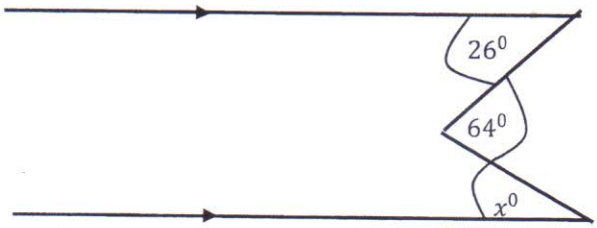
UNIVERSITY OF GHANA

DEPARTMENT OF TEACHER EDUCATION
SCHOOL OF EDUCATION AND LEADERSHIP
COLLEGES OF EDUCATION
END OF SEMESTER TWO EXAMINATIONS FOR LEVEL 100, 2022/2023
B.ED. PROGRAMME
COURSE CODE: **TEJS 104/TEUP106/TEEG104**
COURSE TITLE: **LEARNING, TEACHING, AND APPLYING GEOMETRY AND HANDLING DATA**

Instruction: Answer **all** questions in Section A and any **three** questions in Section B.
Time: 2 hours

SECTION A
[25 Marks]
Answer all the questions in this section.

1. Solve for x in the diagram.



A. 26^0
B. 28^0
C. 38^0
D. 64^0

2. Two interior angles of a hexagon are 120^0 *and* 180^0. If the remaining angles are the same, find the measure of each equal angle.
   A. 180^0
   B. 120^0
   C. 105^0
   D. 90^0

3. A rectangle with length 11cm has a perimeter equal to 38cm. Calculate the area of the rectangle.
   A. $80cm^2$
   B. $88cm^2$
   C. $292cm^2$
   D. $418cm^2$

4. The sum of interior angles of a regular polygon is 1260^0. How many sides has the polygon?
   A. 6
   B. 7
   C. 8
   D. 9

5. A basic school learner decided to draw two intersecting lines and name them OX and OY. She placed a compass at O and drew an arc to intersect OX and OY at A and B respectively. With the compass point at A with a reasonable radius, she drew an arc in the space between XY and repeated same with compass point at B intersecting at C. What is the locus drawn from O through C?
   A. Perpendicular bisector.
   B. Angle bisector.
   C. Circle bisector.
   D. Intersection bisector.

6. The government of Ghana decided to build a chip compound for three compounding villages AB and C. An architect was engaged to help locate a place for the project, so he located the project at a point which is equidistant to the paths connecting the three villages. This means that the architect_____.
   A. Bisected the paths connecting the villages.
   B. Bisected the angles connecting the villages.
   C. Bisected the centre connecting the villages.
   D. Bisected the squares connecting the villages.

7. Without using tables, find the value if $sine30^0$
   A. 0.87
   B. 0.57
   C. 0.50
   D. 0.25

8. Given that $\cos 45^0 = \frac{1}{\sqrt{2}}$, find $\tan 45^0$
   A. $\frac{1}{\sqrt{2}}$
   B. $\frac{1}{\sqrt{3}}$
   C. $\frac{2}{\sqrt{2}}$
   D. 1

9. The diagonal of a rectangle is 17cm. If the length of the rectangle is 15cm, calculate the width of the rectangle.
   A. 7cm
   B. 8cm
   C. 10cm
   D. 14cm

10. A ladder of length 2.5meters leans against a wall, making an angle of $65^0$with the ground. Find the distance from the base of the ladder to the base of the wall. Leave your answer in 2dp.
   A. 10.56m
   B. 2.05m
   C. 1.05m
   D. 1.06m

11. Given that $\boldsymbol{a} = \begin{pmatrix}5\\3\end{pmatrix}$ *and* $\boldsymbol{b} = \begin{pmatrix}x-3\\y+4\end{pmatrix}$, find the values of x and y when **a** = **b**.
   A. $x = 1, and\ y = 8$
   B. $x = 8, and\ y = 1$
   C. $x = -1, and\ y = 8$
   D. $x = 8, and\ y = -1$

12. Given that $\overrightarrow{AB} = \begin{pmatrix}4\\2\end{pmatrix}$ $and\overrightarrow{AC} = \begin{pmatrix}-4\\-6\end{pmatrix}$, find the vector $\overrightarrow{BC}$.
   A. $\begin{pmatrix}8\\8\end{pmatrix}$
   B. $\begin{pmatrix}-8\\-8\end{pmatrix}$
   C. $\begin{pmatrix}0\\4\end{pmatrix}$
   D. $\begin{pmatrix}0\\-4\end{pmatrix}$

