UNIVERSITY OF GHANA

DEPARTMENT OF TEACHER EDUCATION

SCHOOL OF EDUCATION AND LEADERSHIP

COLLEGES OF EDUCATION

END OF YEAR TWO SEMESTER TWO EXAMINATIONS, 2020/2021

B.ED. PROGRAMME

COURSE CODE: **TEJS 104**

COURSE TITLE: **TEACHING AND APPLYING GEOMETRY AND HANDLING DATA (TEJS 104)**

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

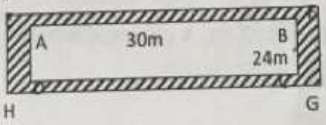
Time: 2 hours

1. The measure of two of the angles in a triangle are 35° and 75°. What special name will you give to this polygon?

A. Regular pentagon
B. Scalene triangle
C. Isosceles triangle
D. Equilateral triangle

2. A rectangular park of length 30 m and breadth 24 m is surrounded by a 4 m wide path. Find the area of the path.

A. 496 m^2
B. 596 m^2
C. 696 m^2
D. 396 m^2



3. What name is given to a locus of points which moves in space such that at any point in time, its distance is always equal to |PQ| and |PR|?

A. Perpendicular bisector of |QR| with foot at P

B. Parallel lines with P distance apart

C. Circumference of a circle centre P

D. Angle bisector with vertex at P

4. The sum of the interior angles of a regular polygon is 900°. Find the number of sides of the polygon.

$(n-2)180 = 900$

$n = 7$

A. 6

B. 7

C. 8

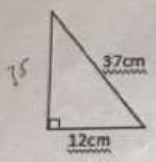
D. 9

5. The exterior angle of a hexagon are n, 2n, 3n, 4n and 5n. Calculate the value of n.

$n+2n+3n+4n+5n$

A. 24°
B. 36°
C. 48°
D. 72°

6. Find the perimeter of the figure below



A. 35cm
B. 47cm
C. 84cm
D. 210cm

7. Express the true bearing of 250^0 as a compass bearing .

A. $N20^0E$
B. B. $S20^0E$
C. C. $S70^0W$
D. D. $N70^0E$

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8. If $270^0 < \theta < 360^0$ and $\cos\theta = 0.6$, find $\sin\theta$ and $\tan\theta$ without using tables.

A. $\sin\theta = \frac{4}{5}$ and $\tan\theta = \frac{4}{3}$

B. $\sin\theta = \frac{3}{5}$ and $\tan\theta = -\frac{4}{3}$

C. $\sin\theta = -\frac{4}{5}$ and $\tan\theta = -\frac{4}{3}$

D. $\sin\theta = -\frac{4}{5}$ and $\tan\theta = \frac{3}{4}$

9. The table below shows the scores of a group of students in a test.

Scores	1	2	3	4	5	6
No. studs	1	4	5	6	x	2

If the average score is 3.5 , find the value of x.

A. 1
B. 2
C. 3
D. 5

10. M(-3, 6) and N(a, b) are points on the number line. If $\overrightarrow{MN} = \begin{pmatrix} 2 \\ -2 \end{pmatrix}$, find the values of a and b.

A. $\begin{pmatrix} -1 \\ 4 \end{pmatrix}$

B. $\begin{pmatrix} -5 \\ 4 \end{pmatrix}$

C. $\begin{pmatrix} -5 \\ 8 \end{pmatrix}$

D. $\begin{pmatrix} -1 \\ -8 \end{pmatrix}$

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11. In the diagram, O is the centre of a circle of radius 5cm. If the angle POS is 60°; what is the area of the shaded sector?

