

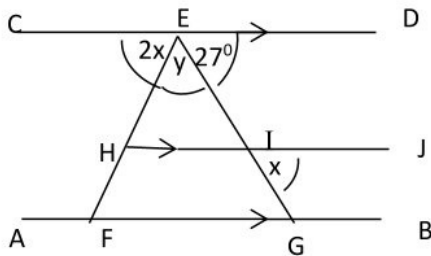
Answer **four** questions in all. All questions carry equal marks.

1. (a) In a class of 30 students,  $(x + 10)$  study Algebra,  $(10x+3)$  study statistics, 4 students study both Algebra and statistics,  $2x$  study only Algebra and 3 study neither Algebra nor statistics. Each student study at least one of the two subjects.
- Illustrate the information on a Venn diagram
  - How many students study;
    - Algebra
    - Only statistics
  - If a student is chosen at random from the class, what is the probability that he or she studies statistics?
- (b) Make  $v$  the subject of the relation

$$KE = \frac{1}{2}mv^2$$

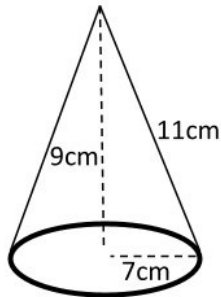
- (c) Simplify  $\frac{2^8 \times 3^7}{3^5 \times 2^5}$  and leave your answer in standard form.

(d)



In the diagram above,  $CD \parallel AB$ , angle  $IED = 27^\circ$

- Calculate angle  $EGB$
  - Find  $x$  and  $y$
  - What type of triangle is triangle  $EHI$ ?
2. (a) Consider the cone shown below



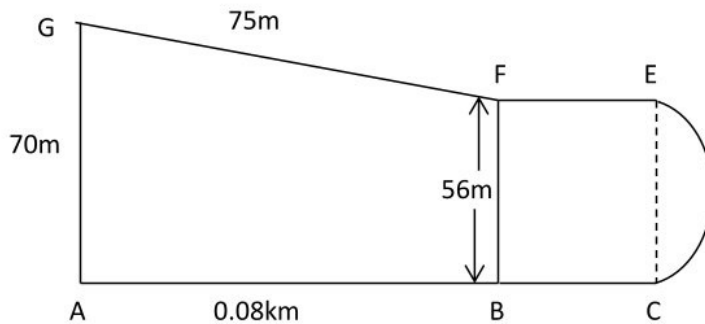
- Calculate the (i) Curved surface area  
 (ii) Volume [take  $\pi = \frac{22}{7}$ ]

- (b) Find the quotient of 4296 and 4

(c) Using a ruler and a pair of compasses only, construct

- Pentagon ABCDE such that  $|AB| = 6\text{cm}$ ,  $\angle ABC = \angle BAD = 120^\circ$ ,  $|BC| = 3.5\text{cm}$  and  $|AD| = 4\text{cm}$
- Construct the locus  $L_1$  of points equidistance from A and B to meet  $|AB|$  at O, such that  $|OD| = 8\text{cm}$
- Measure  $\alpha$ .  $|CE|$  and  $|DE|$   
 $\beta$ .  $\angle ADE$  and  $\angle BCE$

3. (a)

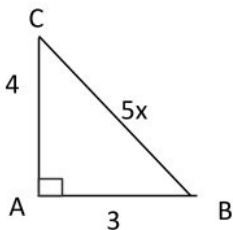


The diagram above represents a plot of land which is made up of a trapezium, a square and semi-circular shape at the end.

Calculate (i) The perimeter of the plot of land

(ii) The total area of the plot of land

- Find the truth set of  $\frac{1}{2}(y - 2) + 4 \geq \frac{5}{6}(2y - 1)$ , and illustrate the answer on a number line.
  - Osei is 5 years older than Nayeram. If Nayeram is 15 years old, find the sum of their ages.
  - Evaluate  $a^2 b^3 - (ab)^2$  if  $a = -2$  and  $b = 3$
4. (a) Using a scale of 2 cm to 2 units on both axes, draw on a graph sheet two perpendicular axes OX and OY for the intervals  $-14 < x \leq 14$  and  $-6 \leq y \leq 14$ . Mark the origin 0. Draw
- $\triangle ABC$  with vertices A (4, 8), B (4, 10) and C (6, 10)
  - The image of  $\triangle A_1 B_1 C_1$  of  $\triangle ABC$  using the y-axis as a mirror line where  $A \rightarrow A_1$ ,  $B \rightarrow B_1$ , and  $C \rightarrow C_1$ .
  - The image of  $\triangle A_2 B_2 C_2$  of  $\triangle A_1 B_1 C_1$  under anti clockwise rotation of  $90^\circ$  about the origin where  $A_1 \rightarrow A_2$ ,  $B_1 \rightarrow B_2$  and  $C_1 \rightarrow C_2$ .
- (b) In the triangle below,  $\angle BAC$  is  $90^\circ$ .  $|AB| = 3\text{cm}$ ,  $|AC| = 4\text{cm}$  and  $|BC| = 5x$ . Solve for x.



