JULY, 2021
EBS 124J
COLLEGE GEOMETRY
2 HOURS

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)
FIRST YEAR, END-OF-SECOND SEMESTER EXAMINATION, JULY/AUGUST, 2021

JULY 26, 2021 COLLEGE GEOMETRY 2:00 PM – 2:40 PM

This paper consists of two sections, A and B. Answer ALL the questions in Section A and THREE questions from Section B. Section A will be collected after the first 40 minutes.

SECTION A
(40 Marks)
Answer ALL the questions in this Section.

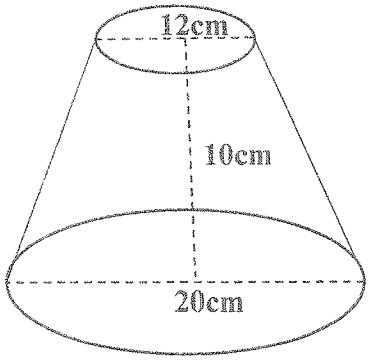
For items 1 to 20, each stem is followed by four options lettered A to D. Read each item carefully and circle the letter of the correct or best option.

1. Find the radius of the circle $x^2 + y^2 - 2x - 4y - 11 = 0$
   A. 4
   B. $2\sqrt{2}$
   C. 8
   D. 16

2. A closed rectangular metal box is 90cm long, 60cm wide and 45cm high. Calculate the minimum amount of metal used to make the box.
   A. $12150cm^2$
   B. $24300cm^2$
   C. $36400cm^2$
   D. $243000cm^2$

3. A bird is located on the point $M(2,3)$ from a straight line on the ground. If the equation of the straight line is $3x + 4y - 5 = 0$, what is the shortest distance of the bird from the line.
   A. 2.0 units
   B. 2.6 units
   C. 5.3 units
   D. 7.2 units

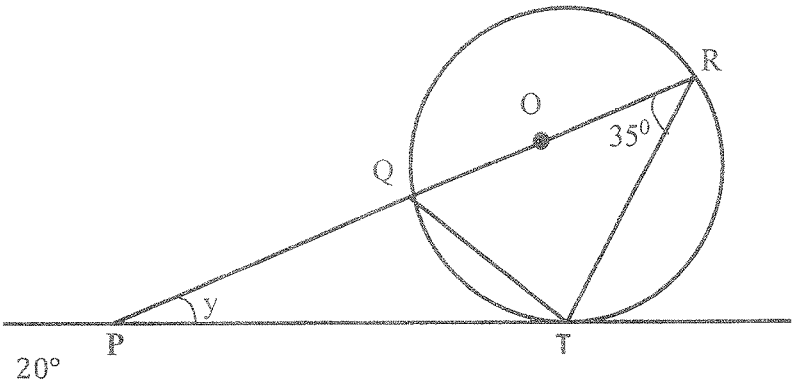
A glass cone is cut x cm from its apex to form a lampshade, which is in a form of a frustum. The lower diameter is 20 cm, the upper diameter is 12 cm and the height is 10 cm, as shown in the figure. ***Use this information to answer questions 4 and 5.***



4. What is the value of x?
   A. 10cm
   B. 15cm
   C. 20cm
   D. 25cm

5. Calculate the height of the original glass cone.
   A. 10cm
   B. 15cm
   C. 20cm
   D. 25cm

6. In the diagram, O is the centre of the circle QRT and PT is a tangent to the circle at T. What is the value of the angle marked y.



   A. 20°
   B. 35°
   C. 90°
   D. 160°

7. Find the equation of a circle with center $(3, 7)$ and area 16π square units.

A. $x^2 + y^2 - 6x + 14y + 42 = 0$

B. $x^2 + y^2 - 6x - 14y + 42 = 0$

C. $x^2 + y^2 + 6x - 14y - 42 = 0$

D. $x^2 + y^2 + 6x + 14y + 42 = 0$

8. Find the equation of the straight line passing through the point P (2, 5) and perpendicular to $x + 2y = 0$.

A. $2x - y - 1 = 0$

B. $x - 2y + 8 = 0$

C. $x + 2y - 8 = 0$

D. $2x + y - 9 = 0$

9. Which of the following is the equation of the circle with center (2, 3) if the circle has the $x - axis$ as a tangent.

