FOCUS A365

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121/2 MATHS PAPER 2

FORM FOUR

ENTRY EXAMS 2019

TIME: 2 ½ HOURS.

INSTRUCTIONS

- Write your name, admission number, stream and class number in the spaces provided above.
- This paper consists of two sections: Section I and Section II.
- Answer all the questions in Section 1 and **only five** from section II.
- Show all the steps in your calculations, giving your answer at each stage in the spaces provided below each question.
- Marks are given for correct working even if the answer is wrong.
- Non-programmable silent electronic calculators and KNEC mathematical tables may be used.

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	

SECTION I (50MARKS) ANSWER ALL QUESTIONS IN THIS SECTION

1. Use logarithm tables to evaluate (4mks)

$$\sqrt[4]{\frac{456 \times 398}{271}}$$

2. Two brands of sugar X and Y costing sh. 45 and sh. 50 respectively. In what ratio must they be mixed in order to make 25% profit by selling the mixture at sh. 60 (3mks)

3. Make t the subject of the formula. (3mks)

$$2a = \sqrt{\frac{t^2 + q}{p^2}}$$

4. The fifth term of an arithmetic progression is 11 and the twenty fifth term is 51. Find the first term and the common difference of the progression. (3mks)

5.

a) Expand and simplify $(2-x)^5$ in ascending powers of X up to the term X^3. (2mks)

b) Hence approximate the value of 1.98^5 to four significant figures. (2mks)

6. Simplify completely. (3mks)

$$\frac{3x^2-1}{x^2-1}-\frac{2x+1}{x+1}$$

7. Find the equation of a circle whose diameter is from a point (-2,5) to a point (4,1) in the form $x^2 + y^2 + ax + by + c = 0$ (4mks)

8. Given that $a^2x^2 + 6ax + k$ is a perfect square, find **k.** (3mks)

9. $Tan\ X = \frac{3}{4}$ determine $\sin x^2 + \cos x$ (3mks)

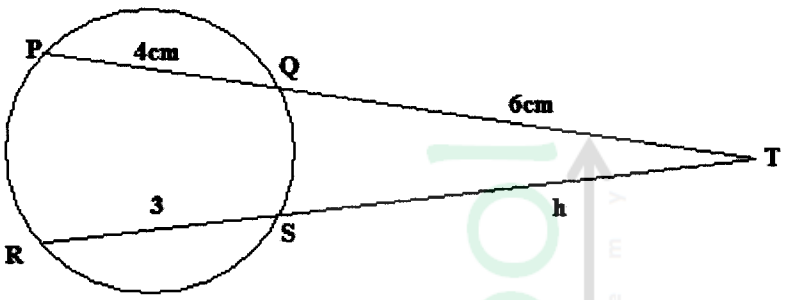
10. If $p = 5 + \sqrt{2}$ and $q = 3 - 4\sqrt{2}$. Find the value of $\frac{q}{p+q}$ in the form $a + b\sqrt{c}$, where **a, b** and **c** are rational numbers. (3mks)

11. The base and perpendicular height of a triangle are measured as 8.2cm and 6.3cm respectively. Calculate the percentage error in calculating the area correct to three decimal places. (3mks)

12. Evaluate without using mathematical tables or a calculator. (3mks)

$$2\log 5 - \frac{1}{2}\log 16 + 2\log 40$$

13. In the figure below, chords PQ and RS intersect externally at T.



Given that PQ = 4cm, QT = 6cm and RS = 3cm, find RT. (3 mks)

14. Evaluate: $\int_3^5 (x^3 - 7x^2 + 7x + 15)\,dx$ (3 marks)

15. Mrs. Ondiek invested Ksh63560 in a bank where the interest was compounded quarterly at the rate of 12% per month. Determine the amount of money she had after 2 ½ years. (2mks)

