Name…………………………………………   Index No. ……………………

School …………………………………………...

121/1
MATHEMATICS
PAPER 1
July/August-2007
2 ½ HOURS

BONDO DISTRICT SECONDARY SCHOOLS EVALUATION EXAMINATIONS – 2007
SECTION 1 (50 MARKS)
Answer all the questions in the spaces provided after each.

1. Without using tables or calculators, evaluate.   (3mks)

$$\sqrt{\frac{0.0625 \times 2.56}{0.25 \times 0.08 \times 0.5}}$$

2. Find the value of d so that the expression $25x^2 - 10x + \dfrac{1}{3} + d$ is perfect square where d is a real number.   (3mks)

3. A wholesaler sold a dress to a retailer at a profit of 50%. The retailer sold the dress at a profit of 25% of her cost price to a consumer for sh. 120. How much did the wholesaler pay for the dress.

     (3mks)

4. Without using Mathematical tables or a calculator, find the value of y.   (4mks)

$$\log_4 48 + \log 24 - 2\log_4 y = {}^5/_2$$

5. The line passing through the point A(-1, 3n) and B(n, 3) is parallel to the line whose equation is $2y - 3x = 9$. Write down the co-ordinates of A and B.   (3mks)

6. Solve the simultaneous inequalities below and state the positive integral values of x.

$$\frac{1}{4}x \cdot 3 \le x + 2 \le 21 - 2x \qquad (4mks)$$
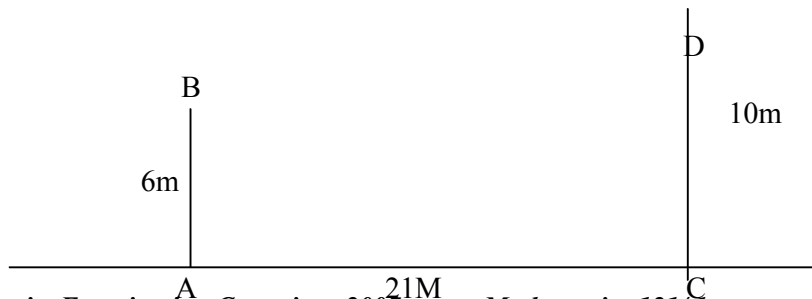
7. In the figure below, lines AB and LM are parallel.
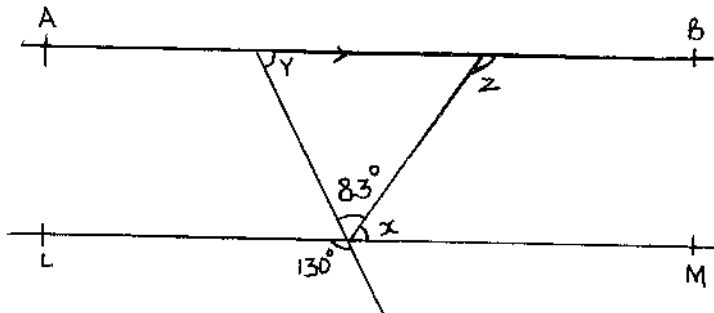
Find the values of the angles marked x, y and z.   (3mks)

8. The exterior angle of a regular polygon is equal to one-third of the interior angle. Calculate the number of sides of the polygon and give its name.   (4mks)

9.

Two vertical poles AB and CD stand 21m apart on a horizontal ground. The heights of the poles AB and CD are 6m and 10m respectively. Calculate the angle of depression of B from D.

(3mks)

10.   Simplify the expression.   (2mks)

$$4x - \left\{ \frac{3x + y}{8} - \frac{x + 3y}{4} \right\}$$

11.   A building contractor requires 3 lorries and 8 pick-ups to move 15 tonnes of sand in one trip. To move 21 tonnes of sand he would require 2 lorries and 20 pick-ups. How many tonnes will he move using 5 lorries and 4 pick-ups in one trip.

(4mks)

12.   The lengths of the minor and major arcs of a circle are in the ratio 3:8. Find the length of the major arc if the radius of the circle is 14cm. (Take $\pi = {}^{22}/_7$)   (3mks)

13.   OP is the position vector of P and OP = $2\mathbf{i} – 3\mathbf{j}$. M is the mid-point of line PQ and OM = $\mathbf{i} + 4\mathbf{j}$, obtain the vector PQ in terms of $\mathbf{i}$ and $\mathbf{j}$.   **(**3mks**)**

14.   The mean of four numbers n, 8n + 1, 17 and 20 is 14. Find
        (i) The value of n.   (2mks)
        (ii) The mode of the data.   (1mk)

