UNIVERSITY OF JOHANNESBURG

FACULTY	:	Education
DEPARTMENT	:	Science and Technology Education
CAMPUS	:	APK
MODULE	:	EDUCATIONAL THEORY IN STEM. (HETSSOY)
SEMESTER	:	Second
EXAM	:	November 2019

ASSESSOR(S)	:	DR ED SPANGENBERG (Chief assessor) PROF P ANKIEWICZ, DR F VAN AS (Technology Ed) PROF M NDLOVU, DR V RAMDHANY (Mathematics Ed) PROF U RAMNARAIN, DR L MAVURU, DR S RAMAILA (Science Ed)
MODERATOR	:	DR LS VAN PUTTEN (UP)
DURATION	:	2 HOURS **MARKS** : 75

NUMBER OF PAGES: 3 PAGES

INSTRUCTIONS:

1. Answer **each question** in a **separate** book.
2. Answer ALL THE QUESTIONS.
3. Number your answers clearly.
4. Write legibly and present your work neatly.
5. Read the questions carefully before answering them.

QUESTION 1

1.1 Discuss the rational (fundamental reasons) for STEM education that consists mainly of **two (2)** broad arguments. **(6)**

1.2 Discuss **three (3)** possibilities of working across STEM subjects in the enacted curriculum. **(9)**

1.3 Identify and discuss opportunities to foster and develop “ways of thinking” (21st century skills) (Binkley et al., 2012) through STEM education. **(10)**

[25]

QUESTION 2

2.1 Give **three (3)** reasons that supports the rationale of STEM education by focusing on South Africa. **(3)**

2.2 Define the meaning of the term **epistemology** of STEM education. **(1)**

2.3 Differentiate between a specified, an enacted and an experience curriculum in STEM education. **(3)**

[7]

QUESTION 3

3.1 Name any **four (4)** of the possible seven core principles of change in STEM educational reform as stated by Fullan (2006). **(4)**

3.2 There are many benefits of station teaching, especially when applied in STEM Education. Name any **four (4)** of the benefits of station teaching in inclusive STEM learning. **(4)**

[8]

QUESTION 4

4.1 Explain, in your own words, what you think pedagogical content knowledge (PCK) is. **(3)**

4.2 STEM education encourages teachers to integrate aspects of different STEM subjects into their teaching, where possible. Discuss one (1) way in which PCK can enable teachers to integrate effectively. **(3)**

4.3 Teachers should use formative assessment as much as possible when trying to integrate topics of various STEM subjects. Do you agree with this statement? **(1)**

4.4 Provide one (1) motivation for your answer in 4.3 above. **(3)**

[10]

QUESTION 5

5.1 According to the National Research Council (2014), “building connected knowledge structures” is a key characteristic of effective STEM learning. Discuss this characteristic by using appropriate examples. **(10)**

5.2 Discuss any two constructivist teaching strategies as applied in your STEM subject. **(8)**

5.3 Discuss situated cognition in terms of context, content and the role of the teacher in scaffolding STEM learning. **(7)**

[25]

TOTAL: 75