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| <b>SCHOOL</b>       | EDUCATION                             |               |     |
| <b>DEPARTMENT</b>   | APPLIED EDUCATIONAL SCIENCES          |               |     |
| <b>SUBJECT</b>      | TEACHING METHODS OF PHYSICAL SCIENCE  |               |     |
| <b>SCUBJEC CODE</b> | EMSP3700/EMSP 4700/EMSP 4720/EMSP4702 |               |     |
| <b>DATE</b>         | NOVEMBER 2024                         |               |     |
| <b>DURATION</b>     | <b>3 HOURS</b>                        | <b>MARKS:</b> | 100 |

## **FIRST OPPORTUNITY EXAMINATION**

**Examiner: Prof. M. Mukwambo**

**Moderator: Dr. C. Haambokoma**

### **Instructions**

**Answer ALL the questions in this question Paper.**

This question paper consists of 7 pages, including the cover page.

## Section A

Each question in this section carries [1] mark and total number of marks in this section is [20]

1. Which of the following define the term school science?
  - A. Is a body of knowledge specifically intended for learners at primary and secondary level to inform learners about nature and things around them etc.
  - B. Are general statements of what is to be achieved through the learning process in a subject, B
  - C. Learning area, or curriculum over a longer period of time. Refers to everything that is taught in school (formal, informal and hidden curriculum).
  - D. Refers to the classification of the different (cognitive) objectives that teachers/educators set for their learners/students.
2. Which option best describes nature of science?
  - A. Is full of mythology and only applicable to a particular context.
  - B. It is a language, tool, universal but is not cultural aligned.
  - C. It is cultural aligned, a language, tool and universal.
  - D. Science is tentative, developmental, language, tool, universal, and cultural aligned
3. Which of the following words best describes that science is used in many disciplines?
  - A. Universal.
  - B. Tool.
  - C. Logical
  - D. Tentative.
4. Why is it important to differentiate between aims and objectives in a Physical Science syllabus when planning lessons?
  - A. Aims provide a broad understanding of the subject, while objectives define specific, measurable outcomes that students should achieve.
  - B. Aims are specific to individual lessons, whereas objectives apply to the entire curriculum.

- C. Aims focus on theoretical knowledge only, while objectives are centred around practical skills.
  - D. There's no real distinction; aims and objectives can be used interchangeably in lesson planning.
5. When creating a lesson plan, which of the following is most important for ensuring that lesson objectives are met?
- A. Including extra reading materials.
  - B. Setting clear, measurable learning outcomes for the lesson.
  - C. Planning to cover as much content as possible.
  - D. Allowing students to decide the topic of discussion.
6. In which of the following scenarios would concept maps be most effective in a physical science lesson?
- A. When introducing new scientific vocabulary.
  - B. When demonstrating complex relationships between scientific concepts.
  - C. When assessing student's knowledge through multiple choice quizzes.
  - D. When assigning students individual research projects.
7. Which of the following is a key benefit of continuous assessment (CA) in education?
- A. It provides a final judgment of students' abilities.
  - B. It reduces the need for student feedback.
  - C. It supports ongoing student learning and improvement.
  - D. It eliminates the need for formal examinations
8. Coursework is typically used to assess which of the following skills?
- A. Memorization and recall.
  - B. Practical application and critical thinking.
  - C. Attendance and punctuality.
  - D. Multiple-choice test-taking abilities
9. Which of the following best describe the benefit of practical work?
- A. It enhances students understanding by involving them in real-world applications
  - B. It helps students become proficient in text-book theory.

- C. It encourages students to focus only on exams.
- D. It reduces the need for classroom discussion.

**10.** Why is it important to include assessment methods in the scheme of work?

- A. To allow students to choose their favourite subjects.
- B. To ensure consistent monitoring of students' progress and understanding.
- C. To reduce the number of assignments students, receive.
- D. To eliminate the need for exams.

**11.** Which of the following best describes the purpose of using concept maps in science education?

- A. To replace traditional lectures with visual representations of scientific concepts.
- B. To provide a method for assessing students' understanding by mapping out their knowledge and identifying misconceptions.
- C. To develop detailed lesson plans that cover all aspects of the syllabus in a structured format.
- D. To record the specific topics covered in each lesson and track students' performance.

**12.** Which of the following is the best to refer to laboratory work?

- A. Experimental work.
- B. Practical work.
- C. Laboratory work.
- D. Laboratory activity.

