

**NATIONAL UNIVERSITY OF LESOTHO**

**DEPARTMENT OF SCIENCE EDUCATION**

**B. SC. ED. SEMESTER 2 EXAMINATIONS**

**SCE 3481 – 12: CURRICULUM STUDIES IN JUNIOR SECONDARY SCIENCE**

**30 MAY 2023**

**MARKS: 100**

**TIME: 3 HOURS**

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***Instructions:***

*There are five questions in this paper.*

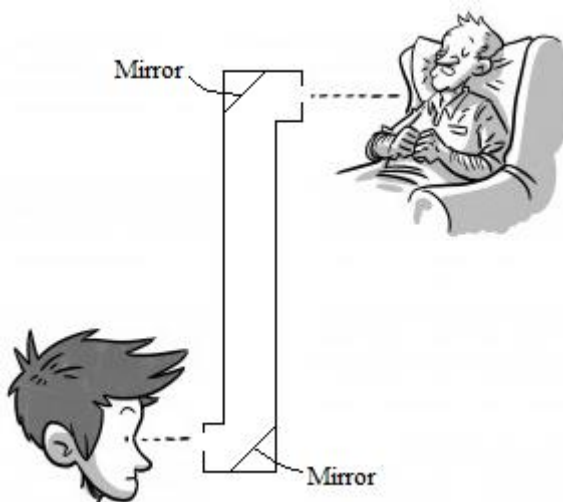
*Answer any **four** questions.*

### Question 1

- (a) Using the kinetic theory of matter, explain why hot water is less dense than cold one. (4)
- (b) Design an experiment to demonstrate how heat is transferred by convection in liquids. List all the measurements and/or observations involved. (6)
- (c) Students claim that pieces of cloth of the same material and dimensions take the same time to dry on a washing line exposed to the sun regardless of their colour. (1)
- (i) State the method of heat transfer responsible for this drying. (1)
- (ii) Describe the lesson you could offer to prove or disprove the students' claim. Also, state whether their claim is valid or not. (7)
- (d) You are a teacher in a school with a well-equipped science laboratory and full access to technology for teaching science. (3)
- (i) Mention **three** reasons why you might want to use videos in teaching thermal transfer. (3)
- (ii) Describe any **two** challenges of using videos against physical laboratories. (4)
- [25]**

### Question 2

- (a) State the law of reflection of light. (1)
- (b) Describe a laboratory experimental procedure that students at the junior secondary level may perform to investigate the law of reflection of light. Draw a well-labelled diagram for clarity. (8)
- (c) The diagram below shows an optical instrument.



- (i) Name this instrument. (1)
- (ii) Explain how this instrument uses the concept of reflection of light to produce an image. (2)

(d) The table shows information from the Grade 8 Science and Technology syllabus.

Learning outcome: at the end of Grade 8, learners should be able to:	Concepts	What to assess: the teacher should assess learners' ability to:	Suggested resources
15. Describe reflection of light	Light Reflection Virtual and real images Ray diagrams Applications of: - reflection	State and explain the characteristics of the optical image as seen in the plane mirror.	Sources of light. Plane mirrors. Lenses. Prism blocks.

- (i) Explain the difference between learning outcome and instructional/lesson objective as used in this syllabus. (2)
- (ii) Write **one** instructional/lesson objective you may construct from the given information and explain how you derived it. (3)
- (iii) State prerequisite knowledge for the lesson objective in (ii) above and explain why you consider it important. (2)
- (iv) With reference to this learning outcome, describe the difference between a teacher-centred and a learner-centred lesson. The description should include the roles of a teacher and students in each lesson. (6)

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### Question 3

- (a) **State** the meaning of the following worldviews common in science debates and **explain** how each of them informs the teaching of science.
  - (i) Empiricism
  - (ii) Scientific skepticism
  - (iii) Rationalism
  - (iv) Scientific objectivity

(16)

- (b) Use any four science topics/ concepts to justify the contribution of science to our societies. (8)
- (c) Mention one typical scientific knowledge or idea which demonstrates that science does not always rely on physical evidence. (1)

[25]

#### **Question 4**

- (a) Compare Behaviorism and constructivism using the following headings: mental activity, learning process, assessment, and role of teacher. (12)
- (b) As a science teacher, explain why it would not be practical to rely only on one theoretical stance (either behaviorism or constructivism) for effective teaching. (5)
- (c) From the topic, 'Chemical bonding' write one lesson objective for a constructivist and one for a behaviorist-oriented classroom. (2)
- (d) How is the Zone of Proximal Development an important construct for science teachers? Use any topic or concept from the LGCSE syllabus to support your point. (6)

[25]

#### **Question 5**

- (a) Science and technology inform each other for advancement. Use examples of concepts /topics from LGCSE Physical science syllabi to justify this statement. (6)
- (b) Information and communication technology (ICT) tools are said to be useful in teaching and learning of science.
- (i) Mention any **two** ICT tools and **explain** how they can help you to teach a **named concept** from science and technology grade 8 syllabus. Your explanation should include the nature of concept and how the chosen ICT tool makes teaching effective. (8)
- (ii) Why would you **not** recommend overreliance on using ICT tools for teaching and learning of natural phenomena like seeds dispersal? (4)
- (iii) **State** and **explain two** challenges that may interfere with learning in a poorly planned multimedia presentation in science. (4)
- (iv) Mention any three challenges that may be barriers to the use of ICT tools in Lesotho schools. (3)

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