



UNIVERSITY OF GHANA

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DEPARTMENT OF TEACHER EDUCATION

SCHOOL OF EDUCATION AND LEADERSHIP

COLLEGES OF EDUCATION

END OF SEMESTER ONE EXAMINATIONS FOR LEVEL 200, 2022/2023

B.ED. PROGRAMME

COURSE CODE: TEJS 243

COURSE TITLE: THEORIES IN THE LEARNING OF MATHEMATICS (JHS)

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

Time: 2 hours

SECTION A

[25 Marks]

Answer all the questions in this section.

- 
1. Platonism argues that mathematical concepts and principles are                 
    - A. human inventions that can change over time
    - B. limited to practical applications and lack intrinsic meaning
    - C. objective reality and exist as eternal, unchanging entities
    - D. only applicable to the physical world and not beyond it

2. Which one of the following statements best reflects the role of effective teachers in teaching and learning mathematics?
- A. Effective teachers emphasize the importance of a balanced instructional approach in school.
  - B. Effective teachers focus on enabling students and teachers to always achieve success at school.
  - C. Effective teachers integrate instructional approaches to meet students' diverse learning needs.
  - D. Effective teachers prioritize college and career readiness in life beyond the four walls of school.
3. How can teachers effectively address the multiple intelligences of their students in the classroom?
- A. By focusing primarily on the dominant intelligences of most students in the class.
  - B. By giving students opportunities to engage with various intelligences through activities.
  - C. By labeling students with specific intelligence types and treating them accordingly.
  - D. By neglecting the existence of multiple intelligences and focusing on academic content.
4. Which is the correct sequence of Piaget's stages of cognitive development?
- A. Pre-operational, concrete operational, formal operational, sensorimotor
  - B. Pre-operational, informal operational, formal operational, post-operational
  - C. Sensorimotor, concrete operational, formal operational, post-operational
  - D. Sensorimotor, pre-operational, concrete operational, formal operational
5. Platonist philosophy posits that mathematical truths \_\_\_\_\_
- A. are arbitrary and depend on individual perspectives.
  - B. are contingent upon empirical evidence and observations.
  - C. are discovered rather than invented by humans.
  - D. vary across different cultures and societies.
6. Which of the following statements best reflects the relationship between teachers' beliefs about the nature of mathematics and their teaching practices?
- A. Teachers' beliefs about the nature of mathematics directly influence their teaching practices and instructional approaches.
  - B. Teachers' beliefs about the nature of mathematics have no impact on their teaching practices and classroom management.
  - C. Teachers' beliefs about the nature of mathematics influence their teaching practices through curriculum reform movements.
  - D. Teachers' beliefs about the nature of mathematics only affect their curriculum implementation but not their teaching practices.

7. How do teachers' attitudes impact the teaching of mathematics?

- A. They affect students' commitment to national development.
- B. They determine students' willingness to participate in debates.
- C. They influence the classroom atmosphere and ethos.
- D. They shape the students' values and psychosocial skills.

8. An inclusive classroom is a classroom where \_\_\_\_\_

- A. assessments are repeated till the time every learner achieves maximum grades
- B. teachers create diverse and meaningful learning experiences for every learner
- C. teachers only teach from prescribed books to lessen the burden of the students
- D. there is active participation of children in solving as many problems as possible

9. For effective teaching of mathematics, which one of the following must be most prevalent?

- A. Adherence to strategies and processes,
- B. Appropriate use of mathematical vocabulary,
- C. Providing a serene environment,
- D. Randomization and efficiency.

10. How can the value of commitment to achieving excellence impact the teaching of mathematics?

- A. It encourages teachers to prioritize speed and efficiency in solving problems, overlooking conceptual understanding.
- B. It leads teachers to discourage creative and critical thinking in favour of rote memorization and repetition.
- C. It motivates teachers to set high expectations for their students and provide them with challenging math tasks.
- D. It promotes a lack of effort and engagement in teaching mathematics, resulting in low academic standards.

11. Which of the following is an important element of effective mathematics teaching that involves creating purposeful learning experiences for students?

- A. Integrating assessment into instructional practice,
- B. Offering an appropriate mathematical challenge,
- C. Providing a supportive learning environment,
- D. Solving problems in relevant and meaningful contexts.

12. In a constructivist classroom, as envisioned by Piaget and Vygotsky \_\_\_\_\_

- A. learning happens through the pairing of a stimulus and a response
- B. reinforcement by the teacher stimulates learning to take place
- C. students actively construct learning for themselves with guidance
- D. students passively receive learning from the teacher sometimes

13. Which of the following statements best describes the cognitive learning perspective of learning mathematics?

- A. Cultural factors primarily influence the social process of learning mathematics.
- B. Learning mathematics involves the acquisition of facts and procedures through imitation.
- C. Learning mathematics involves the active construction of knowledge through reasoning.
- D. Learning mathematics is based on the memorization and repetition of concepts.

