For Examiner’s use only.
Section I

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Section II

<table>
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Grand Total

SECTION I (50 MKS)

Attempt all questions.

1. Use tables of reciprocal only to evaluate \( \sqrt{0.325} \) hence evaluate: \( 3 \frac{0.000125}{\sqrt{0.325}} \) (3mks)
2. Two boys and a girl shared some money. The elder got \( \frac{4}{9} \) of it, the younger boy got \( \frac{2}{5} \) of the remainder and the girl got the rest. Find the percentage share of the younger boy to the girl’s share.

(3mks)

3. Annette has some money in two denominations only. Fifty shillings notes and twenty shilling coins. She has three times as many fifty shilling notes as twenty shilling coins. If altogether she has sh. 3,400, find the number of fifty shilling notes and 20 shilling coin. (3mks)

4. The figure below shows a rhombus PQRS with PQ= 9cm and \( \angle SPQ=60^0 \). SXQ is a circular arc, centre P.

\[ \text{Calculate the area of the shaded region correct to two decimal places (Take Pie= } \frac{22}{7} ) \]  \( \text{(4mks)} \)

5. Solve the equation \( 2x^2 + 3x=5 \) by completing the square method  \( \text{(3mks)} \)

6. Simplify the expression \( \frac{3x^2 - 4xy^2 + y}{9x^2-y^2} \)  \( \text{(3mks)} \)
7. Solve the equation \(8x^2 + 2x - 3 = 0\) hence solve the equation \(8\cos^2 y + 2\cos y - 3 = 0\)

For the range \(0^0 < y < 180^0\)  

(4mks)

8. Show that the points P(3,4), Q(4,3) and R(1,6) are collinear.  

(3mks)

9. Solve the inequalities \(x \leq 2x + 7 \leq \frac{1}{2}x + 14\) hence represent the solution on a number line.  

(3mks)

10. The mean of five numbers is 20. The mean of the first three numbers is 16. The fifth number is greater than the fourth by 8. Find the fifth number.  

(3mks)

11. The volume of two similar solid spheres are 4752cm\(^3\) and 1408cm\(^3\). If the surface area of the small sphere is 352cm\(^2\), find the surface area of the larger sphere.  

(3mks)

12. Solve for \(x\) in the equation \(\frac{1}{2}\log_2 81 + \log_2 (x - x/3) = 1\)  

(3mks)
13. A farmer has a piece of land measuring 840m by 396m. He divides it into square plots of equal size. Find the maximum area of one plot. (3mks)

14. a) find the inverse of the matrix \[
\begin{pmatrix}
4 & 3 \\
3 & 5 \\
\end{pmatrix}
\] (1mk)

b) Hence solve the simultaneous equation using the matrix method
\[
\begin{align*}
4x + 3y &= 6 \\
3x + 5y &= 5
\end{align*}
\] (2mks)

15. In the figure below O is the centre of the circle and \(<OAB=20^0\). Find;
   a) \(<AOB\) (1mk)
   b) \(<ACB\) (2mks)

16. Each interior angle of a regular polygon is 120° larger than the exterior angle. How many sides has the polygon? (3mks)

**SECTION II (50MKS)**

Choose any five questions

17. Three business partners, Bela, Joan and Trinity contributed Kshs 112,000, Kshs 128,000 and Kshs 210,000 respectively to start a business. They agreed to share their profit as follows:
   
   - 30% to be shared equally
   - 30% to be shared in the ratio of their contributions
   - 40% to be retained for running the business.

   If at the end of the year, the business realized a profit of Kshs 1.35 Million. Calculate:
   
   a) The amount of money retained for the running of the business at the end of the year. (1mk)

   b) The difference between the amounts received by Trinity and Bela (6mks)
c) Express Joan’s share as a percentage of the total amount of money shared between the three partners. (3mks)

18. Complete the table below for the function \( y = x^3 + 6x^2 + 8x \) for \(-5 \leq x \leq 1\) (3mks)

<table>
<thead>
<tr>
<th>( x )</th>
<th>-5</th>
<th>-4</th>
<th>-3</th>
<th>-2</th>
<th>-1</th>
<th>0</th>
<th>1</th>
</tr>
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<tbody>
<tr>
<td>( x^3 )</td>
<td>-125</td>
<td>-64</td>
<td>-1</td>
<td>0</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( 6x^2 )</td>
<td></td>
<td>54</td>
<td>-1</td>
<td>0</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( 8x )</td>
<td>-40</td>
<td>-24</td>
<td>-16</td>
<td>0</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( y )</td>
<td>0</td>
<td>3</td>
<td>-15</td>
<td>0</td>
<td>15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\( a) \) Draw the graph of the function \( y = x^3 + 6x^2 + 8x \) for \(-5 \leq x \leq 1\) (3mks)
(\text{use a scale of 1cm to represent 1 unit on the } x\text{-axis. 1cm to represent 5 units on the } y\text{-axis})

\( b) \) Hence use your graph to estimate the roots of the equation
\( x^3 + 5x^2 + 4x = -x^2 - 3x -1 \) (4mks)

19. Three islands P,Q,R and S are on an ocean such that island Q is 400Km on a bearing of 030\(^{0}\) from island P. Island R is 520Km and a bearing of 120\(^{0}\) from island Q. A port S is sighted 750Km due South of island Q.

\( a) \) Taking a scale of 1cm to represent 100Km, give a scale drawing showing the relative positions of P,Q,R and S. (4mks)
Use the scale drawing to:

b) Find the bearing of:
   i. Island R from island P  
   ii. Port S from island R

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c) Show that E, F and O are collinear

21. A bag contains 5 red, 4 white and 3 blue beads. Two beads are selected at random one after another.
a) Draw a tree diagram and show the probability space.

b) From the tree diagram, find the probability that;

i. The last bead selected is red  (3mks)

ii. The beads selected were of the same colour (2mks)

iii. At least one of the selected beads is blue. 3(mks)

22. The table below shows how income tax was charged on income earned in a certain year.

<table>
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<th>Taxable income per year (Kenyan pounds)</th>
<th>Rate shilling per K£</th>
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<td>1-3630</td>
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<tr>
<td>3631- 7260</td>
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<tr>
<td>7261-10890</td>
<td>4</td>
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<td>10891-14520</td>
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</table>
Mr. Gideon is an employee of a certain company and earns a salary of Ksh. 15,200 per month. He is housed by the company and pays a nominal rent of Ksh. 1050 per month. He is married and is entitled to a family relief of Ksh. 450 per month.

i. Calculate his taxable income in K£ p.a (2mks)

ii. Calculate his gross tax per month. (4mks)

iii. Calculate his net tax per month (2mks)

iv. Calculate his net salary per month (2mks)

23. The table below shows the distribution of mathematics marks of form 4 candidates in Mavoko Secondary school.

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<th>10-20</th>
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<td>23</td>
<td>21</td>
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<td>4</td>
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Use the above data to calculate:

a) Mean using assumed mean of 65 (3mks)

b) Median (3mks)
24. Coast bus left Nairobi at 8.00am and travelled towards Mombasa at an average speed of 80Km/hr. At 8.30am, Lamu bus left Mombasa towards Nairobi at an average speed of 120 km per hour. Given that the distance between Nairobi and Mombasa is 400Km.: determine:

   i. The time Lamu bus arrived in Nairobi.  

   ii. The time the two buses met.  

   iii. The distance from Nairobi to the point where the two buses met.  

   iv. How far coast bus is from Mombasa when Lamu bus arrives in Nairobi