NEXT GENERATION EXAMINATION @2024 SET 2

PHYSICS PAPER ONE

TIME: $2\frac{1}{4}$ HOURS

INSTRUCTIONS

- Attempt any **four** questions only.
- You may use silent, non-programmable calculator.
- Show all your workings clearly step by step.
- Use paragraphs to indicate a new point/step/idea.

QUESTION ONE (12 scores)

Grain millers in a certain community faced a problem of impure grains which spoilt their grinding machine. It was discovered by one of their workers that some community members bring grains mixed with some metal pieces such as iron.

You may use these support materials.

Connecting wires, switch, 6-inch-long nail, battery (power source), iron fillings, masking tape, insulated copper wire

Task

a) Design a prototype of a **simple device** which the millers can use to sort the impurities from grains and **explain** how it works stating any **precautions** which must be taken while designing and using it. (Ensure to **test** if the device you have designed works). **Conclude** by suggesting other **applications** of the device you have designed.

QUESTION TWO (12 scores)

During the inter-class athletics competitions in one of the schools in Uganda, the school nurse examined the participants' body temperature before the race started. The games master then started the race and recorded the distance covered by the participants with time taken as shown in the table below. One of the participants collapsed after the 100m race.

Support information.

- The normal human body temperature is 37.0 ^0C.
- According to old records, this athlete normally runs at a speed of $6.5\ ms^{-1}$ without collapsing.

Examination results of the participant who collapsed.

- body temperature before the start of the race was 39.8 ^0C.
- Body temperature after the race was 44.0 ^0C.

Table showing the distance run by the athlete in a given time.

DISTANCE (m)	0	20	40	60	80	100
TIME (s)	0.00	2.50	5.00	7.50	10.00	12.50

Task

If you are the games master or the school nurse, how can you use the above examination results to **scientifically investigate** the cause of the collapse of this athlete? Conclude by **commenting** on the results you have obtained from your investigation and provide a suitable **recommendation (s)** to this athlete.

QUESTION THREE (12 scores)

The headteacher of your school wishes to buy two batteries each of emf **6V** and internal resistance **2 Ω** each to be used on the school lighting system. The lighting system can use a maximum voltage of **6 V**. The head teacher would also wish to buy the connecting wires. **wire A** has a diameter of **0.1mm** and costs **1000** shillings per metre and the **wire B** has a diameter of **0.15mm** and costs **2500** shillings per metre. He is not sure which wire to buy.

More support information.

- The batteries are to be connected to a bulb of resistance **4 Ω**.
- The bulb may blow up if the current exceeds **3A**.

Task

a) Advise the headteacher on how best he can **arrange** the batteries and the **type** of the wire to be used. **Conclude** by **commenting** on the advantage (s) of the arrangement chosen and the wire used.
b) Prove mathematically if the **current** produced by the arrangement designed in task (a) above is **safe** for the bulb.

QUESTION FOUR (12 scores)

A newly recruited dentist was supposed to examine the tooth of the patient. The dentist used a mirror whose focal length is **10cm**.The dentist is not so sure of the right position of the patient's tooth from the mirror. The possible positions of the tooth from the mirror are position A, B, C, D and E.

Support information.

POSTION	A	B	C	D	E
Object distance (u)	**10cm**	**5cm**	**15cm**	**20cm**	**25cm**

Where "**u**" is the position of the tooth of the patient from the mirror.

TASK

Using physics knowledge, explain how you will help the dentist to **select the best** position of the patients' tooth from the mirror and give reasons **why you did not** select each of the other remaining positions.

QUESTION FIVE (12 scores)

If one has ever been to the beach for long enough, one may have noticed a change in the ocean's water level. In one of the ports, a large ship failed to land on shore due to low water levels at that shore at that time of the day. One of the tourists wondered why it happens like this at times. He was confused on why the water level was too low at that time of the day.

Task

If you were the tour guide at that port, with the aid of a well labelled **illustration**, write down a possible **explanation** that you will provide to this tourist in order to promote understanding of earth and space physics. **Conclude** by suggesting the **positive** and **negative** effects of such a situation.

EXPECTED RESPONSE FOR MAGNETISM

- Well labelled diagram @2mks.
- Description of the diagram/design @2mks
- Explanation of how the design/diagram works @4mks
- Precaution @1mk.
- Applications @ 3mks.