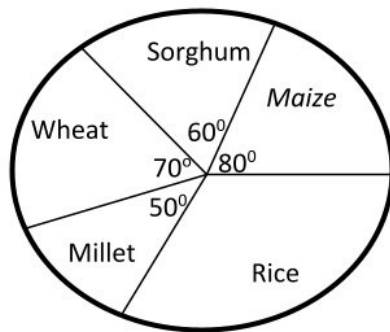
(c) Simplify  $(2x - 4)^2 - (x + 5)^2$ .

(d) Find the place value of 2 in the sum of 284687.3 and 258.4689.

5. (a) Given that  $a = \left(\frac{2x+1}{y+3}\right)$  and  $b = \left(\frac{4}{4}\right)$ , find  $x$  and  $y$  if  $b$  is twice of  $a$
- (b) Frank and Hayford shared an amount of GH¢  $x$ , in the ratio 5:4 respectively. If Hayford received GH¢ 8000. Express Frank's share as a percentage of the total amount shared. [Correct to 2 decimal places]
- (c) Find the Highest Common Factor (H.C.F) of 88, 143 and 165.
- (d)  $X$  and  $Y$  are subsets of a universal set
- $\mu = \{x: 0 \leq x \leq 12\}$  such that
- $x = \{\text{counting numbers}\}$  and
- $y = \{\text{odd numbers}\}$
- (i) List the elements of
- $\alpha. \mu, X, Y$
- $\beta. (X \cup Y)^c$
- $\gamma. (X \cap Y)$
- (ii) If a number is taken at random from the universal set, what is the probability of selecting an even number?

6. (a) The pie chart below shows the distribution of cereals on a farm.

Use it to answer the questions that follow.



- i. What angle represents the number of rice on the farm?
- ii. If there are 250 millets on the farm, what is the total number of cereals on the farm?
- iii. What percentage of the total number of cereals is rice?
- (b) The sum of three consecutive odd numbers is 33. Find the odd numbers. [Take the last odd number as  $2x-1$ ]
- (c) i. Convert 25.67g to kg.
- ii. Factorize completely  $-pq - pr + mq + mr$
- (d) The ratio of the inside radius to the outside radius of a metal pipe is 3: 4 respectively. If the inside radius is 7cm and the height of the pipe is 28cm. Calculate the
- i. volume of the pipe
- ii. cross-sectional area of the pipe [Take  $\pi = \frac{22}{7}$ ]

**END OF PAPER**

Answer **all** the questions.

Each question is followed by **four** options lettered A to D. Find the correct option for each question and shade **in pencil** on your answer sheet the space which bears the same letter as the option you have chosen. Give only **one** answer to each question.

1. What is the cardinality of the set of odd positive integer less than 10?

- A. 10
- B. 5
- C. 3
- D. 20

2. A group of 7 friends are having lunch together. Each person eats at least  $\frac{3}{4}$  of the pizza. What is the smallest number of whole pizza needed for lunch?

- A. 28
- B. 7
- C. 6
- D. 5

3. Liverpool FC won W games and lost L games. What fraction represents their lost games?

- A.  $\frac{W}{L}$
- B.  $\frac{(W - L)}{W}$
- C.  $\frac{L}{(W + L)}$
- D.  $\frac{(W + L)}{W}$

4. Evaluate  $\frac{30 - (-6) + (-4)}{-2 - 2}$

- A. 8
- B. -8
- C. 10
- D. -6

5. Which of the following has the greatest value?

- A. 4
- B. 300%
- C.  $1/0.1$
- D.  $5 \times 0.5$

6. Expand  $-3(-4x - 1)$

- A.  $12x + 3$
- B.  $-12x - 3$
- C.  $12x - 3$
- D.  $-12x + 3$

7. The side of a square is 60dm. Find its perimeter in meters.

- A. 24m
- B. 240m

- C. 2400m
- D. 24000m

8. The height of an isosceles triangle is the same as one of its slanted sides. Find its perimeter if its base is 5cm.

- A. 15cm
- B.  $(x + 5)$  cm
- C.  $(3x + 5)$  cm
- D.  $(2x + 5)$  cm

9. Evaluate 28% of 450 minus 45% of 200

- A. 25
- B. 36
- C. 216
- D. 252

10. Abigail rejects 0.08 of the questions as substandard. How many questions did she examine to reject 200 substandard questions

- A. 1200
- B. 2400
- C. 1400
- D. 2500

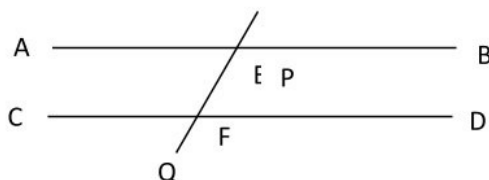
11. What should be added to  $\frac{3}{8}$  to get  $-\frac{1}{24}$ ?

- A.  $-\frac{5}{12}$
- B.  $-\frac{7}{23}$
- C.  $\frac{31}{72}$
- D.  $\frac{2}{33}$

12. If the image of x of a function defined by  $x \rightarrow 2^x + 1$  is 3, find x

- A. 1
- B. 9
- C. 16
- D. 3

13.



