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UNIVERSITY OF GHANA

TEUP 205: THEORIES OF LEARNING MATHEMATICS (UP) (3 CREDITS)
END OF FIRST SEMESTER EXAMINATION MARCH 2021 TIME: 2 HOURS

General Instruction: Answer all the questions in *Section A* and any **three** from *Section B* in the answer booklet provided.

SECTION A (10 Marks)

This section is in two parts. In the first part, each question is followed by four options lettered A to D. Read each question carefully and write down the letter that corresponds with the correct or best option in the booklet provided. In the second part, fill in the gaps. The duration of this section is **30 minutes**.

1. The learning principle associated with Zoltan Dienes states that 'transformations within one model correspond to transformations in an isomorphic model although the embodiments of these models are different'. This is called _____ principle.
 - A. construction
 - B. dynamic
 - C. multiple embodiments
 - D. perceptual variability
2. The idea of breaking complex behaviours into smaller component behaviours originated with _____.
 - A. Brunner
 - B. Gardner
 - C. Piaget
 - D. Skinner
3. What term did Bandura use to refer to the overall process of social learning?
 - A. Modelling.
 - B. Conditioning.
 - C. Self-efficacy.
 - D. Vicarious reinforcement.

4. Which one of the following BEST describes how we develop knowledge, from the perspective of a constructivist?
- A. We are born with most of our knowledge embed within us.
 - B. We are sponges that absorb everything from the authority.
 - C. We develop knowledge by continually engaging with others.
 - D. We gain knowledge only by going to school.
5. As a teacher who firmly believes in the social constructivist theory of Lev Vygotsky, which of the following methods would you prefer for assessing your students?
- A. Collaborative projects.
 - B. Fact-based recall questions.
 - C. Multiple-choice type questions.
 - D. Standardized tests.
6. How might a constructivist theorist describe knowledge overall?
- A. Faith.
 - B. Fantasy.
 - C. Individual thought patterns.
 - D. Shared beliefs and ideas.
7. The Zone of Proximal Development is about the _____.
- A. fact that most children can learn alone always
 - B. gap between learning alone and learning with assistance
 - C. knowledge or skill that the child already knows
 - D. intelligence level of the child at any given point
8. Which of the following best describes the theory of constructivism?
- A. Knowledge is constructed always through reasoning rather than the senses.
 - B. Knowledge is constructed through experiences and interactions with the world.
 - C. Knowledge is constructed through the influence of other people on us.
 - D. Knowledge is constructed without any external influence on the learner.
9. Which of the following is NOT one of Vygotsky's main focuses in child development?
- A. Attention.
 - B. Language.
 - C. Memory.
 - D. Social Cognition.

10. Which one of the following is the key to incorporating Vygotsky's theories in your classroom?

- A. Discovery Learning.
- B. Hands-on activities.
- C. Learning Styles.
- D. Scaffolding.

11. To the *Behaviourist*, learning involves all the following EXCEPT _____.

- A. the closeness of occurrence of event creates bondedness
- B. the environment (stimulus) shapes behaviour
- C. that learning is a change in behavior
- D. that learning is internal mental processes

12. The theory that considers learning in term of the connection between stimulus and response or between response and reinforcement is known as the _____ theory of learning.

- A. behaviourist
- B. cognitivist
- C. constructivist
- D. developmentalist

13. Some students do not have sufficient time to learn mathematics because it is a norm to help their parents out on the farm. The same students could not also afford their tuition fees for extra classes. The students' learning of mathematics is affected by which of the following factor(s)?

- I. Environmental factor
 - II. Economic factor
 - III. Psychological factor
 - IV. Social factor
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- A. I and II
 - B. I and III
 - C. I and IV
 - D. II and IV

14. One of the highest values in mathematics, like science is its _____.

- A. abstractness
- B. openness
- C. Preciseness
- D. Proofs

15. Interpersonal Intelligence is defined as having which one of the following criteria?

- A. The ability to control one's body movements and to handle objects skillfully.
- B. The ability to make use of the relationship between pitch, rhythm, and timbre.

- C. The ability to recognize and categorize plants, animals, and other objects in nature.
D. The capacity to detect and respond appropriately to the moods, and desires of others.

16. According to Vygotsky, learning cannot be separated from its _____.
17. During the harvesting of maize at the end of a farming season, a class six pupil demonstrated a high level of understanding of the concept *Sets Theorem* taught in her class a few weeks earlier. Such student was applying _____.
18. A teacher who makes use of a variety of tasks to cater for the different learning styles of his/her learners is influenced by _____.
19. The stage of development where children acquired the ability to deal with the abstract in both verbal and mathematical situations is called _____.
20. Kofi is picture smart. This means that kofi possesses _____ intelligence.

SECTION B (30 Marks)

Answer any THREE questions from this section.

The duration of this section is 90 minutes.

Note: If you answer more than three questions, only the first three questions would be marked.

1. Explain the following views about the *nature of mathematics*:
 - a) Absolutists view [5 marks]
 - b) Fallibilists view [5 marks]
2. Explain five types of intelligences that are common among the pupils you observed within the Supported Teaching School period. [10 marks]
3. Explain five instructional factors that affect learning and teaching of numeracy in schools. [10 marks]
4. Briefly distinguish between cognitive constructivism and social constructivism in mathematics education. [10 marks]
5. At the heart of the mathematics curriculum is the belief in nurturing honest, Creative, and responsible citizens. As such, every part of the mathematics curriculum, including the related pedagogy should be consistent with the set of values. Explain two of the values of learning mathematics. [10 marks]