14. Materials like food for hungry animals or water for thirsty animals are called \_\_\_\_\_ reinforcers.

- A. fixed
- B. intermittent
- C. primary
- D. secondary

15. Which of the following statements best describes the concept of intelligence?

- A. Genetic factors are the only ones that determine intelligence.
- B. Intelligence is a fixed trait that remains constant for life.
- C. Intelligence is a measure of one's social and emotional skills.
- D. Intelligence is a multifaceted cognitive ability that can be developed.

16. Punishment is effective only when it weakens the \_\_\_\_\_ response.

- A. desirable
- B. negative
- C. positive
- D. undesirable

17. A belief that mathematics is the most/least important concept and very useful/useless describes your \_\_\_\_\_

- A. attitude
- B. cognition
- C. skills
- D. understanding

18. Teamwork teaches essential concepts and social skills such as \_\_\_\_\_

- A. be unique in your own way
- B. time is the only factor
- C. we are stronger together
- D. your success is your own responsibility

19. In Piaget's stages of cognitive development, the emergence of language is one of the major hallmarks of the \_\_\_\_\_ stage of development.

- A. concrete operational
- B. formal operational
- C. preoperational
- D. sensorimotor

20. According to the theory of multiple intelligences, which of the following is NOT one of the identified intelligences?

- A. Athletic intelligence
- B. Logical-mathematical intelligence
- C. Musical intelligence
- D. Spatial intelligence

21. Major Characteristics and Developmental Changes of children from '2 to 7 Years' include the following EXCEPT \_\_\_\_\_

- A. children are better with language and thinking, but they think in very concrete terms
- B. children at this stage are egocentric and struggle to see from the perspective of others
- C. children think things continue to exist even though they cannot be seen with their eyes
- D. children think symbolically and learn to use words and pictures to represent objects

22. Inductive reasoning is a thinking process used when a set of data is presented and students are asked to \_\_\_\_\_

- A. draw a conclusion
- B. give examples
- C. make a specification
- D. provide a justification

23. The sociocultural theory of learning does NOT assume that \_\_\_\_\_

- A. cognitive development can be separated from culture
- B. development is studied by examining the process of change
- C. people's thinking differs dramatically from one another
- D. thinking is transformed through the use of tools

24. The following are true of behaviourism principle, with the EXCEPTION \_\_\_\_\_

- A. of desirable human behaviour is more the product of design than accident
- B. of some learning conforming to the basic stimulus-response model
- C. that inborn factors have a lot of influence on behaviour and learning ability
- D. that it is an illusion to say that humans have free will; this can never be

25. The socio-cultural theory developed from the work of which of the following psychologists?

  - A. Albert Bandura
  - B. Aleksei, N. Leont'ev
  - C. Jean Piaget
  - D. Lev Vygotsky

## SECTION B

[75 Marks]

Answer any THREE questions in this section

- 1

(a) In no more than **FIVE** sentences, list the classroom implications of 10 Marks Behaviorism theory. 5 Marks

(b) State any **Five** of the key principles of behaviourism. 9 Marks

(c) Explain **THREE** of the criticisms of behaviourism 1 Mark

(d) State any of the behavioural theorists

2

(a) Explain how Sociocultural learning theory affect learning in a 6 Marks mathematics classroom.

(b) What are the implications of teachers' beliefs in the teaching and learning of mathematics? 6 Marks

(c) Explain **FOUR** of the values that must be inculcated in the learners along with the mathematics content as indicated by the new mathematics curriculum. 8 Mark

(d) As the organizer of the mathematics club in your school, what are the 5 Marks **FIVE** tips for mathematics success that you will give to the new senior high school students during their orientation?

3

(a) Explain any **FOUR** ways in which the Multiple Intelligence Theory guides the teaching, learning and assessment of mathematics in inclusive classrooms at the Junior High School level? 12 Marks

(b) As a pre-service mathematics teacher, briefly explain the importance of mathematical vocabulary to the Junior High School pupil. 2 Marks

- (c) Explain any **FIVE** of the factors that influence the teaching and learning of mathematics in Ghanaian junior high schools.
- (d) Who propounded the theory of multiple intelligence? 1 Mark

4

- (a) Explain how Cognitive Learning Theory affect learning in a mathematics classroom. 6 Marks
- (b) What are the implications of teachers' values for the teaching and learning of mathematics?
- (c) State **FOUR** of the assumptions that underlie the current junior high school mathematics curriculum.
- (d) Explain how **THREE** of the stated assumptions in 4(c) shape the teaching and learning of mathematics in this context. 9 Marks

5

- (a) Explain multiple intelligences. 2 Marks
- (b) List any **FIVE** of the multiple intelligences 5 Marks
- (c) Explain any **FIVE** of the listed multiple intelligences in 5(b) with practical illustrations. 10 Marks
- (d) Students encounter varied feelings in the mathematics classroom. 8 Marks  
Describe an activity you would take learners through to help them understand feelings.