MATHEMATICS
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SECTION I (50 MARKS)
Answer ALL the questions in this section

1.   Evaluate   3mks*UG*

$$\frac{4 \times 6 + \frac{1}{25} \div 0.05 + \frac{1}{5}}{(-3) \div (-6) + (23) - 6 \text{ of } 3}$$

2.   When a certain number is divided by 30, 45, or 54, there is always a remainder of 21. Find the
      least number.   3mks*UG*

3.   Without using calculators or mathematical tables, find the value of;   3mks*UG*

$$\frac{\sqrt{45} \times (2.04)^2}{\sqrt{0.05} \times 2.89}$$

4.   Solve for b in the equation.
      $5^{2b} + 10(5^b) = 3.$ 4mks*UG*
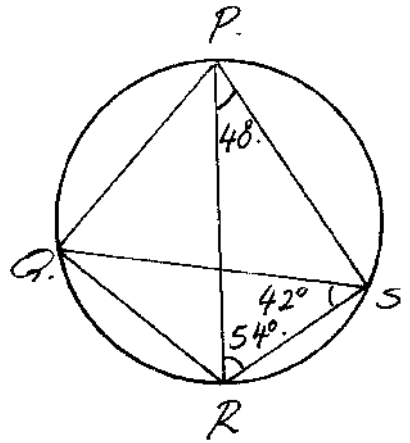
5.   A trader imported a camera for which she paid import duty at 40% of the purchase price. She
      later sold it to a customer giving 8% discount. If the customer paid sh. 18,032 for the camera,
      find the purchase price.   3mks*UG*

6.   Solve the simultaneous equations;   4mks*UG*
$$2 \log^s = \log 2 + \log t$$
$$2^s = 4^t$$

7.   In the figure below angle RPS = 40^0 angle PRS = 54^0 and angle QSR = 42^0 Find angle PRQ.

                                                                                                 2mks*UG*

8.   Solve the equation   3mks*UG*
$$\frac{1}{4x} = \frac{5}{6x} - 7$$

9.   Use reciprocal and square root tables to evaluate, to 4 significant figures, the expression:
                                                                                                 3mks*UG*

$$\frac{5}{0.04796} + \sqrt{583.6}$$

10.   A cylindrical jar has a diameter of 20cm. The area of the curved surface is 1200cm^2, Find
      (i) The height of the jar correct to 1 decimal place.   2mks*UG*
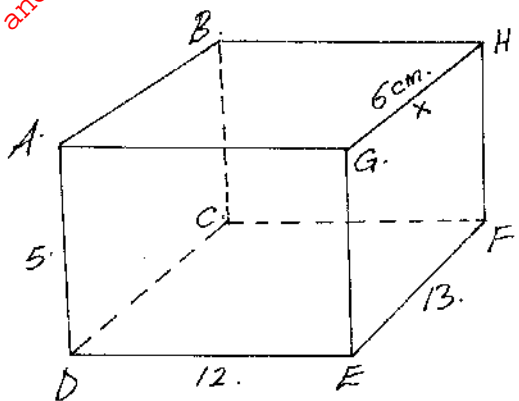   (ii) The volume of the jar correct to 4 significant figures.   2mks*UG*

11.   Find the equation of a line passing through (2,-3) and is perpendicular to the line 4y – 6x+ 5=0

                                                                                                 3mks*UG*
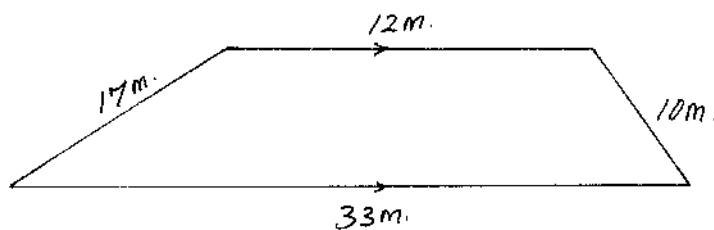

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12.

The above diagram shows an open cuboid. Find the distance between points E and X on the surface of the solid given that GX is 6cm. 3mks*UG*

13. A flower garden is in the form of the trapezium shown below. Find the area of the garden in m^2. 4mks*UG*

14. Given the vectors **a** = 6**i** + 8**j**

b = 3**i** – 9**j**

and c = 4i + j

Find the value of h and k such that h**a** + k**b** = **c**. 2mks*UG*

15. The sum of digits of a two digit number is 13. When the number is subtracted from the number formed by reversing the digits, the difference is 27. Find the number. 4mks*UG*

16. The area of a triangular seed bed is 0.024 hactares. If its base is 30m, find the perpendicular height of the plot. 2mks*UG*

SECTION II (50 MARKS)
Answer any five questions in this section

17. The length of the common chord of two intersecting circles of radius 10cm and 12cm is 6cm.
    a) Calculate the angles subtended by the chord at the center of the two circles. 4mks*UG*
    b) Calculate the area common to the two circles. 6mks*UG*

18. a) Draw triangle ABC in which AB=6cm, BC = 5.5 and <B=60^0. (Use a pair of compasses and a ruler only). 2mks*UG*
    Measure AC

b)   Four towns P,Q,R, and S are such that town Q is 120km due east of town P. Town R is 160km due north of town Q. Town S is on a bearing of 330^0 from P and on a bearing of 300^0 from R. Use a ruler and compasses ONLY for all constructions in this question. Taking a scale of 1cm = 50km, construct a scale drawing to show the positions of towns P,Q,R, and S. 5mks*UG*
    Use your scale drawing to determine
    (i) the distance SP 1mk*UG*
    (ii) the distance SR 1mk*UG*
    (iii) the bearing of town S from town Q. 1mk*UG*

19. The figure below shows two circles that intersect at points W and X. Point A is the center of the smaller circle and lies on the circumference of the larger circle. BXZ and BWY are straight lines. Angle WBX = 55^0 and angle WYZ = 80^0.