13. The bearing of town A from B is 075^o. Determine the bearing to B from A.
   A. 075^o
   B. 105^o
   C. 150^o
   D. 255^o

14. Which of the following vectors is parallel to the vector $\begin{pmatrix}-4\\3\end{pmatrix}$?
   A. $\begin{pmatrix}12\\9\end{pmatrix}$
   B. $\begin{pmatrix}8\\6\end{pmatrix}$
   C. $\begin{pmatrix}-8\\6\end{pmatrix}$
   D. $\begin{pmatrix}-8\\-6\end{pmatrix}$

15. A circular wire ring has a diameter of 21cm. Find the length of the wire. (Take $\pi = 22/7$)

A. 33cm
B. 36cm
C. 66cm
D. 132cm

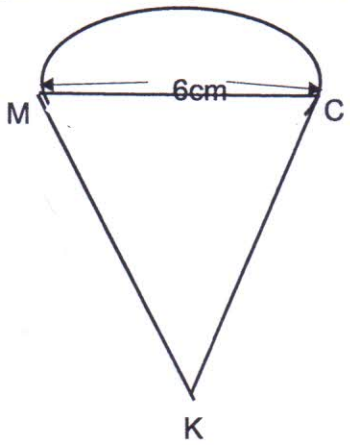
16. The minute hand of a clock moved from 12 to 4. If the length of the minute hand is 3.5cm, find the area covered by the minute hand. [take $\pi = \frac{22}{7}$

A. $4.3cm^2$
B. $6.4cm^2$
C. $9.6cm^2$
D. $12.8cm^2$

17. The length of a rectangular field is 15m longer than the width. If the perimeter is 380m, find the length of the field.

A. 72.5m
B. 87.5m
C. 102.5m
D. 115.0m

18. The diagram below is a plane figure consisting of a semi-circle of diameter 6cm on an equilateral triangle. Find, correct to 2dp the perimeter of the figure.



A. 15.43cm
B. 21.43cm
C. 27.43cm
D. 33.43cm

19. Which of the following best describes a prism? A solid figure with a _____.

A. triangular base
B. square base
C. more cross-sections
D. uniform cross-section

20. A glass cylinder has a curved surface area of $440cm^2$. The diameter of the glass is 10cm. calculate its height. [take $\pi = \frac{22}{7}$]

A. 14.0cm
B. 10.8cm
C. 7.0cm
D. 5.6cm

21. Which one of the following represents the radius of the earth?

A. 3400km
B. 4400km
C. 5400km
D. 6400km

22.P(lat. 40^0N, long. 18^0 W) and Q(lat. 40^0N, long. 78^0 W) are two cities on the earth surface. Calculate the radius of the parallel of latitude on which P and Q lie, correct to the nearest 10km.

A. 6400km
B. 5400km
C. 4900km
D. 3900km

23. The following data was collected during a survey during an STS program. Calculate the mean mark.

Marks	16	17	18	19	20
No. of learners	2	8	4	4	2

A. 15.3
B. 16.8
C. 17.0
D. 17.8

24. In an examination, Dede scored 72% in Mathematics, 68% in Chemistry and y% in Physics. If her mean mark in the three subjects was 65%, find y.

A. 50

B. 55

C. 60

D. 65

25. In a race, 3 students competed from Green House, 2 from Red House, 4 from the Blue House and 1 from the Yellow House. What is the probability that a student from the Blue House will come first, if there is no tie?