EXPECTED RESPONSE FOR MECHANICS (MOTION +TEMP)

- Title of distance-time graph @1mk
- Labelling both axes @1mk
- Convenient scales used @ 1mk.
- Plotting points @3mks
- Getting slope @2mks
- Comment (two) for @2mks.
- Recommendations (two) @2mks.

EXPECTED RESPONSE FOR EARTH AND SPACE PHYSICS

- ✓ Ocean tides @1mk
- ✓ Meaning of ocean tides @1mk
- ✓ Illustration of ocean tides @2mks
- ✓ Explanation of origin of ocean tides @4mks
- ✓ 2 positive effects @2mks
- ✓ 2 negative effects @2mks

EXPECTED RESPONSES FOR LIGHT

- Right selection of position=B= @1mk
- Justification (features of image formed) @3mks (3 features)
- Illustration of image formed at B @3mks.
- Position A and justification @1mks (infinity)
- Position C and justification @ 1mks (inverted and others)
- Position D and justification @ 1mks (inverted and others)
- Position E and justification @ 2mks (inverted and diminished)

EXPECTED RESPONSES OF ELECTRICITY

- ❖ Method used=parallel @1mk
- ❖ Diagram used = @2mks
- ❖ Advantage of arrangement chosen @2mks
- ❖ Advantages of wire used @2mks.
- ❖ Mathematical analysis of the current flowing through the bulb @5mks


The Author of this workbook is an experienced teacher following the competence based curriculum who has taught in schools like Green Hill Academy ,Kakungulu Memorial SS and currently at Mandela SS .The author of this book is a graduate teacher of physics and mathematics from Makerere University
This book will ease your work since all types of questions have been included which require knowledge application and
The questions have been made as simple as possible to enable students easily understand (very many examples, pictures, and illustrations). The various activities of intergration have also been included at the end of each topic to enable students apply the knowledge attained from already learnt topic.
The worksheet is to help students practice as many questions as possible.
The space provided is just enough for each question asked.
The book provides a brief introduction, short answer questions in the right sequence as it is recommended by other text books available in the market.
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SENIOR THREE PHYSICS WORKBOOK 2024
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SENIOR TWO PHYSICS WORKBOOK 2023
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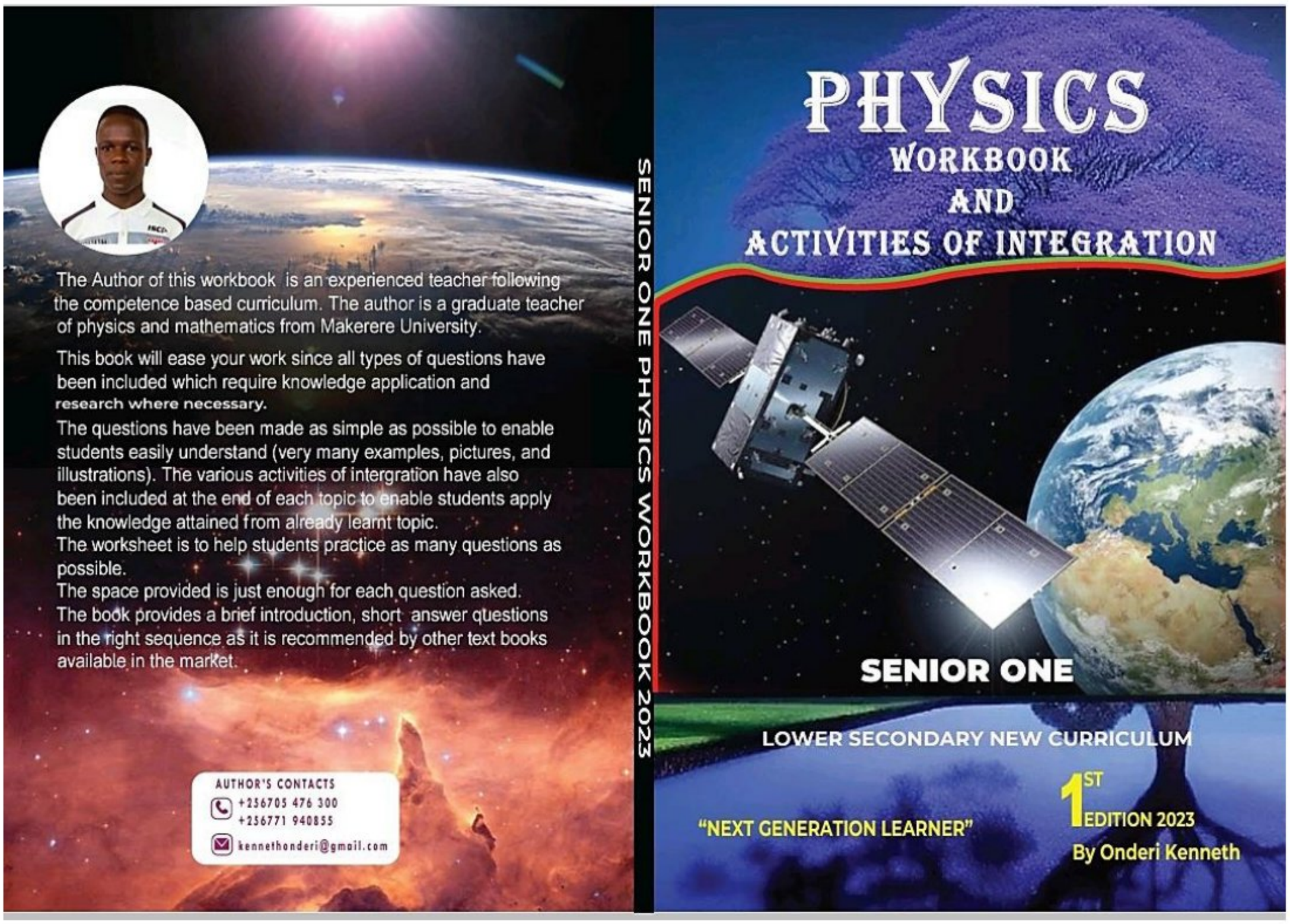