A. $20\frac{5}{6}\pi$ cm²

B. $8\frac{1}{3}\pi$ cm²

C. $4\frac{1}{6}\pi$ cm²

D. $1\frac{2}{3}\pi$ cm²

12. What is the unit vector of $\mathbf{a} = 8\mathbf{i}+6\mathbf{j}$?

A. $\frac{1}{10}(8\mathbf{i}-6\mathbf{j})$

B. $\frac{1}{10}(8\mathbf{i}+6\mathbf{j})$

C. $\frac{1}{5}(8\mathbf{i}+6\mathbf{j})$

D. $\frac{1}{5}(8\mathbf{i}-6\mathbf{j})$

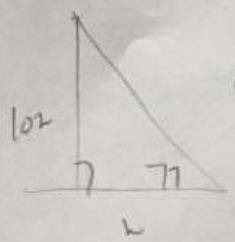
13. A cliff is 102m high. From the top of the cliff angle of depression of a boat is 27°. Find the distance of the boat from the foot of the cliff.

A. 104m

B. 114m

C. 200m

D. 244m



4

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14. Which of the following is **not** considered as the differences between a triangular prism and triangular pyramid?

A. A triangular prism has a uniform cross section whereas a triangular pyramid has a non-uniform cross section.

B. A triangular prism has five (5) faces whereas a triangular pyramid has four (4).

C. All the faces of a triangular pyramid other than the base are tapered to a point (apex)

D. A triangular prism has eight (8) edges whereas a triangular pyramid has four (4)

15. The length of a side of an equilateral is 10cm. find the height of the triangle.

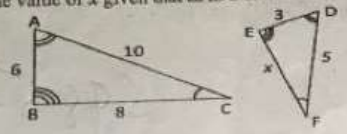
A. 11.18cm

B. 10.00cm

C. 8.66cm

D. 5.00cm

16. Find the value of x given that ΔABC and ΔDEF below are similar.



A. 4

B. 6

C. 8

D. 10

17. A man starts from a point A and walks 1000m on a bearing of 025.

How far north is he from his starting point?

A. 432m

B. 906m

C. 609m

D. 9060m.

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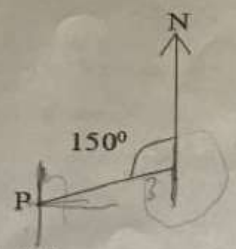
18. State the bearing of the point P from the origin in the following diagram.



A. 105°

B. 150°

C. 205°

D. 210°

19. In triangle PQR $\overrightarrow{PQ} = \begin{pmatrix} -3 \\ 5 \end{pmatrix}$, and $\overrightarrow{RP} = \begin{pmatrix} 4 \\ 2 \end{pmatrix}$, find $|\overrightarrow{QR}|$.

A. $5\sqrt{2}$

B. 4

C. $\sqrt{10}$

D. $\sqrt{13}$

20. Two towns P and Q are (4° N, 40° W) and (4° N, 20° E) respectively. What is the distance between them along the latitude? Take $\pi = \frac{22}{7}$, R = 6400

A. 4600 km

B. 4616 km

C. 5800 km

D. 6688km

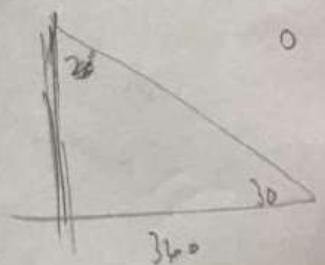
21. The angle of elevation of the top of a tower from a point on the ground is 30°. If the point is 36m away from the foot the tower find the height of the tower

A. 62.35m

B. 20.78m

C. 18.00m

D. 10.39m



6

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22. Data obtained by measuring the temperature of a patient is.....

