GATITU DAY MIXED SECONDARY SCHOOL

END OF TERM 1 EXAM

FORM FOUR MATHEMATICS

1. Use logarithm s correct to four decimal places to evaluate .Show all the steps giving your answers at each stage (4mks)

2.53 2 × 83.45

√0.4562

2. Make M the subject of the formula (3mks)

Q= d √f-m

2f m

3. Given that M varies jointly as the square of R and as H. Fin d the percentage change in M if R is decreased by 15% and H is increased by 12% (3mks)

4. Given that x=2i+j-2k, y= -3i+4j-k and z=-5i+3j+2k and p=3x-y+2z. Calculate the magnitude of P correct to 3 significant figures (3mks)

5 a) Expand (1- ½ x) 4 in ascending power of x (2mks)

b) Use the first three terms of your expansion in (a) above to evaluate (0.995)4 (3mks)

6. Solve for x in the equation

½ log 81 + log 2(x2 –x/3) =1 (3mks)

7. Find the value of x for which the matrix below has no inverse (3mks)

8. Kingaru bought a new Tornado motor bike at sh. 80,000 last year. If he was to sell the motorbike after 2 years time the rate of depreciation is 15% semi annually ,What will be the value of the motorbike(3mks)

9. In the diagram below QP is parallel to XY. QP=1.5cm, XY =4.5cm andQY= 9.0cm

Q P

O

X Y

Calculate the lengths (4mks)

i) OP

ii) OQ

10. The first and the last term o f an arithmetic sequence are -12 and 22 respectively. The sum of all the terms is 260. Find the number of the terms in the series (3mks)

11. Solve for (4mks)

8y= 4 (2x+1

272y=9 x-3

12. The 11th term of an arithmetic progression is 4 times its second term. The sum of the 1ST seven terms of the same progression is 175. Find the first term and the common difference of the progression (3mks)

13. Find the centre and radius of this circle

X2+y2 + 10x +18y+-38=0 (4mks)

14. The sine wave is given by the equation

y=3 find

i) Amplitude (1mks)

ii) Period (2mks)

15. Simplify the expression (3mks)

SECTION II (50mk s)

Answer any five questions from this section

16. Mr. Mapesa is married and earns a salary of Sh. 25000, medical allowance e sh. 2,400 house allowance e of sh. 13000 commuter allowance of Sh. 45000 and also pays sh. 3000 for his life Insurance. He is entitled too a personal relief of sh. 1760

The table below shows the rate at which income tax is charged.

|  |  |
| --- | --- |
| Annual taxable income in K$ | Rate sh. perk$ |
| 1-9680 | 2 |
| 9861-18800 | 3 |
| 18801-27920 | 4 |
| 27921-37040 | 5 |
| 37041 and above | 6 |

Calculate Mr. Mapesa

a) Taxable income in K$ (2mks)

b) P.A.Y.E (6mks)

c) Net salary (2mks)

17. A basket contains two green oranges, three yellow oranges and five red Oranges. Two oranges are drawn one at a time without replacement

a) Draw a tree diagram to show all the possibilities (2mks)

b) Find the probability that

i) The two oranges are of the same colour (3mks)

ii) The two oranges are red (2mks)

iii) At least one orange is green (3mks)

18. The figure shows the triangle of the vectors in which OS:SP= 1:23 PR:RQ=2:1 and T is the midpoint of OR

P

S

R

O M Q

a) Given that OP=p and OQ=q express the following g vectors in terms of p and q

i) OR (2mks)

ii) QT (2mks)

b) Express TS in terms of p and q and hence show that the points Q,T and S are collinear (3mks)

c) M is a point on OQ such that OM=kOQ and PTM is a straight line. Given that PT: TM=5:1 find the value of k (3mks)

19. Complete the table below for the function

y=2x2 +4x2-5x-8 (3mks)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| X | -4 | -3 | -2 | -1 | 0 | 1 | 2 |
| 2x3 | -128 |  | -16 |  | 0 | 2 | 16 |
| 4x2 | 64 | 36 |  | 4 | 0 |  | 16 |
| -5x | 20 |  | 10 | 5 | 0 | -5 |  |
| -8 | -8 | -8 | -8 | -8 | -8 | -8 | -8 |
| y | -52 | -11 |  |  | -8 |  |  |

On the grid provided draw the graph of

y=2x3+4x2-5x-8 (3mks)

Scale: x axis2cm rep 1 unit

Y axis 1cm rep 5 units

c) By drawing appropriate straight lines, solve the equation

i) 2x3+4x2-9x-7=0

ii) 2x3+4x2-10x+4=0 (2mks)

20. The figure below shows two circle s centres A and B radii 6cm and 8cm respectively.

The circle intersect at P and Q

Angle PAB=42 and angle ABQ=30

a) Find the size of angle PAQ and PBQ (2mks)

b) Calculate to one decimal lace the area of

i) Sector APQ and PBQ (2mks)

ii) Triangle APQ and PBQ (2mks)

iii) The shaded area (take π=22/7 (4mks)

21. The diagram below shows a cone of the base radius 42cm from which a small cone o f base radii 28cm has been removed to form a frustum PQRAS. The height of the frustum is 20cm as shown .Calculate to 3decimal places the total surface area of the frustum in squares meters (10mks)

22. The distance between Kamau house and Ngumo house is 40km. One day Kamau left his house at 9.00am and cycled towards Ngumos house at an average speed of 20km/hr .Ngumo left his house at 10.30 am on the same day at an average speed of 30km/hr.

a) Determine the distance from kamau house where the two cyclists met (5mks)

ii) The time of the day when they met (2mks)

b) The two continued with their respective journeys until each reached his destination. Determine who reached his destination earlier and by how long (3mks)