A. $\frac{2}{5}$

B. $\frac{1}{5}$

C. $\frac{3}{10}$

D. $\frac{7}{10}$

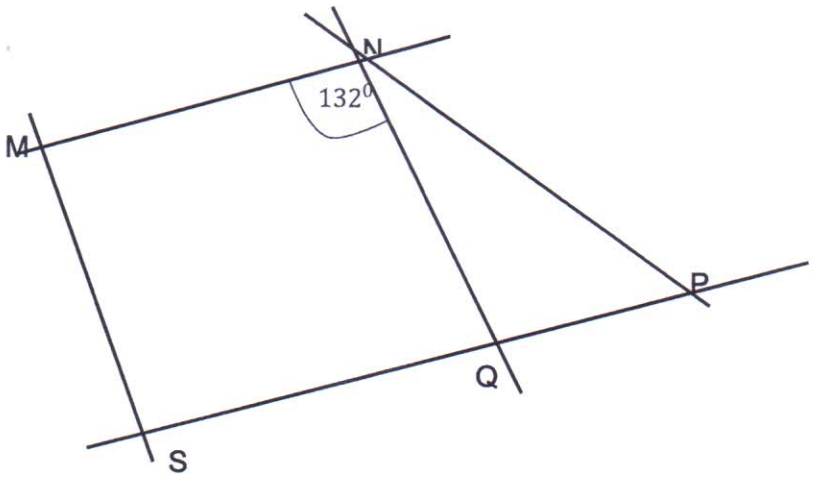
SECTION B

[75 Marks]

Answer any three questions in this section.

1.a In the diagram, MNPS is a quadrilateral. A line is drawn through N to cut SP at Q. Angle MNQ = 132^0, angle SMN is twice angle MSQ and angle NPQ is twice angle QNP. If NP bisects the acute angle at N, find: [15marks]

i. Angle SQN.
ii. Angle MSQ.



1b. Using diagrams, sketch the following towns on the Globe. [10Marks]

i. Q(60^o N, 40^o E)
ii. M(70^o S, 30^o W)
iii. B(20^o N, 40^o E)
iv. Y(60^o N, 40^oW)
v. W(50^o S, 40^oE)

2 Using a ruler and a pair of compasses only, [25 Marks]

a. Construct ΔPRQ such that, $|PQ| = 9cm$, $\angle PQR = 75^0$ and $\angle QPR = 60^0$

b. Locate a point T, inside ΔPRQ such that it is equidistant from $\overline{RQ}$, $\overline{RP}$, *and* $\overline{PQ}$.

c. Construct a circle which touches the three sides of ΔPRQ and measure its radius.

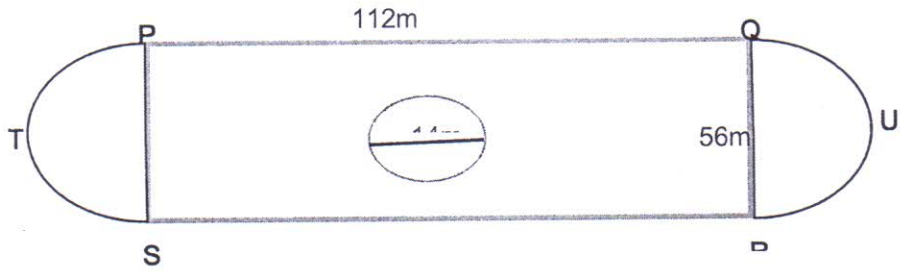
3a. Two points A and C, on the opposite sides of a vertical pole, are on the same level ground as the foot of the pole, B. the angles of elevation of the top of the pole D from A and C are 30^0 and 48^0 respectively. If the distance between A and C is 50m, find $|BD|$, height of the pole. [15Marks]

3b. If $\mathbf{a} = \begin{pmatrix} 1 \\ -3 \end{pmatrix}$, $\mathbf{b} = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$ and $\mathbf{c} = \begin{pmatrix} 8 \\ 3 \end{pmatrix}$, find [10Marks]

i) m and n such that, $\mathbf{c} = m\mathbf{a} + n\mathbf{b}$, where m and n are scalars.

ii) $|\boldsymbol{d}|$ if $\mathbf{d}=\mathbf{c}-2\mathbf{a}$ (leaving your answer to the nearest whole number).

4 The diagram represents a field with a circular pond of diameter 14m. PTS and QUR are semi-circles. PQRS is a rectangle with $|PQ| = 112m$ and $|QR| = 56m$. [25Marks]



Find :

a. The distance round the pond

b. The area of the field excluding the pond. [take $\pi = \frac{22}{7}$]

5. The table below shows the distribution of marks obtained by students in an examination. [25Marks]

Marks	Frequency
11-20	5
21-30	21
31-40	15
41-50	43
51-60	10
61-70	14
71-80	7
81-90	3
91-100	2

a. Draw a histogram to represent the above data.
b. Use your histogram to estimate the mode.
c. Find the class that contains the median mark.
d. If a student is chosen at random, find the probability that he obtains a mark between 41 and 90.