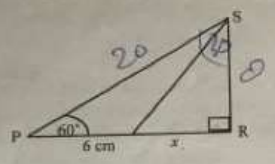
A. ordinal data

B. nominal data

C. continuous data

D. discrete data

23. In the diagram above, $|PS| = 20$cm, $|PQ| = 6$ cm, $|QR| = x$ cm, $\angle SPR = 60^\circ$ and $\angle SRP = 90^\circ$, find x



A. 4

B. 6

C. 10

D. 11.32

24. What method/instrument is suitable for collecting the following data: *assessing a lesson being delivered by a mathematics teacher as strong or weak.*

A. Observation

B. experiment

C. clinical interview

D. written test

25. If $\sin x = \frac{1}{q}$, which of the following is equal to tan x.

A. $\frac{1}{\sqrt{q^2-1}}$

B. $\frac{\sqrt{q^2-1}}{q}$

C. $\frac{1}{\sqrt{q^2+1}}$

D. $\frac{\sqrt{q^2+1}}{q}$

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SECTION B

Answer three questions from this section

1. a) Two circles of radii 3 cm and 4 cm have their total areas as a third circle. Find the radius of the third circle. (Take $\pi = \frac{22}{7}$) [7 marks]

(b) A sector of angle 75° is removed from a thin circular sheet of radius 10cm and folded to form a right circular cone. Find the volume of the cone. (Take $\pi = \frac{22}{7}$) [8 marks]

c) If two balls are drawn at random one after the other, what is the probability that both of them will be

(i) black, if there is no replacement? [5 marks]

(ii) blue, if there is a replacement? [5 marks]

2a). Construct triangle ABC such that $|AB| = 8cm$, $\angle ABC = 30^0$ *and* $\angle BAC = 105^0$

i. The locus l_1 of points equidistant from A and B [5 marks]

ii. The locus l_2 of points equidistant from B and C [5 marks]

iii. Locate P, the point of intersection of l1 and l2. [2 marks]

iv. Using PC as radius draw a circle [5 marks]

b) A ship sails from Port R on a bearing of 065° to Port S a distance of 54km. It then sails on a bearing of 155 °from Port S to Port Q, a distance of 80km. Find, correct to one decimal place:

i) the distance between R and Q [4marks]

ii) the bearing of Q from R [4 marks]

3a) The table below gives the data of mass of patients who attended hospital after a major festival.

Mass (kg)	42	45	51	54	57	60	63
Freq	4	13	11	25	20	12	9

Find the

i) mode [3 marks]

ii) Median [4 marks]

iii) Mean [6 marks]

8

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b) Provide one real life example of
(i) independent event [3 marks]
(ii) mutually exclusive events [3 marks]
(iii) impossible events [3 marks]
(iv) conditional probability [3 marks]

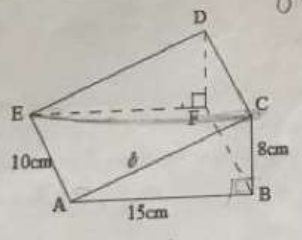
4a) Design an activity you would use to assist JHS 1 students to deduce that the circumference of a circle is given as $C = 2\pi r$ [8marks]

b) A parallelogram ABCD has vertices A(1,3), B(-2,5), C(1,8) and D(m,n), find the coordinates of D [5marks]

c) The probability that a school will be opened on Saturday is 0·3 and the probability that a nearby church will be opened on Saturday is 0,4. Find the probability that:
(i) Both the school and the church will be opened on Saturday. [3 marks]
(ii) Neither will be opened on Saturday. [3marks]
(iii) Only one of them will be opened on Saturday. [3marks]
(iv) At most one of them will be opened on Saturday. [3marks]

5(a). The figure below shows a solid triangular prism. ABCDEF. <ABC = 90°, |EA| = 10cm,

|BC| = 8cm and |AB| = 15cm.