**13.** Which teaching method involves starting from a specific?

- A. Deductive Teaching
- B. Inductive Teaching
- C. Lecture-Based Teaching
- D. Direct Instruction

**14.** Which of the following teaching method starts from general?

- A. Analogical.
- B. Deductive.

- C. Experimental.
  - D. Metaphorical
15. Which of the following learning and teaching theories does **not** support learner centred teaching and learning?
- A. Radical constructivism
  - B. Cognitive constructivism
  - C. Social constructivism
  - D. Behaviourism.
16. Which of the following option present some of the habits of mind a learner must have to be scientifically literate?
- A. Experimental
  - B. Pattern sniffers. experimenter.
  - C. Pattern Sniffers, experimenter.
  - D. Descriptor, pattern sniffer, experimenter, tinkerer, inventor and visualizer
17. To contextualize science, a teacher need to be:
- A. Cultural and gender sensitive.
  - B. Cultural sensitive and have the skills.
  - C. Only to be gender sensitive and there is no need of skills.
  - D. Consider the biological and physical environment.
18. What do you think of misconception in science?
- A. Misconceptions emphasize students' reasoning and problem solving.
  - B. They are useful as one will assimilate or accommodate the science concept under discussion.
  - C. Suitable to teach those beginning to learn science.
  - D. They are useful as one will assimilate and accommodate the science concept under discussion.
  - E. .
19. Who of the following theorist advocates the idea of accommodation and assimilation
- A. Skinner
  - B. Vygotsky

- C. Piaget
- D. Skinner and Piaget

20. When teaching it is necessary to create cognitive conflicts also known as dissonance, is this necessary and why?

- A. Yes, since it helps prevent memorization as one undergoes deep learning.
- B. No, since it does not help develop critical thinking and problem-solving skills.
- C. Yes, since it emerges passive listening and note-taking.
- D. Yes, because it allows rote learning of procedures and algorithms.

## SECTION B

**Answer all the question in this section related to pedagogical content knowledge. The marks for each question are indicated at the end of each question in brackets. This section carries [60] marks**

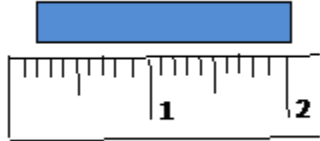
1. Teachers are usually encouraged to be culturally sensitive. This can be through use of ethno-science. Ethno-science can be defined as science community members use to understand and explain natural phenomenon they see around them.
  - (a) Give an examples of this ethno – science in a community you have stayed or staying and say the science found there and relate to the science in the official curriculum. [8]
  - (b) Can the ethno – science you have mentioned in (a) be useful in teaching physical science and how can it be done. [6]
  - (c) Can ethno – science you have mentioned be used to contextualize science teaching practices and explain how you will achieve this. [6]
2. Practical work is useful in the teaching of physical science
  - (a) What do you understand by the term ‘practical work’? [4]
  - (b) (ii) Discuss in detail any two (2) ways of organizing practical work. Explain each of the items stated. [8]
  - (c) Suggests two reasons teachers prefer to refer laboratory work as practical work and explain each reason. [8]
3. Given the concepts of “reflection of waves”, describe how you will use ICT to enhance the teaching and learning of your Grade 10 Physical Science learners. [10]

4. Discuss and justify any five advantages of using concept maps in Physical Science teaching and learning. [10]

### SECTION C

Answer all the question in this section related to physical science content knowledge. The marks for each question are indicated at the end of each question in brackets. This section carries a total of [20] marks

1. Imagine you are at a school where apparatus for conducting a practical work on preparing and testing carbon dioxide are not available, only lime water or a red litmus paper is available in the storeroom. To address quality, access, democracy and equity, fairness, ensuring that your learners are also exposed to how  $\text{CO}_2$  is produced and tested you are required to select science in everyday life. Select any activity in the community that produce  $\text{CO}_2$ , explain how  $\text{CO}_2$  is produced and how you will test it. You can also use a diagram to illustrate your explanation. [10]
- (a) The diagram below shows a meter ruler with a zero error. Explain what we mean by this zero error. [3]



- (b) What action will you do for you to come up with proper measurement? [2]
- (c) What is the value of the reading presented? [2]
2. The word inert means inactive. Explain why an inert gas is used in a bulb. [3]

**END OF EXAMINATION!**