

Name:..... Index Number:..... /..... Adm No.....
Candidate's signature:
Date:

121/1
Mathematics
Paper 1
2 ½ Hours
June 2010

KASSU JOINT EVALUATION TEST (J.E.T)

Kenya Certificate of Secondary Education (K.C.S.E)

Instructions to candidates.

- Write your name class and admission number in the space provided at the top of this page.
- This paper consists of Two sections: section I and section II.
- Answer ALL questions in section I and only five questions in section II.
- Show all the steps in your calculations, giving your answer at each stage in the spaces below each question.
- Marks may be awarded for correct working even if the answer is wrong.

For Examiner's Use Only

Section I

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total

Section II

17	18	19	20	21	22	23	24	Total

Grand Total

1. Given that

$$\frac{-8 + (A) \times (-8) - (-6)}{-3 + (-8) \div 2 \times 4} = -2$$
 Where A is an integer. Find the value of A. (3mks)

2. Use table of reciprocals, square roots and cubes to evaluate. (4mks)

$$\frac{28}{\sqrt{0.1156}} + \frac{4}{(0.1663)^3} \text{ giving your answer to 4 s.f.}$$

3. Use a calculator to work out the following giving your answer correct to 3 s.f. (3mks)

$$\sqrt{\frac{392.16^{1/3} \div 15.6^2}{25.12 \times 0.022}}$$

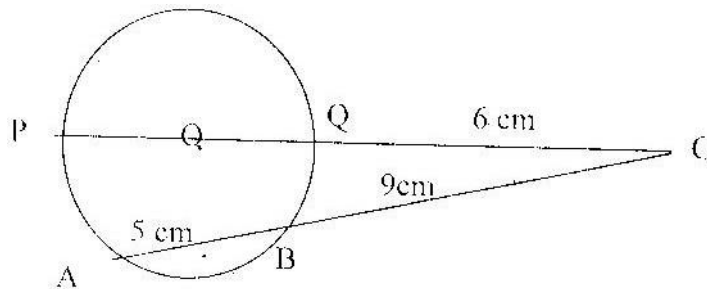
4. The position vector of points X and Y are $x=2i + 4j - 3k$ and $y= 3i + 2j - 5k$ respectively. Express xy as a column vector and hence find $|xy|$ (3mks)

5. A circle passes through point A(-2,-6) and B(x,-x). The coordinates of the centre of the circle is (1,-2). Calculate the possible coordinates of point B. (4mks)

6. After milling, the cost per kilogram of maize flour and millet flour are Kshs. 3 and Kshs. 6.20 respectively. The maize and millet are now mixed in the ratio 5:3. What should the selling price per kilogram of the mixture be in order to make a profit of 25%? (3mks)

7. Given that $p = 17.0\text{cm}$, $q = 13.0\text{cm}$ and $r = 7.0\text{cm}$. Calculate the percentage error involved in the calculation of $\frac{p + q}{p - r}$ answer to 3 decimal places.

8. In the figure below O is the centre of the circle. POQ & ABC are staright lines. QC = 6cm, AB = 5cm & BC = 9cm. Calculate the length of PQ. (2mks)