- **Get in touch with the author to get the scoring guide and implement the competency-based curriculum with ease.**
- You can also contact the author for the above TEXTBOOKS.
- BOOK FOUR is to be released this JUNE 2024
- The workbooks are meant to simplify groupwork for learners and teachers as well.
- Scenario based questions are available in the workbooks.
- Perfect illustrations are drawn in the workbooks.

- Positive criticism is well received to help improve our service delivery to the nation in terms of physics as a subject and how the books should be like in order to make the subject better.

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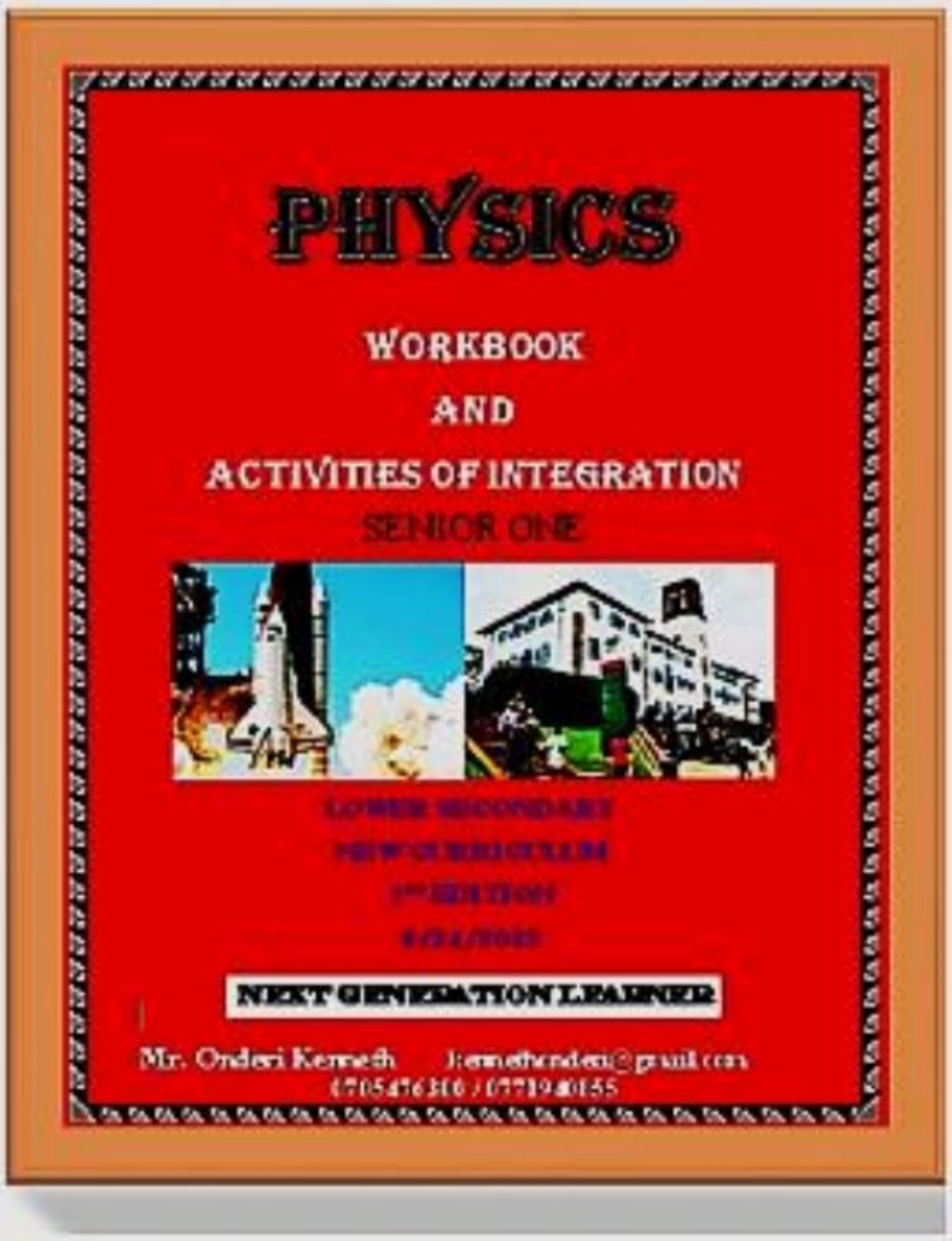
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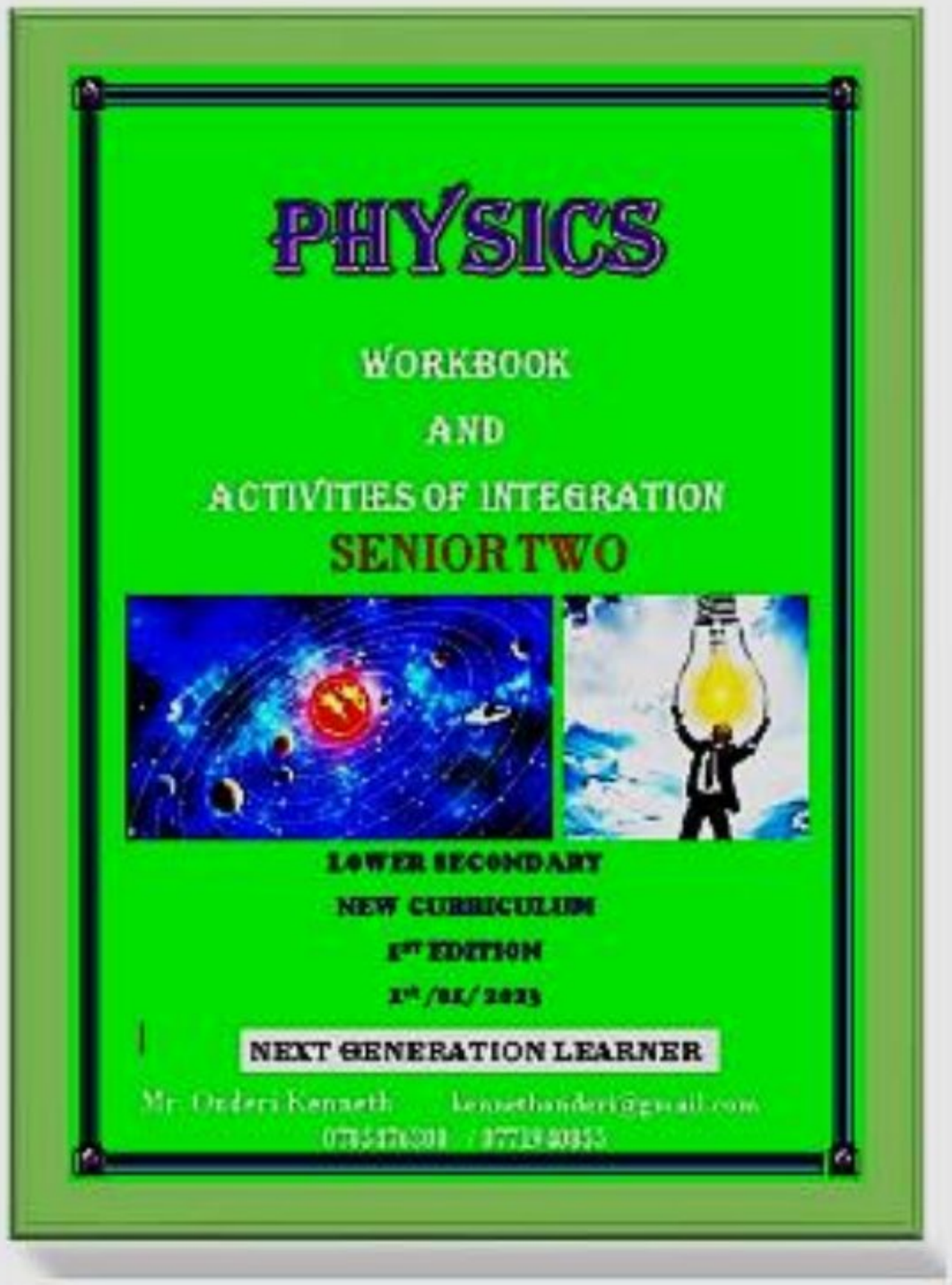