A. $x^2 + y^2 + 4x - 6y + 9 = 0$

B. $x^2 + y^2 + 4x - 6y + 13 = 0$

C. $x^2 + y^2 + 4x - 6y + 4 = 0$

D. $x^2 + y^2 - 4x - 6y + 4 = 0$

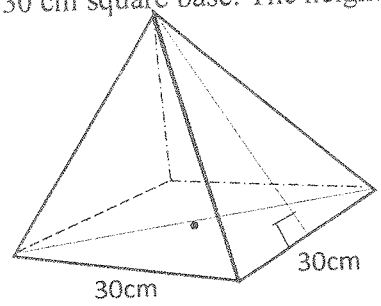
10. The diagram below is a sketch of a pyramid with a 30 cm by 30 cm square base. The height of the pyramid is 15 cm. Calculate the slant height.

A. 21.2 cm

B. 21.8 cm

C. 25.5 cm

D. 33.5 cm



11. A sphere of radius r cm has the same volume as a cylinder of radius 9 cm and height 12 cm. Find the value of r.

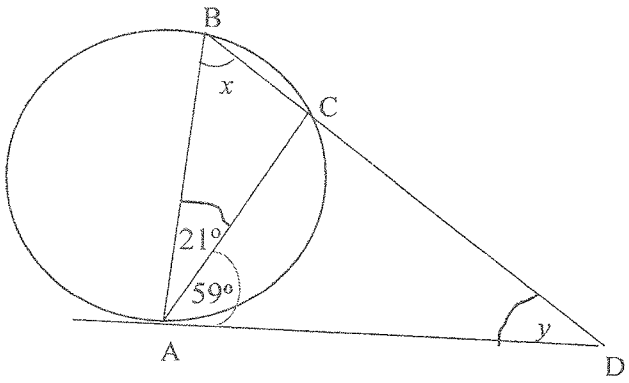
A. 3 cm

B. 6 cm

C. 8 cm

D. 9 cm

A, B and C are points on the circumference of a circle with AB as the diameter as shown in the diagram below. Angle BAC = 21° and angle CAD = 59°. Use the information to answer questions 12 and 13.
(Diagram not drawn to scale)



12. What is the value of ∠ABC marked x?
    A. 21°
    B. 59°
    C. 69°
    D. 80°

13. What is the value of ∠ADC marked y?
    A. 31°
    B. 59°
    C. 62°
    D. 69°

14. Find the length of the tangent from $(2,5)$ to the circle $2x^2 + 2y^2 - 18 = 0$.

    A. $3\sqrt{2}$
    B. $2\sqrt{5}$
    C. 5
    D. 18

15. The area of a rectangular sheet is $108m^2$. If the length of the sheet is three times its breadth, what is the length of the rectangle?
    A. 6cm
    B. 18cm
    C. 36cm
    D. 108cm

16. The height of an equilateral triangle is $\sqrt{3}cm$. What is the perimeter of the triangle?
    A. 2cm
    B. 3cm
    C. 6cm
    D. 12cm

17. The point P divides the line EF, $E(-1, 2)$ and $F(3, 4)$ externally in the ratio 3: 2. Find the coordinates of P.

A. $(1, 7)$
B. $(2, 6)$
C. $(11, 8)$
D. $\left(\frac{8}{5}, 11\right)$

18. Which of the following formulas' is used to find the total surface area of a closed cylinder?

A. $\pi r^2 + 2\pi rh$
B. $2\pi r^2 + 2\pi r$
C. $2\pi r(r + 2h)$
D. $2\pi r(r + h)$

19. A cylindrical tank that **has not been** covered is fixed on the ground on a concrete slab. The diameter of the tank is $6m$ and its height is $14m$. A painter is charging GH¢5.00 per square meter. How much will it cost to paint the outside of the tank? (Take $\pi = \frac{22}{7}$)

A. GH¢1320.00
B. GH¢420.00
C. GH¢264.00
D. GH¢84.00

20. Given that $A(x_1, y_1)$ and $B(x_2, y_2)$ are the end points of the line segment AB and $C(x,y)$ is the point which divides AB in the ratio m:n, which of the following conditions is true?

A. $\frac{AC}{CB} = \frac{m}{n}$
B. $\frac{CB}{AC} = \frac{m}{n}$
C. $\frac{AC}{CB} = \frac{n}{m}$
D. $\frac{AC}{m} = \frac{n}{BC}$