16. Pipes S and T can fill a tank in 2 hours and 3 hours respectively. Pipe U can empty the full tank in 4 hours. How long will it take to fill the tank with all the pipes running? (2mks)

SECTION II (50MARKS) ***ANSWER ONLY FIVE QUESTIONS IN THIS SECTION***

17. a) In a form four class, there are 22 girls and 18 boys. The probability that a girl completes the secondary education course is $^3/_5$ whereas that of a boy is $^2/_3$. A student is picked at random from the class. Find the probability that the student picked:

i) Is a boy and completes the course. (2mks)

ii) Will complete the course. (2mks)

iii) Is a girl and will not complete the course. (2mks)

b). A bag contains 5 blue balls, 3 green balls and 8 red balls all of similar size and shape. A ball is picked at random without replacement and its color noted. Use a tree diagram to determine the probability that at least one of the first two balls picked is green (4mks)

18. Three quantities R, S and T are such that R varies directly as S and inversely as the square of T.

a) Given that R = 480 when S = 150 and T = 5, write down an equation connecting R, S and T. (4mks)

b) Find the value of R when S = 360 and T = 1.5. (2mks)

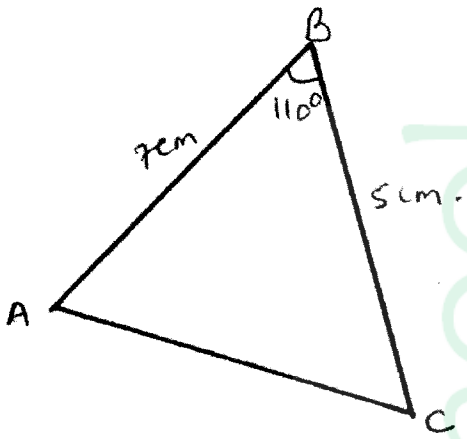
c) Find the percentage change in R if S increases by 5% and T decreases by 20%. (4mks)

19. Wambui planned to spend sh 16 800 to buy a number of bags of maize. When she went to the market she discovered that the price of maize had increased by sh 200 per bag. She could now afford to buy two bags less than she had planned to buy with the same amount of money.

a) Determine the number of bags she had planned to buy. (6 marks)

b) She later sold the maize at sh 1 750 per bag. Find the percent profit she made. (4 marks)

20. Triangle ABC is such that AB = 7 cm, BC = 5 cm and angle ABC = 110^0.



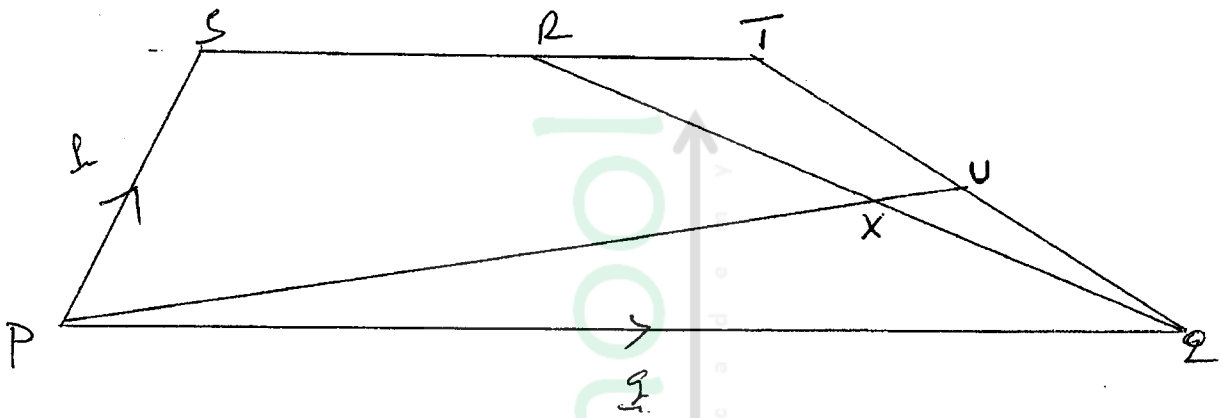
Calculate to 2 decimal places;

i. The area of the triangle ABC. (2 marks)

ii. The perimeter of triangle ABC. (4 marks)

iii. The size of angle ACB. (4 marks)