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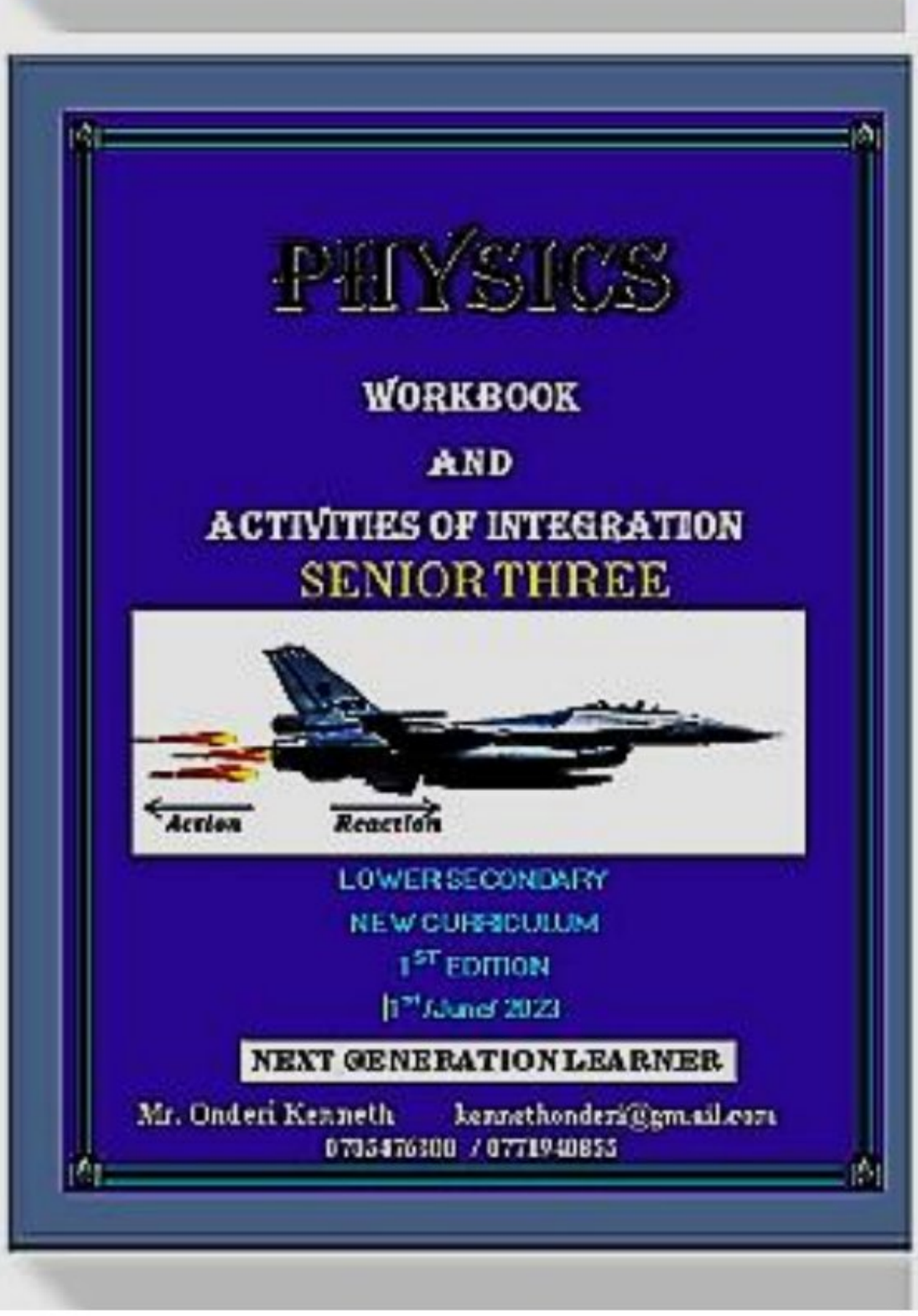
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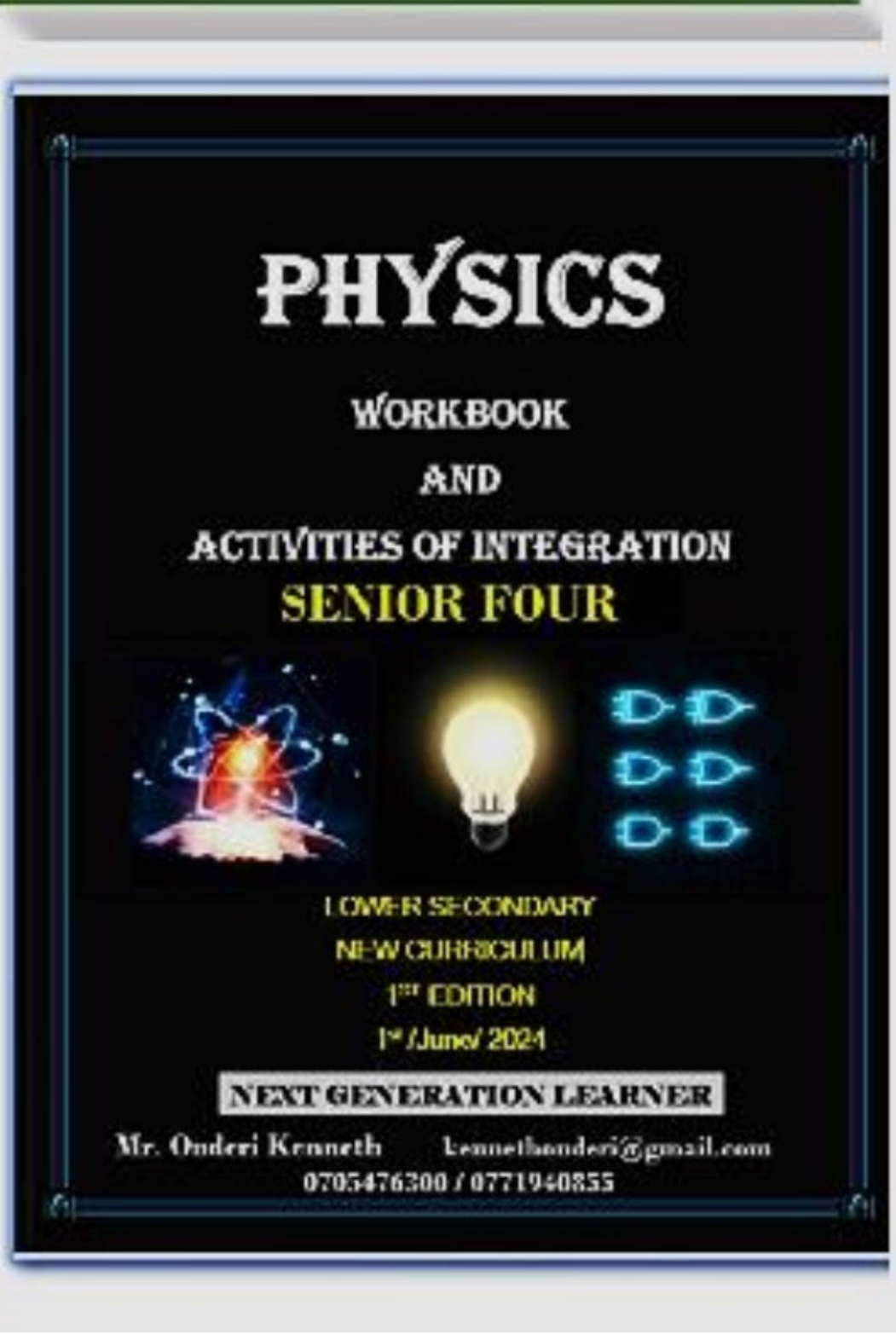
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