MARCH 2021
EBS 371
PEDAGOGICAL CONTENT KNOWLEDGE IN MATHEMATICS
30 MINUTES

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, MARCH 2021

MARCH 16, 2021 **PEDAGOGICAL CONTENT KNOWLEDGE IN MATHEMATICS** **12:00 PM – 12:30 PM**

Answer ALL questions. Each question carries 2 marks.

For items 1 to 13, each stem is followed by four options lettered A to D. Read each item carefully and circle the letter of the correct or best option.

1. The problem-solving model which involves the sequential stages identified as *entry phase, attack phase* and *review phase* is attributed to .....
   A. George Baiden.
   B. George Polya.
   C. IDEAL.
   D. John Mason.

2. Which mathematics teaching strategy involves teacher posing a mathematics task to students who are given about a minute to ponder as individuals, then they team up with a partner for discussion and then later discuss their solutions with the rest of class?
   A. Before-During-After.
   B. Think-Before-Sharing.
   C. Think-Pair-Share.
   D. Three-Part-Sharing.

3. A typical successful problem solver, aside being strong in mathematics, is known to .....
   A. be unconcerned about the messiness or neatness of work.
   B. disregard critical elements while being attentive to irrelevant ones.
   C. disregard relevant elements in the task.
   D. have unconcerned attitude towards mathematics tasks.

4. The "*process of searching for the unknown means to a distinctively conceived end*" specifically refers to ..... in mathematics.
   A. exercise
   B. investigation
   C. problem
   D. problem solving

5. The instructional strategy in which a 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 as .....
   A. Before-During-After pattern.
   B. Exercise-Problem solving strategy.
   C. Explain-then-Practice pattern.
   D. Think- Pair-Share strategy.

6. Which of the following are **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 & II only
   B. I & III only
   C. II & III only
   D. I, II & III

7. Which one of the following is best described as the *general suggestions or strategies which are usually independent of any particular subject matter and which are intended to keep problem solvers tackle and understand a problem and to organize a solution*?
   A. Algorithms.
   B. Conjectures.
   C. Heuristics.
   D. Investigations.

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

9. One effective tool for teaching and learning mathematics which contains a mathematical task and adequate space for students to organize their solution is termed as .....
   A. pupils' guide.
   B. task instructional.
   C. worksheet.
   D. workstation.

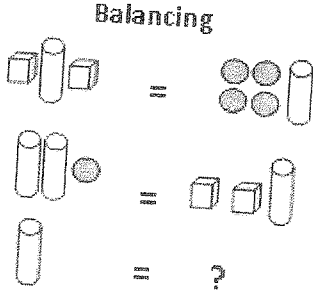
10. The correct sequence of the three components of a problem in mathematics is the .....
   A. current task, a goal and a path for reaching the goal.
   B. end goal, process for solving and prerequisite knowledge.
   C. initial state, a goal and a path for reaching the goal.
   D. initial state, prerequisite knowledge and procedure.

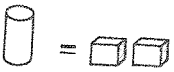
11. Which one of the following statements is **not** an implication of developmental approach to teaching mathematics?
   A. Each mathematics student has a unique pedagogical knowledge.

B. Effective teaching is a student-centred activity.
C. Reflective thinking is a very important ingredient for effective learning.
D. Students construct their own knowledge and understanding.

12. The principle that underpins the Three-Part Lesson structure is that .....
A. mathematics can and should be taught through problem solving.
B. mathematics that students learn makes them mentally passive and dependent.
C. students should be made to solve mathematics tasks that are direct and routine.
D. students' pedagogical knowledge should be an integral part of problem solving.

13. Complete the balancing equation in the diagram shown below.

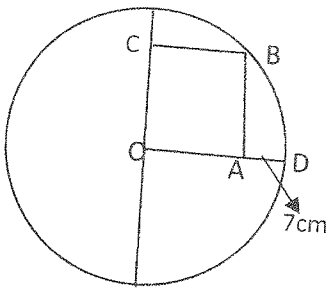


A. 
B. 
C. 
D. 

For questions 14 - 16, write your response in the space provided.

14. The **rectangle** OABC has one vertex at O, the centre of the circle. A second vertex A is 7 cm from the edge of the circle as shown. The vertex A is also a distance of **19** cm from C. What is the radius of the circle?

[2 marks]



.....
.....
.....
.....
.....
.....
.....
.....
.....

15. Place the '+' and '-' (plus and minus) symbols in the digits so as to make a sum of 100. **[4 marks]**

1 2 3 4 5 6 7 8 9

.....

.....

.....

.....

.....

.....

16. Observe the following operations:

(i)

$$\begin{array}{r} 654 \\ -\ 456 \\ \hline 198 \\ +\ 891 \\ \hline 1089 \end{array}$$

(ii)

$$\begin{array}{r} 936 \\ -\ 639 \\ \hline 297 \\ +\ 792 \\ \hline 1089 \end{array}$$

(iii)

$$\begin{array}{r} 721 \\ -\ 127 \\ \hline 594 \\ +\ 495 \\ \hline 1089 \end{array}$$

a. Describe precisely what the process (or trick) is that leads to getting 1089 anytime the process is employed. **[6 marks]**

.....

.....

.....

.....

.....

.....

.....

b. Write down **one** similar example that also results in 1089. **[2 marks]**

.....

.....

.....

.....

.....

.....

.....