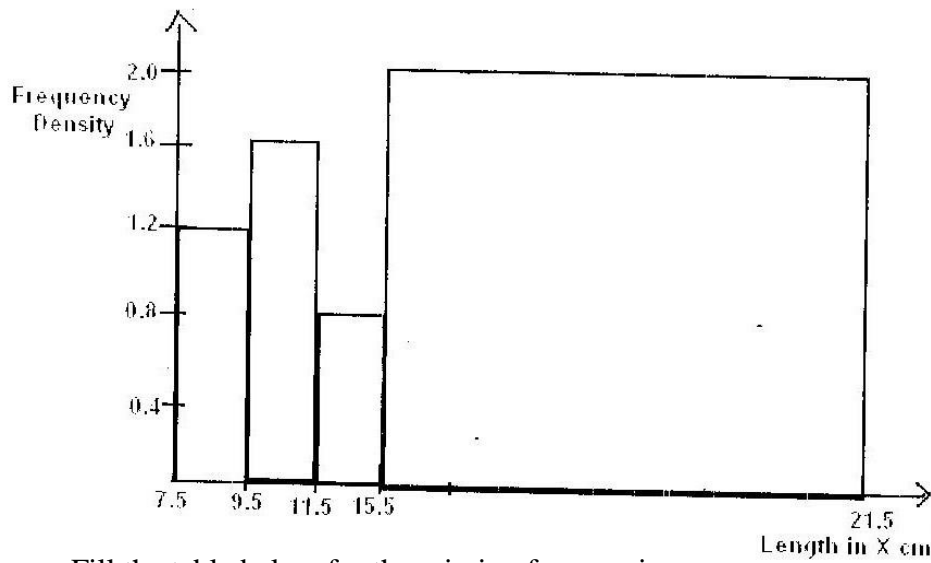


9. Solve for θ in the equation $\sin \theta + \frac{\cos^2 \theta}{\sin \theta} = 2$ for $0^\circ \leq \theta \leq 360^\circ$ (3mks)

10. Find the value of x in the following equation. (3mks)
 $25^{x-1} + 5^{2x} = 130$

11. Solve the simultaneous equations below using matrix method. (3mks)
 $y = 19 - 5x$
 $3y - x = 9$

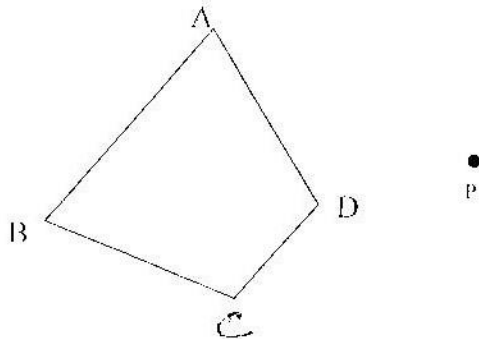
12. The figure below shows a histogram.



Fill the table below for the missing frequencies.

Length 10xcm	Frequency
$7.5 \leq x \leq 9.5$	12
$9.5 \leq x \leq 11.5$	
$11.5 \leq x \leq 15.5$	
$15.5 \leq x \leq 21.5$	

13. Draw triangle ABC where $AB = 6\text{cm}$ and $AC = BC = 5\text{cm}$. On triangle ABC draw the locus of P on the same side of AB as C such that $\angle APB = \frac{1}{2} \angle ABC$ and the area of triangle ACB = twice the area of triangle APB.
14. Without using mathematical tables, find the value of x in the equation.
 $\text{Log}x^3 + \text{Log}5x = 5\text{log}^2 - \text{Log}^2/5$ (3mks)
15. (a) Expand and simplify $(2 - \frac{1}{2}x)^5$ in ascending power of x. (2mks)
 (b) Hence use your expansion to find the value of $(1.995)^5$, correct to 3 decimal places. (2mks)
16. The figure ABCD below is mapped onto A'B'C'D' by an enlargement scale factor -2 about point P. Construct A'B'C'D' (3mks)



SECTION II (50 MARKS)

Answer only five questions from this section.

17. In a safari rally, drivers are to follow a route PQRST. Q is 375km from P on a bearing of 075° . R is 105km from Q and on a bearing of 110° from Q. The bearing of R from S is 040° and a distance of 450km.

