Candidate's Index Number
Signature:

UNIVERSITY OF CAPE COAST
COLLEGE OF EDUCATION STUDIES
SCHOOL OF EDUCATIONAL DEVELOPMENT AND OUTREACH
INSTITUTE OF EDUCATION

COLLEGES OF EDUCATION
FOUR-YEAR BACHELOR OF EDUCATION (B.ED)
THIRD YEAR, FIRST SEMESTER MID-SEMESTER QUIZ, JULY 2023

25TH JULY 2023   PEDAGOGICAL CONTENT   12:00 PM – 12:30 PM
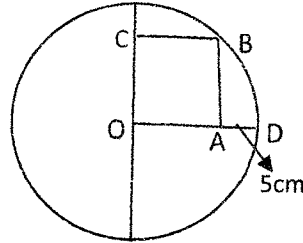   KNOWLEDGE IN MATHEMATICS

Answer ALL the questions.
(20 MARKS)

Items 1 to 20 are stems followed by four options lettered A to D. Read each item carefully and circle the letter of the correct or best option.

1. The suggestion that teachers *listen attentively* to their students as a way of promoting reflective thinking is exemplified in ....
   I. making teaching more child-centred
   II. teachers encouraging students' thoughts more than theirs
   III. teachers believing their students' ideas

   A. I and II only
   B. I and III only
   C. I, II and III
   D. II and III only

2. Mathematics tasks that appear to be unfamiliar and the pathways to finding their solutions also appear to be unfamiliar are classified under ....
   A. exercise.
   B. induction.
   C. investigation.
   D. problem.

3. The three main components of a problem in mathematics are ....
   A. current situation, exercise and investigation activities.
   B. current situation, strategies and practice exercises.
   C. goal, strategies and investigation activities.
   D. initial state, desired outcome and path to the goal.

4. In the diagram below, the **rectangle** OABC has one vertex at O, the centre of the circle. The vertices B and D lie on the circumference of the circle and the vertex A is 5cm from D as shown. The vertex A is also a distance of 14 cm from C. What is the radius of the circle?
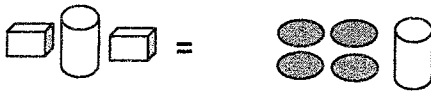   A. 9.0 cm
   B. 10.7 cm
   C. 14.0 cm
   D. 19.0 cm

5. Which of the following are characteristics of a typical successful problem solver? He/She needs to ....
       I.   be concerned about the messiness or neatness of work.
       II. have a positive attitude toward mathematics.
       III. disregard critical elements and be attentive to irrelevant ones.
       IV. resist distractions and be a divergent thinker.

   A. I and II only
   B. I and III only
   C. II and III only
   D. II and IV only

6. Which of the following is described as the *process of finding the unknown means to a distinctively conceived end*?
   A. Exercise development
   B. Problem-solving
   C. Puzzle posing
   D. Technique development

7. The teaching strategy in which the teacher assigns a mathematics task to students and allow them to ponder as individuals for about a minute; then the students team up with a partner for finding the solution, and then later discuss their solutions with the rest of the class is referred to as ....
   A. before-during-after.
   B. think-pair-share.
   C. think-share-before.
   D. three-part-format.

8. The instructional strategy in which the teacher spends a little amount of time at the introductory stage to review an idea and then goes into the action of allowing students to do a series of exercises, is often labelled ....
   A. before-during-after pattern.
   B. exercise-problem-solving strategy.
   C. explain-then-practice pattern.
   D. think-pair-share strategy.

9. The following statements are implications of the developmental approach to teaching mathematics **except** ....
   A. allowing students to construct their own knowledge and understanding.
   B. believing that each mathematics student has unique pedagogical knowledge.
   C. making reflective thinking a very important ingredient for effective learning.
   D. recognizing effective teaching as a student-centred activity.

10. Which one of the following mathematical processes **best** helps students to develop their "mathematical power"?
    A. Computation
    B. Exercises
    C. Memorizing
    D. Problem-solving

11. Which of the following is/are **not** true about mathematical investigation?
    I.   An open statement that lends itself to multiple pathways leading to a variety of solutions.
    II. What is asked in the task is known but a direct way of solving it is not readily apparent.
    III. What is asked in the task is not necessarily known, so is the way of solving it.

    A. I and II only
    B. I and III only
    C. II only
    D. III only

12. "General suggestions or strategies which are usually independent of any particular subject matter and which are intended to help problem solvers tackle, understand and organize a solution" is a description that **best** fits ....
    A. algorithms.
    B. conjectures.
    C. heuristics.
    D. investigations.

13. Which of the following are appropriate ways of structuring mathematics lessons to promote reflective thought?
    I.   Pose worthwhile mathematical tasks
    II. Create a mathematical environment
    III. Encourage individual work and discourse

    A. I and II only
    B. I and III only
    C. .I, II and III
    D. II and III only

14. What does the letter 'A' in the problem-solving model with the acronym 'IDEAL' stand for?
    A. Anticipate outcomes
    B. Attack possibilities
    C. Attempt solution
    D. Attract outcomes

15. Which one of the following mathematics processes **least** helps in creating contexts which stimulate real life?
    A. Investigation
    B. Problem-solving
    C. Puzzle cracking
    D. Working exercises
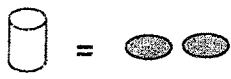
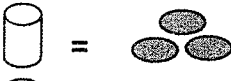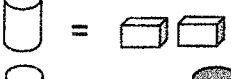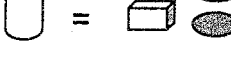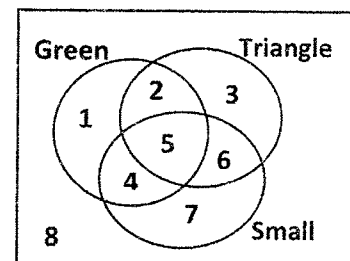16. Complete the balancing equation in the diagram shown below.

Balancing

A.

B.

C.

D.

17. The three-stage problem solving model which involves entry phase, attack phase and review phase is attributed to ....
   A. George Polya.
   B. Harrison.
   C. John Mason.
   D. Socrates.

18. What is the underlining principle on which the Three-Part Lesson structure is built?
   A. Mathematics can and should be taught through problem-solving.
   B. Mathematics that students learn should make them mentally passive and dependent.
   C. Pedagogical knowledge should be an integral part of problem-solving.
   D. Students should be made to solve problems that are direct and routine.

The Venn diagram below shows the regions for three attributes (shape, colour and size). Use the information in the diagram to answer questions 19 and 20.

19. Which of the following attributes *can fit* region 5?
   A. Big green triangles.
   B. Green triangles.
   C. Small green triangles.
   D. Small triangles

20. Which of the following attributes describes region 3? Triangles that are ....
   A. green and small.
   B. green but not small.
   C. neither small nor green.
   D. small but not green.