UNIVERSITY OF EDUCATION, WINNEBA
INSTITUTE FOR TEACHER EDUCATION AND CONTINUING PROFESSIONAL DEVELOPMENT (ITECPD)
END-OF-SECOND-SEMESTER EXAMINATIONS, OCTOBER, 2023

LEVEL 100
COURSE CODE: EBC 122
COURSE TITLE: LEARNING, TEACHING AND APPLYING GEOMETRY AND HANDLING DATA

TIME ALLOWED: 2 HRS

STUDENT'S INDEX NUMBER:

GENERAL INSTRUCTIONS:
- This paper is made up of ONE SECTION.
- *The Section is made up of five essay type questions.*
- *Answer any THREE questions in your answer booklet.*
- *Each question carries equal marks. You are expected to start each question on a new page.*
- *You are expected to hand over your answer booklet to the invigilator before you leave the examination hall.*

Instruction: *Answer any three (3) questions in the answer booklet provided.*

1a. The diagonal of a square field is $8.77cm$.
  i.   Find the area of the square field **(3 Marks)**
  ii. Given that it cost ¢27.50 to paint $2.2cm^2$ of the wall, find how much it would cost to paint the entire fence wall of the field. **(2 marks).**

1b. In a mathematics test, the scores obtained by all students are shown in the table below:

Score	1	2	3	4	5	6	7	8	9	10
Number of students	2	3	5	10	15	30	25	15	10	5

Find the mean of their scores. **(5 Marks)**

1c. $Y(25°N, 30°E)$ and $P(25°N, 40°W)$ are two places on the surface of the earth. Calculate, correct to three significant figures, the distance from P to Y measured along the latitude. (*Take* radius of earth $= 6400km$ and $\pi = 3.14$). **(10 marks)**

2a. Using a pair compasses and ruler only, construct a triangle XYZ, given that $|XY| = 8.7cm$, $|YZ| = |XZ|$ and. $\angle XZY = 45°$ **(8 marks)**
**2b.** Locate M as center, such that $|YZ| = |XZ| = |XY|$ **(4 marks)**
2c. With M as center, draw a circle which touches the three sides of $\triangle XYZ$.

                                                      (4 marks)
2d. Measure the radius of the circle and find the perimeter of $\triangle XYZ$.   **(4 marks)**

3a. Describe how you can assist a learner to find the sum of the interior angle of a pentagon without measuring.   **(10 marks)**

3b. In the diagram below, O is the centre of the circle of radius 8cm. Find the area of the shaded region, correct to 2 significant figures, and take $\pi = \frac{22}{7}$ **(7 marks)**
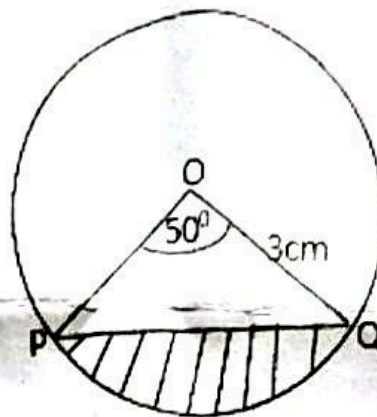
3c. Two fair coins are tossed once. Write down the set of all possible outcomes and find the probability of obtaining:

     i.   Exactly two tails
     ii.   No tail
     iii.   A head and a tail   **(3 marks)**

4a. The table below shows the distribution of students in a class who studied mathematics and English. Copy and complete the table;

Variable	Mathematics	English	Total
Boys	A	B	48
Girls	24	C	52
Total	D	39	E

If a student is selected at random, find the probability that the student is

    i.   Studying mathematics
    ii. A girl
    iii. If a boy is chosen at random, what is the probability that he is studying English?

                                      (6 marks)

4b. Using a ruler and a pair of compasses only, construct a quadrilateral ABCD, where $|AB| = 8cm$, $|AD| = 6cm$, $|BC| = 10cm$ and $\angle BAD = 60°$ and $\angle ADC = 135°$

    i.   The locus l_1 of point equidistant from BC and CD.
    ii. The line l_2 from B perpendicular to l_1
    iii. Locate E the point of intersection l_1 and l_2.
    iv. Measure $|AE|$

                                        (12arks)

5a. A box contains 15 identical balls of which 8 are Green and the remaining are Red. What is the probability of selecting two red balls if the selection is done?

    i.   With replacement   **(2 Marks)**
    ii. Without replacement.   **(2 Marks)**

5b. A ladder, 8 m long, leans against a vertical wall at an angle of 60^0 to the ground. If the ladder slips down the wall 3 m, find, correct to 2 decimal places, new angle the ladder makes with the ground   **(6 marks)**

5c. If $M(9,7)$ and $N(7,3)$ are in the OXY plane

    i.   Find the coordinates of the point R such that $\overrightarrow{OR} = \overrightarrow{OM} + \frac{1}{2}\overrightarrow{NM}$.

                                        (6 marks)

    ii. Calculate, correct to the nearest degree, the angle $\overrightarrow{OR}$ makes with the horizontal axis.   **(4 marks)**