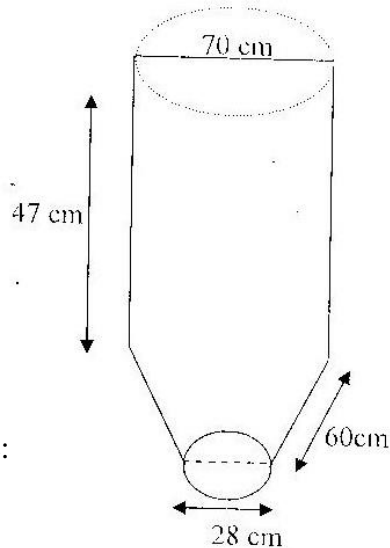
- (a) By using a scale of 1cm to represent 30m, draw a well labeled diagram to represent the route PQRST. (4mks)
- (b) Hence determine.
- (i) The distance of P from R. (2mks)
- (ii) The bearing of Q from R. (1mk)
- (iii) The distance and bearing of P from S (3mks)

18. Mrs. Shivana is a civil servant on a monthly basic salary of Kshs. 30,000 and total allowance of Kshs. 2,800. She is housed in a free company house. She has a life assurance which she pays Kshs. 1,800 per month. Use the income tax table fro the year 2009 below to answer the questions that follow.

Income in K£ per month	Rate (Kshs. Per pound)
1508	2
509987	3
988 1466	4
14671945	5
Excess over 1946	6

- (a) Calculate the taxable income in K£ per month. (2mks)
- (b) She is entitled a family relief of Kshs. 1,200 and claims insurance relief of Kshs. 3 per pound. Calculate her monthly PAYE in Kshs. (6mks)
- (c) In addition to the PAYE the following deductions are made on her pay every month:
- (i) NHIF Kshs. 400
- (ii) NSSF Kshs. 200
- Calculate her monthly net pay. (2mks)

19. The figure below represents a model of a solid structure in the shape of a frustum of a cone attached to a cylindrical pant with a hemispherical top. The diameter hemispherical pant is 70cm. The cylindrical pant has a height of 47cm. The frustum has a base diameter of 28cm and slant height of 60cm. Take $\pi = \frac{22}{7}$.

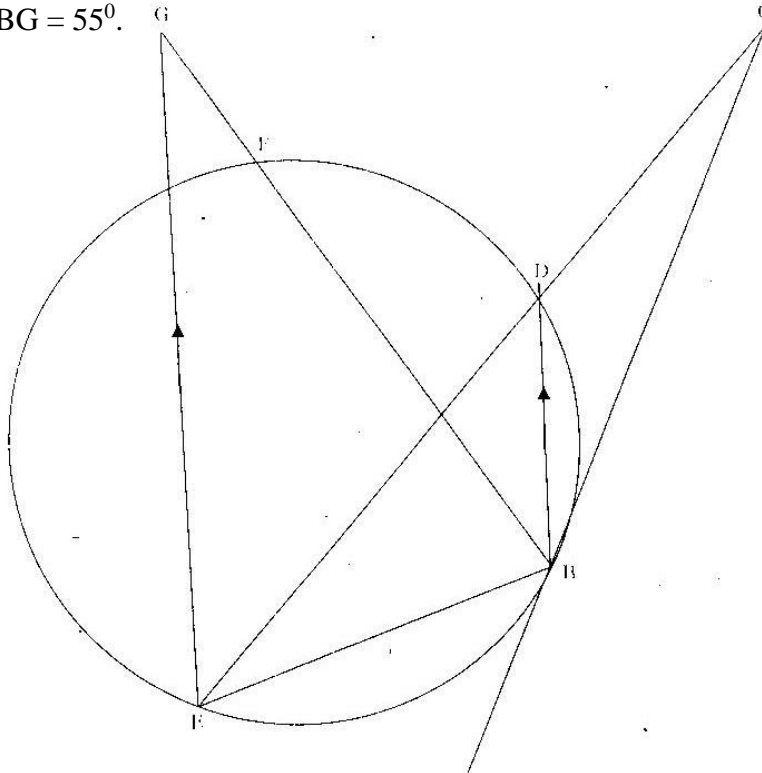


Calculate:

- (a) The surface area of the hemispherical part. (2mks)
 (b) The total surface area of the solid. (8mks)
20. Two variables q and r are related by formula $q = ar^n - 6$ where a and n are constants. The table below shows some values of q and corresponding value of r .