21. In the trapezium shown below $\overrightarrow{PQ} = 3\overrightarrow{ST}$. T divides SR in the ratio 4 :1 and U is the midpoint of **QT. PU** and **QR** intersect at X. **PX = PU** and **QX = kQR.**



Given that **PQ = q** and **PS = p**

(a) Express QR in terms of **p** and **q** (1mk)

(b) Express PX in terms of **p, q** and h. (2mks)

(c) Express PX in terms of **p, q** and k. (3mks)

(d) Hence; obtains the values of h and k. (3mks)

(e) Determine the ratio in which X divides QR. (1mk)

22. The table below shows rates of taxation in a certain year.

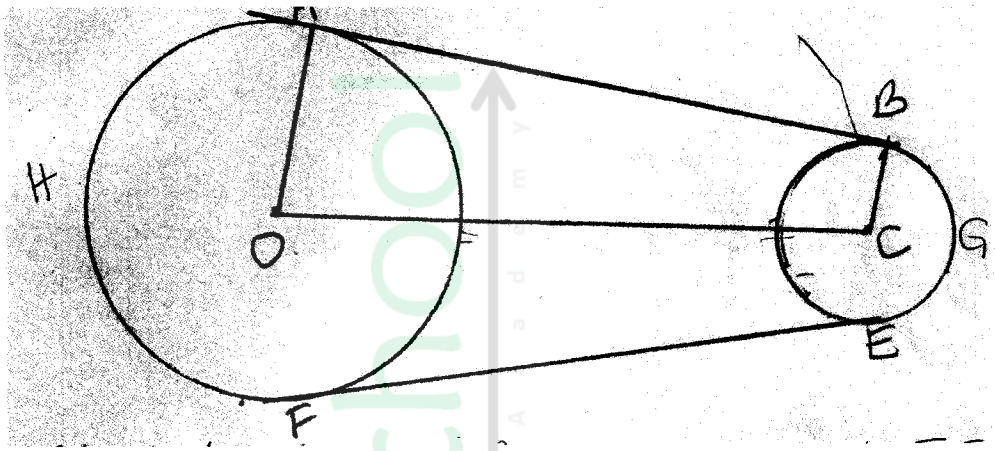
Income in K£ p.a	Sh per K£
1 – 3900	2
3901 – 7800	3
7801 – 11700	4
11701 – 15600	5
15601 – 19500	7
Above 19500	9

In that period Wafula was earning a basic salary of Ksh.21,000 per month. In addition he was entitled to a house allowance of Ksh.9000p.m. and a personal relief of Ksh.1,056 p.m.

(a) Calculate how much income tax Wafula paid per month. (7mks)

(b) Wafula other deductions per month were co-operative society contributions Sh.2000, loan repayment Sh.2500. Calculate his net salary per month. (3mks)

23. Two wheels have radii 20cm and 30cm. Their centres are 70cm apart. A belt, passes tightly round the wheels as shown below.



i. Calculate the length of AB and FE. (3 marks)

ii. Evaluate the angles AOC and BCO. (3 marks)

iii. Calculate the total length of the belt ABGEFHA (4 marks)

24. Kubai saved Kshs 2,000 during the first year of employment. In each subsequent year, he saved 15% more than the preceding year until he retired.

(a) How much did he save in the second year? (2mks).

(b) How much did he save in the third year? (2mks).

(c) Find the common ratio between the savings in two consecutive years (2mks).

(d) How many years did he take to save the savings a sum of Kshs 58,000? (2mks).

(e) How much had he saved after 20 years of service? (2mks).