



UNIVERSITY  
OF  
JOHANNESBURG

<b><u>FACULTY</u></b>	: Education
<b><u>DEPARTMENT</u></b>	: Science and Technology Education
<b><u>CAMPUS</u></b>	: APK
<b><u>MODULE</u></b>	: HCISEOY CURRENT ISSUES IN SCIENCE EDUCATION
<b><u>SEMESTER</u></b>	: Second
<b><u>SUBMISSION</u></b>	: November 2019

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**MODERATOR** Prof J Kriek (UNISA)

**DURATION** 3 HOURS **MARKS** : 100

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NUMBER OF PAGES: 3 PAGES

INSTRUCTIONS:

1. Answer ALL THE QUESTIONS.
  2. Number your answers clearly.
  3. Answer each question in a separate booklet.
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**QUESTION 1: PCK and TPACK**

- 1.1 With reference to your subject area, describe how a teacher's lack of Pedagogical Content Knowledge (PCK) reflects in science teaching? (4)
- 1.2 Critically reflect on the integrative and transformative models of PCK. (6)
- 1.3 Despite the lack of consensus, scholars agree that PCK is a tacit or hidden construct (Kind, 2009), which is difficult to transfer as teachers gain it through classroom teaching experience, and it is topic-specific (Mavhunga & Rollnick, 2016). This led to the development of different PCK models. These models include Magnusson, Krajcik and Borko (1999) and Mavhunga (2012) to mention few. Most of these PCK models focus on how to gain access to teachers' PCK.
- Critically review and interpret one (1) of the listed models by considering the following:
- i. Description of the model.
  - ii. Its uniqueness in relation to Shulman's (1986) model.
  - iii. Whether it is a transformative or integrative model. (10)
- 1.4 Two (2) elements, namely Content Representations (CoRe) and Pedagogical and Professional Repertoires (PaP-eRs), capture and represent PCK in meaningful ways. Critically discuss this statement taking into account the South African science classroom. (10)
- [30]**

**QUESTION 2: Science concept formation and conceptual change**

- 2.1 Use a specific example to discuss how learners' prior knowledge can act as a barrier to science concept formation. (5)

- 2.2 Critically discuss the role of the conceptual change model in dispelling misconceptions in science. (8)
- 2.3 In your own words, describe the role of inquiry-based learning in science concept formation (5)
- 2.4 The Predict-Observe-Explain (POE) is an inquiry model which provides teachers with an opportunity to teach science as inquiry with the aim of promoting learners' understandings of science concept through investigations. Generate a POE for any science concept of your choice from the Life, Natural or Physical Sciences. (7)
- [25]

### **QUESTION 3: Indigenous Knowledge and Science Education**

- 3.1 Critically discuss your position on integrating indigenous knowledge in the science classroom by considering potential benefits and difficulties. (12)
- 3.2 Discuss any three (3) innovative teaching and learning strategies that can be employed when integrating indigenous knowledge in a science classroom. (13)
- [25]

### **QUESTION 4: Language in science teaching and learning**

By shunning away from using learners' home languages in a science classroom, learners are not accorded the full opportunity to access scientific concepts (Mavuru & Ramnarain in press).

- 4.1 Critically analyse the above statement with reference to experiences in your science classroom. (10)
- 4.2 As a teacher in a science classroom in the South African context, explain the three types of classroom talk you would use to help your learners learn science. (10)
- [20]

**Total: 100**

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