q	-3	-1	3	10	14
r	0.35	0.45	0.60	0.80	0.89

- (a) Rewrite the formula above in linear form. (1mk)
 (b) Complete the table above (3mks)
 (c) Draw a suitable straight line graph (3mks)
 (d) Using your graph, determine the value of a and n to the nearest whole number. (3mks)
21. An underground train traveling between two stations starts from rest and accelerates at a constant rate for 10 seconds, then travels at a constant velocity for 30 seconds and finally slows down at a constant rate for 15 minutes. The distance between the two stations is 850 metres.
- (a) Draw the velocity – time graph for the journey. (2mks)
 (b) Calculate:
 (i) The maximum velocity (2mks)
 (ii) The acceleration (2mks)
 (iii) The time it takes to reach the half way point (4mks)
22. In the figure below ABC is a tangent to the circle at B . DE is a diameter and CDE and BFG are straight lines. BD is parallel to EG . Angle $DBC = 40^\circ$ and angle $EBG = 55^\circ$.



Find the following angle giving reasons in each case.

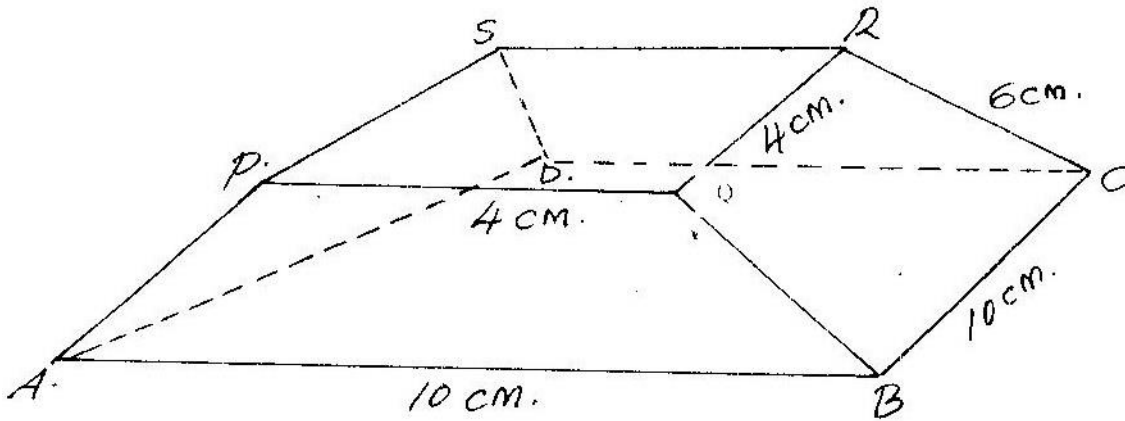
- (a) Angle:
- (i) $\angle BED$ (2mks)
 - (ii) $\angle BCD$ (2mks)
 - (iii) $\angle BFE$ (2mks)
 - (iv) $\angle BGE$ (2mks)

(b) Given that $BC = 8\text{cm}$ and $DC = 4\text{cm}$, find the radius of the circle. (2mks)

23. After t seconds a particle has traveled a distance of S metres where S is given by $S = t^3 - 6t^2 + 9t + 5$. Find the:

- (a) Time when velocity is zero.
- (b) Velocity of the particle when $t = 4$ seconds
- (c) The acceleration of the particle when $t = 4$ seconds.
- (d) The distance traveled in the third second.

24. The diagram below shows a frustum of a square based pyramid. The base $ABCD$ is a square of side 10cm . The top $PQRS$ is a square of side 4cm and each of the slant edges are 6cm .



- (a) Calculate the height of the pyramid. (4mks)
- (b) A point X is $\frac{1}{4}$ of the height of the pyramid from the base. Calculate the angle that line AX makes with the base. (2mks)
- (c) Calculate the angle between planes $PQRS$ and $BCRQ$ (4mks)