15.   Given that x = 2.65cm and y=6.41cm. Find the maximum value of $\frac{x + y}{y - x}$ (2mks)

16.   Object A of area 10cm^2 is mapped onto its image B of area 60cm^2 by a transformation whose matrix is given by
        $$P = \begin{pmatrix} x & 4 \\ 3 & x + 3 \end{pmatrix}$$
        Find the possible values of x.   (3mks)

SECTION II (50 MARKS)

Answer five (5) questions in this section

17.   a) Use the trapezium rule to estimate the area under the curve y = x^2 + x - 6 over the interval
        $0 \leq x \leq 8$ using 8 trapezia.   (5mks)
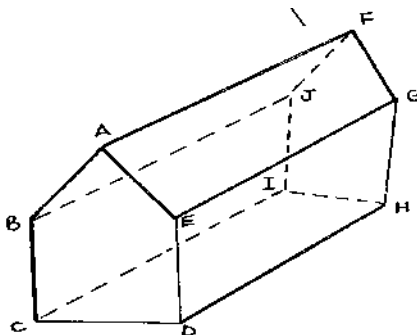   b) Find the exact area under the curve in (a) above.   (3mks)
        c) Find the percentage error in the estimated area in (a) above.   (2mks)

18.   Given below is a pentagonal prism that has a regular pentagon of sides 2cm as its cross-section. The prism is 4cm long.

        (a) Make a sketch of the net of the prism if it is closed on both ends.   (2mks)
   (b) Draw an accurate diagram of the net.   (4mks)
        (c) Calculate the volume of the prism correct to 2 decimal places.   (4mks)

© *The Bondo District Examination Committee 2007*   *Mathematics 121/ 1*   **TURN OVER**

19. Salome recorded data on observation of time spent by Form four students of Aram Secondary School at the library as follows.

Time spent in minutes	11-20	21-30	31-40	41-50	51-60
Cumulative frequency	70	170	370	470	500

   a) Draw the frequency table.   (2mks)

   b)   Using an assumed mean of 35.5, calculate

   (i) The mean   (5mks)

   (ii) The standard deviation   (3mks)

20. a) In a safari rally drivers are to follow route ABCDA. B is 250km from A on a bearing of 075^0 from A. C is on a bearing of 110^0 from A and 280km from B. The bearing of C from D is 040^0 and a distance of 300km. By scale drawing show the position of the point A, B, C and D.

                     (4mks)

   b)   Determine

   (i) The distance of A from C.   (2mks)

   (ii) The bearing of B from C.   (1mk)

   (iii) The distance and bearing of A from D.   (3mks)

21. A matatu and Nissan left town A for town B 240km away at 8.00a.m travelling at 90km/hr and 120km/hr respectively. After 20 minutes the Nissan had a puncture which took 30 minutes to mend.

   a) How far from town A did the Nissan catch up with the matatu.   (6mks)

   b) At what time did the Nissan catch up with the matatu.   (1mk)

   c) At what time did the matatu reach town B.   (3mks)

22. a) Show by shading the un-wanted region the area represented by $4y < x + 11$, $x \geq 1$, $x + y \leq 9$ and $5y > 3x - 3$ on the grid provided.   (8mks)

b) Calculate area of the enclosed region.   (2mks)

23. The figure below shows two pulleys whose centres are 30cm apart connected by a belt ABCDEF. The pulley centre P has a radius 13cm and the pulley centre Q has a radius of 4cm.
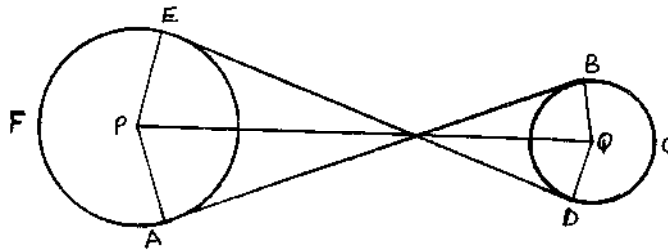
   Calculate

   (a) The length AB   (2mks)

   (b) The reflex angles EPA and BQD.   (2mks)

   (c) The arc length AFE and BCD.   (4mks)

   (d) The total length of the belt.   (2mks)

24. A triangle ABC with vertices A (-4,2), B(-6,6) and C(-6,2) is enlarged by scale factor -1 and centre (-2,6) to produce triangle $A^1B^1C^1$. Triangle $A^1B^1C^1$ is then reflected in line y=x to give triangle $A^{11} B^{11}C^{11}$.

   a) Draw triangle ABC and its successive images on the grid provided. State the co-ordinates of $A^1B^1C^1$ and $A^{11}B^{11}C^{11}$.

                     (6mks)

(b) If triangle $A^{11}B^{11}C^{11}$ is mapped onto a triangle whose co-ordinates are $A^{111}(0,-2)$, $B^{111}(4,-4)$ and $C^{111}(0,-4)$ by a rotation, find the centre and the angle of rotation.   (4mks)

END