Calculate the

i) length of the edge AC [5marks]

ii)) length of EC, correct to one decimal place. [5marks]

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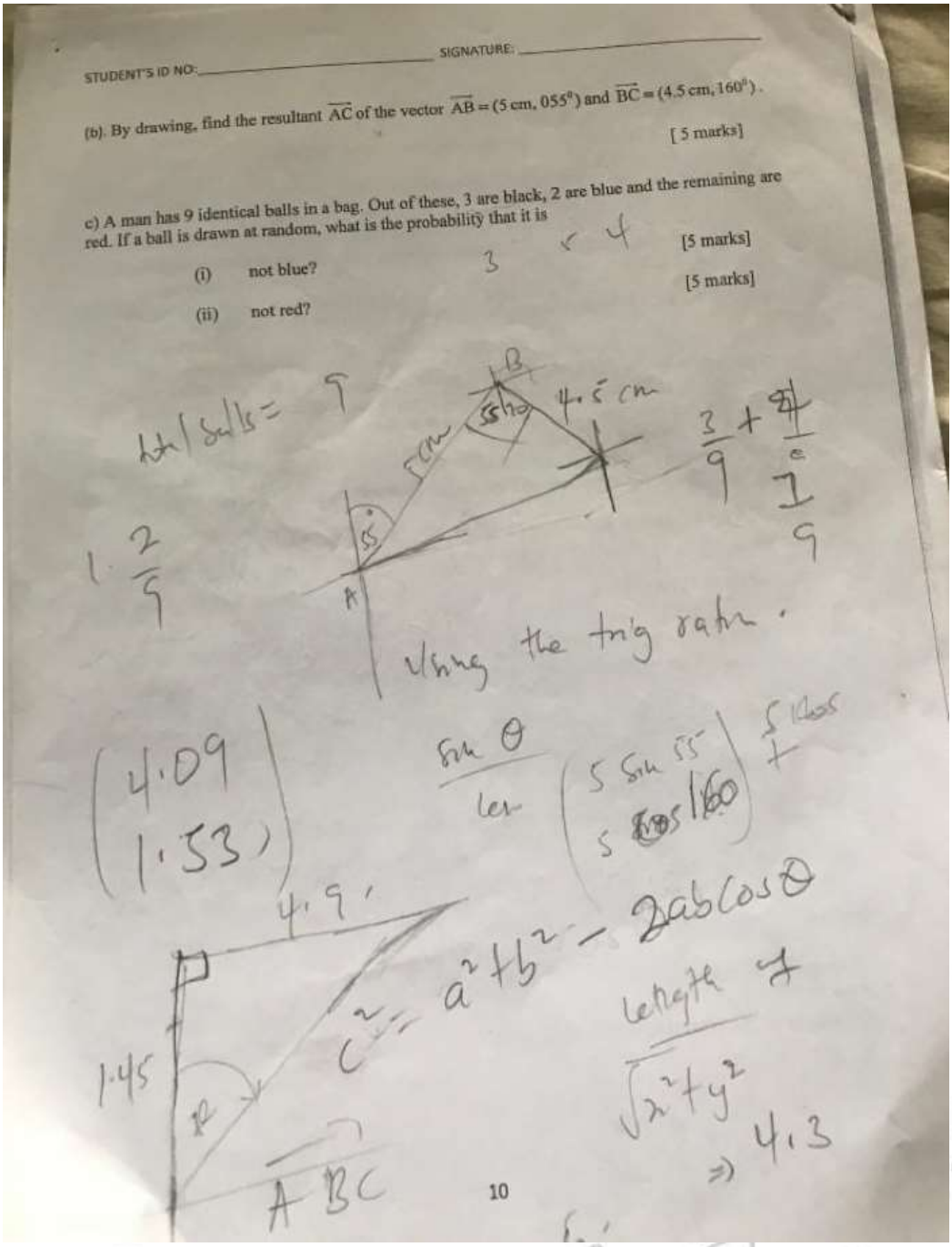
(b). By drawing, find the resultant $\overrightarrow{AC}$ of the vector $\overrightarrow{AB} = (5\text{ cm}, 055^0)$ and $\overrightarrow{BC} = (4.5\text{ cm}, 160^0)$.

[5 marks]

c) A man has 9 identical balls in a bag. Out of these, 3 are black, 2 are blue and the remaining are red. If a ball is drawn at random, what is the probability that it is

(i) not blue? [5 marks]

(ii) not red? [5 marks]



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