EXAMINATIONS, 2020-2021

SUBJECT: GENERAL SCIENCE AND MATHEMATICS

OPTIONS: - LANGUAGE EDUCATION (**LE**)

- SOCIAL AND RELIGIOUS STUDIES EDUCATION (**SRSE**)

DURATION: 3 HOURS

INSTRUCTIONS:

- 1) Write your names and index number on the answer booklet as written on your registration form, and **DO NOT** write your names and index number on additional answer sheets if provided.
- 2) Do not open this question paper until you are told to do so.
- 3) This paper consists of **TWO** sections: **A** and **B**.

Section A: Attempt all questions.	(55 marks)
Section B: Attempt only three questions.	(45 marks)
- 4) Use a **blue** or **black** pen.

SECTION A: ATTEMPT ALL QUESTIONS (55 marks)

- 1) What is the greatest common factor (GCF) of 20 and 24? **(3 marks)**
- 2) Solve in \mathbb{R} the equation $\frac{x-3}{x-1} = \frac{x+1}{x+2}$ **(4 marks)**
- 3) A businessman bought a Television at 85 000F and sold it at 49000F. What was his profit or loss? **(3 marks)**
- 4) The cost of rice is twice than the cost of beans. The total cost is 3000F. Find the price of each. **(4 marks)**
- 5) Find the sum of interior angles of a regular hexagon. **(5 marks)**
- 6) Sarah deposits 4,000F at a bank at an interest rate of 4.5% per year. How much interest will she earn at the end of 3 years? **(5 marks)**
- 7) In an examination, Aline got 200 questions. If she had attempted 80% of the questions then calculate the number of questions she had attempted. **(3 marks)**
- 8) Find the missing decimal. **(5 marks)**
 $0.2, 0.5, 0.8, 1.1, , , , .$
- 9) The difference between two numbers is 48. The ratio of the two numbers is 7:3. What are the two numbers? **(5 marks)**
- 10) A cylindrical fuel tank has a radius of 2 m. Its height is 6 m.
Calculate its volume (use $\pi = 3.14$). **(3 marks)**
- 11) a) Identify any two effects of force on a body. **(2 marks)**
b) A horizontal non- zero net force is applied to an object at rest for 10 min.
What can you say about each of the following physical quantities?
Choose from increases uniformly, remains constant, decreases uniformly to answer these sub-questions:
(i) The acceleration of the body. **(1 mark)**
(ii) The velocity of the object. **(1 mark)**
c) A passenger in a bus notices that a ball which has been at rest in the passageway suddenly starts to roll toward the front of the bus.
(i) What can the passenger conclude about the motion of the bus from this observation? **(1 mark)**
(ii) Justify your answer. **(1 mark)**
- 12) a) (i) Describe a "physical change". **(2 marks)**
(ii) State one example of a chemical change. **(1 mark)**
b) Give 3 differences between a chemical change and a physical change. **(3 marks)**
- 13) Explain why an amoeba does not have a respiratory system. **(3 marks)**

SECTION B: ATTEMPT THREE QUESTIONS (45 marks)

14) a) The data below shows the weights (in Kilogram) of 5 persons:

67, 65, 71, 57, 45.

- (i) Find the mean of their weights. **(3 marks)**
- (ii) Find the median weights **(3 marks)**
- (iii) Find the mode weights **(2 marks)**
- (iv) Calculate the range weights **(2 marks)**

b) The measurements of the two acute angles of a right triangle are in

the ratio 2:7. What are the measurements of the two angles? **(5 marks)**

15) a) Solve the system **(10 marks)**

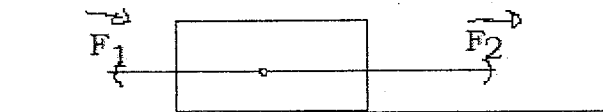
$$\begin{cases} x + y = 300 \\ x - y = 240 \end{cases}$$

b) Workout

(i) $12\text{m}^3 + 10\,000\text{kg} = \dots\dots\text{dal}$ **(3 marks)**

(ii) $25\text{dam}^2 + 35\text{a} = \dots\dots\text{a}$ **(2 marks)**

16) A body of 10 kg at rest on a horizontal surface is acted upon by two opposite forces \vec{F}_2 of 10 N and \vec{F}_1 of 5 N during 30 seconds as shown below.



a) (i) Find the magnitude of the net force \vec{F} exerted on the body.

(1 mark)

(ii) Copy the figure and show on it the direction of the net force \vec{F} .

(1 mark)

b) Apply Newton's law of motion to calculate the acceleration of the body.

(2 marks)

c) (i) Write out the relation between instantaneous speed and acceleration of the above body. **(1 mark)**

(ii) Use the value of acceleration calculated in b) and the formula written in

c) (i) to complete the following table in your answer booklet.

Time t/s	Speed V/ms ⁻¹
0	
10	
15	
20	
25	
30	

(3 marks)

- d) Use graph paper to plot a graph of speed V (along vertical axis) against the time t (along horizontal axis). **(6 marks)**
- e) From the graph, find the speed of the moving body at $t=5s$ **(1 mark)**
- 17) The atomic mass of isotopes of germanium ^{70}Ge , ^{72}Ge , ^{73}Ge , ^{74}Ge and ^{76}Ge are: 21.2%, 27.7%, 7.7%, 35.9% and 7.4% respectively.
- a) Calculate the relative atomic mass of germanium. **(3 marks)**
- b) State 2 uses of radioisotopes by man. **(2 marks)**
- c) The atomic number of germanium is 32 and it belongs to group IVa of the periodic table.
- (i) Write the electronic configuration of Ge in terms of s, p, d and f notation. **(1 mark)**
- (ii) Explain why germanium is used in electronic devices such as diodes and transistors in television sets, computers, radios etc... **(2 marks)**
- d) Element X has the atomic number of 19
- (i) To which group and period does element X belong? **(2 marks)**
- (ii) Determine the molecular formula of a compound formed by reacting X and sulphur. **(2 marks)**
(Atomic number: $S=16$)
- (iii) State the observable change made when X is put in dilute HCl acid. **(1 mark)**
- e) State 2 dangers of radioisotopes to man. **(2 marks)**
- 18) a) Differentiate between Fertilisation and Implantation. **(4 marks)**
- b) Explain the advantages of Internal fertilization. **(6 marks)**
- c) Describe how the placenta is adapted to carrying out its functions. **(5 marks)**

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