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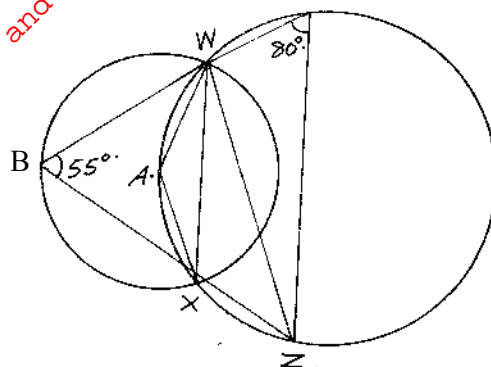
Find the following angles giving reasons.

a) the obtuse angle WAX   2mks*UG*
b) angle WYX   2mks*UG*
c) angle XWZ   2mks*UG*
d) angle WXA   2mks*UG*
e) angle AXB   2mks*UG*

20.   The table below shows the number of letters collected from the post office by a school messenger during a school year.

Letters per day	6 – 10	11 – 15	16 – 20	21 – 25	26 – 30	31 – 35	36 – 40	41 – 45	46 – 50	51 – 55
Frequency	5	19	21	23	25	27	20	25	13	12

(i) State the modal class   1mk*UG*
(ii) Estimate the median of this data.   4mks*UG*
(iii) Estimate the mean of this data.   3mks*UG*
iv) On the grid provided, draw a histogram to represent this data.   2mks*UG*

21.   A triangle has vertices A(-4,-1) B(-1,-3) and C(-2,-1)

(a) Draw triangle ABC on the Cartesian plane.   1mk*UG*
(b) Construct the image triangle A^{1}B^{1}C^1 of ΔABC under reflection in the line y=-x
3mks*UG*
(c) Construct the image triangle A^{11}B^{11}C^{11} of ΔA^{1}B^{1}C^1 under rotation of +90^0 about
the origin   3mks*UG*
(d) Construct the image triangle A^{111}B^{111}C^{111} of ΔA^{11}B^{11}C^{11} under enlargement scale
factor –2 centre (-1,0)   3mks*UG*

22.   A solid cylinder has a radius of 21cm and a height of 18cm. A conical hole of radius r is
drilled in the cylinder on one of the end faces. The conical hole is 12cm deep.If the material
removed from the hole is 2^2/$_3$% of the volume of the cylinder, find; (Use π =3.142)
(i) the surface area of the hole.   5mks*UG*
(ii) the radius of a spherical ball made out of the material.   3mks *UG*
(iii) the surface area of the spherical ball.   2mks*UG*

23.   A bus left Nairobi at 7.00am and travelled towards Eldoret at an average speed of 80km/hr.
At 7.45am a car left Eldoret towards Nairobi at an average speed of 120km/hr. The distance
between Nairobi and Eldoret is 300km
Calculate
a) the time the bus arrived at Eldoret   2mks*UG*
b) the time of the day the two met.   4mks*UG*
c) the distance from Nairobi where the two met.   2mks*UG*
d) the distance of the bus from Eldoret when the car arrived at Nairobi.   2mks*UG*

24.(i) The figure below shows a sketch of Mr. Wangamati's Orchard. The bearing and distances
of the points on it's boundaries are marked A,B,C,D,E,F,G and H from an external point P and
are tabulated.

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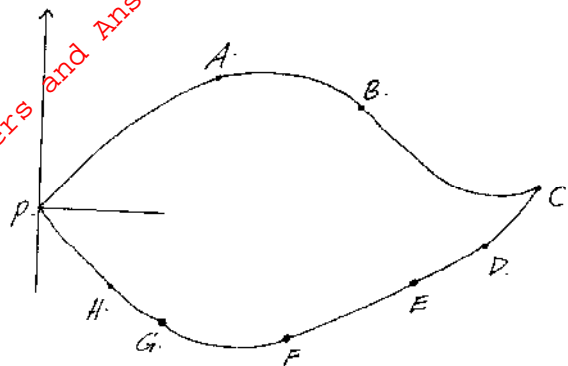
Point	Bearing	Distance (m)
A	035^0	65m
B	050^0	35m
C	080^0	115m
D	090^0	105m
E	110^0	70m
F	135^0	60m
G	140^0	30m
H	140^0	20m

Using a scale of 1cm represents 10m draw an accurate plan of Mr. Wangamati's
Orchard. Hence find;   5mks*UG*

a)   the bearing of A from C
b)   the bearing and the distance of C from F.

ii)   A land surveyor recorded the measurement of a small plot in a field work using base lines

AB=75cm, BC=100cm and CA = 100cm as shown below;

R9	B	W5	C	Z17	A
Q7	55	V 6	55	Y 5	70
P15	42	U 7	70	X 6	50
A	30	S 10	60		25
	A		20		C
			B		

Using a scale of 1cm represents 5m draw the map of the field and hence work out it's area in

hectares.   5mks*UG*

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