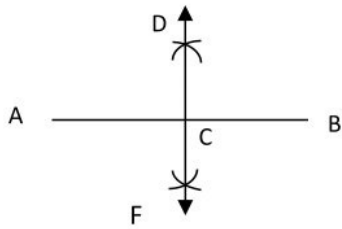
If  $\angle BEF = 3x + 30^\circ$   
 $\angle EFD = 2x + 20^\circ$ , find the value of x

- A.  $28^\circ$
- B.  $24^\circ$
- C.  $26^\circ$
- D.  $22^\circ$

14. The sum of three consecutive even numbers is 54. Find the sum of the first two numbers

- A. 16
- B. 34
- C. 38
- D. 40

15. Which construction is shown below?



- A. the bisector of angle ACD
- B. the midpoint of  $\overline{DF}$
- C. the perpendicular bisector of  $\overline{AB}$
- D. a perpendicular line to  $\overline{AB}$  from point D

16. 7:2 is equivalent to

- A. 28 : 40
- B. 42 : 71
- C. 72 : 42
- D. 63 : 18

17. If the cost of 6 cans of magic malt is GH¢ 21, what is the cost of 4 cans of magic malt?

- A. GH¢ 12
- B. GH¢ 14
- C. GH¢ 10
- D. GH¢ 8

18. The total surface area of a cylinder is

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

19. In a throw of a dice, what is the probability of getting a number greater than 5?

- A.  $1/2$
- B.  $1/3$

- C.  $1/5$
- D.  $1/6$

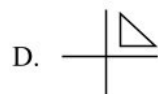
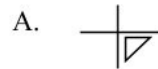
20. If  $A = \{2, 3, 5, 7\}$  and  $B = \{4, 5, 6, 7\}$ . Find  $A \cap B$

- A.  $\{2, 3, 4, 5, 6, 7\}$
- B.  $\{2, 5, 6, 7\}$
- C.  $\{5, 7\}$
- D.  $\{7\}$

21. How many lines of symmetry has a rhombus

- A. 0
- B. 1
- C. 2
- D. 3

22. In which side of the cartesian plane will the image of the figure below fall when it is reflected in the line  $y=0$



23. Find the average speed of a car that travels 12km in 3 hours.

- A. 4 m/s
- B. 15m/s
- C. 9m/s
- D. 1.1m/s

24. Find the image of the point  $(-6, 3)$  when it is translated by the mapping.  $\begin{pmatrix} x \\ y \end{pmatrix} \rightarrow \begin{pmatrix} 2x-1 \\ y \end{pmatrix}$

- A.  $(-13, 3)$
- B.  $(13, 3)$
- C.  $(-11, 3)$
- D.  $(11, 3)$

25. Solve for x in the equation  $2x + 4 = 5 - x$

- A.  $1/3$
- B. 3
- C. 1
- D. 9

26. Simplify  $(3x) + 5$
- $3x + 5$
  - $8x$
  - $5$
  - $x + 5$
27. Triple 27 and decrease it by 15 divided by 3
- 13
  - 22
  - 10.8
  - 76
28. The sum of two numbers is 23. What are the expressions for both numbers?
- $X = Y$
  - $X = 23 + Y$
  - $X = 23 - Y$
  - $X = 23 - X$
29. Zinc and Copper are melted in the ratio 9:11. What is the weight of melted mixture, If 28.8kg of zinc has been consumed in it.
- 50kg
  - 60kg
  - 64kg
  - 70kg
30. A triangle with no side and angle equal is
- isosceles
  - right angled triangle
  - scalene
  - equilateral
31. With the help of a ruler and a compass, it is possible to construct
- $50^\circ$
  - $65^\circ$
  - $37.5^\circ$
  - $40^\circ$
32. If  $2^x = (6/3)^2$
- 0
  - 1
  - 2
  - 13
33. Round 6248562 to the nearest hundred thousand
- 6200000
  - 6250000
  - 6300000
  - 6000000
34. The factors of  $x^2 - 5x + 6$  are
- $(x+2)(x-3)$
  - $(x-2)(x+3)$
  - $(x+2)(x+3)$
  - $(x-2)(x-3)$
35. If two angles, A and B add up to 180, then A and B are said to be
- complementary
  - supplementary
  - alternate
  - vertically opposite
36. The number of sides of a regular polygon is 5. Find its interior angle
- $108^\circ$
  - $180^\circ$
  - $60^\circ$
  - $120^\circ$
37.  $6^3 \times 8^2$  is equivalent to
- $2^5 \times 3^3$
  - $2^9 \times 3^3$
  - $2^8 \times 3^6$
  - $2^2 \times 3^2 \times 5$
- Use the information below to answer questions 38 – 40  
 In a class of 30 students, 5 study Mathematics only, 8 study English only and 3 study neither Mathematics nor English. Each student studies at least one of the two subjects.
38. How many students study Mathematics?
- 5
  - 14
  - 19
  - 22
39. How many students study English?
- 8
  - 14
  - 19
  - 22
40. How many students study exactly one of the two subjects?
- 13
  - 14
  - 27
  - 30