Candidate's Index Number
Signature:

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

FIVE-SEMESTER BACHELOR OF EDUCATION (SANDWICH) PROGRAMME
SECOND YEAR, SECOND SEMESTER EXAMINATION, AUGUST 2020

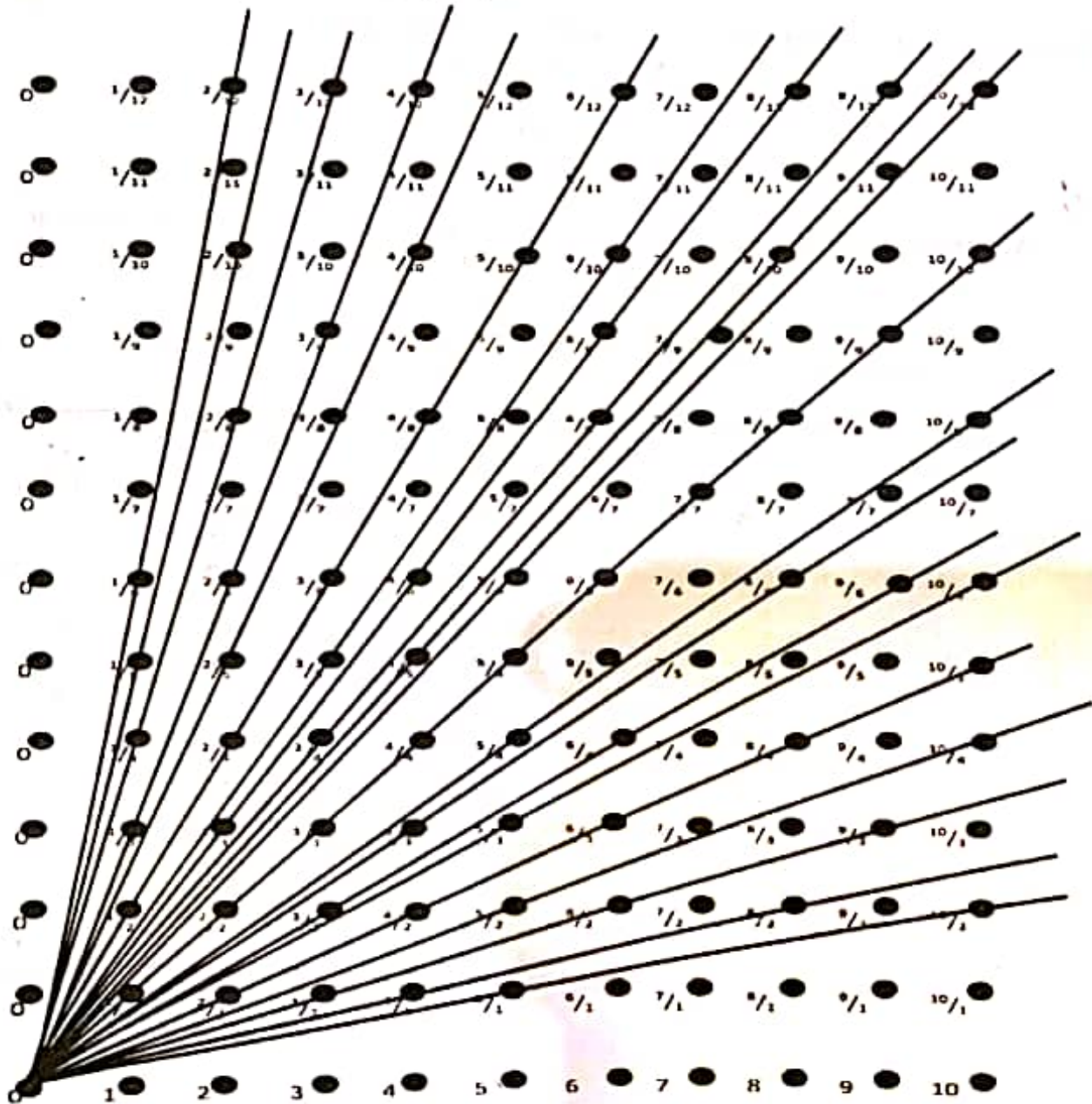AUGUST 29, 2020   DEVELOPMENT OF INSTRUCTIONAL MATERIALS   9:30 AM – 11:00 AM
IN MATHEMATICS

SECTION B
[40 MARKS]

Answer any **TWO** questions from this section in the answer booklet provided. Each
question carries 20 marks.

1.

a. Explain the following components of the TPACK:

   i. Technological Content Knowledge   [2 marks]
   ii. Technological Pedagogical Knowledge   [2 marks]
   iii. Pedagogical Content Knowledge   [2 marks]
   iv. Technological Knowledge   [2 marks]
   v. Content Knowledge   [2 marks]

b. i. Explain **three** ways in which technology is used in Mathematics education.   [6 marks]
   ii. State any **two** benefits technology adds to the teaching and learning of mathematics.
                                                                                         [4 marks]

2.

a. What is a *Professional Learning Network* (PLN)?   [4 marks]

b. State the **two** types of *Professional Learning Network* (PLN) and give one example of
   each.   [6 marks]

c. State **two** pedagogical criteria that you would follow when selecting manipulative
   materials for mathematics lesson. (material should be multipurpose   [4 marks]
   multiuse, facilitate learning.)

d. Explain the following in relation to learning technology by design:

   i. design is for a purpose   [2 marks]
   ii. design is eclectic   [2 marks]
   iii. design is complex   [2 marks]

3.

a. Define *virtual manipulatives* in mathematics learning.   [3 marks]

b. Give **three** examples of virtual manipulatives in mathematics.   [3 marks]

c. Outline **three** factors to be considered when selecting virtual manipulatives.   [3 marks]

d. Give one advantage and one disadvantage each of virtual manipulative.   [2 marks]

e. In the technological world and for that matter in the field of mathematics, computers can be used in three different ways in the teaching and learning process. Explain the three different ways.   [9 marks]

FRACTIONAL GRID

4. You have been provided with fractional grid to be used in a class.

   a. Identify *like fractions* and *equivalent fractions*.   [4 Marks]

   b. Explain *like fractions* and *equivalent fractions*.   [8 Marks]

   c. Explain how to use the fractional grid above to solve:

      (i) $\frac{1}{2} + \frac{3}{2}$ [3 Marks]

      (ii) $\frac{4}{3} - \frac{1}{4}$ [5 Marks]