UMMUL QURA HIGH SHOOL

Arowona Bus-Stop Amuloko Akanran Road, Ibadan.

THIRD-TERM EXAMINATION

CLASS: SSS 2 **SUBJECT**: Mathematics. **DURATION**: $1\frac{3}{4}$ hours.

Instructions: Answer ***all*** questions in ***Section A*** and ***ten*** in ***Section B.***

SECTION A: OBJECTIVES

1. Correct 58546 to 2 significant figures.
   A. 59000
   B. 58500
   C. 58550
   D. 60000
2. Evaluate $2431_6 - 2424_6$.
   A. 5525
   B. 5255
   C. 0007
   D. 0003
3. A quality z varies directly as the square root of x and inversely as the cube of S. If z = 8, when x = 4 and S = 0.5, express z intermediate of x and s. z is equal;
   A. $2\frac{\sqrt{x}}{s^3}$
   B. $\frac{\sqrt{x}}{s^3}$X
   C. $\frac{\sqrt{x}}{2s^3}$
   D. $\frac{2s^3}{\sqrt{x}s^3}$
4. Given that; 2x + 3y = 6 and y – 3x = 1, find the value of (8x + y).
   A. 4
   B. 5
   C. 6
   D. 7
5. Solve the equation $x^2 + 9x + 14 = 0$, x is
   A. -2 or 7
   B. 2 or-7
   C. -2 or-7
   D. 2 or 7
6. The circumference of a circle is given to be 100 cm. Find in terms of h, the radius of the circle.
   A. $\frac{100}{\pi}$ cm
   B. 50π cm
   C. $\frac{50}{\pi}$ cm
   D. 100π cm
7. A rectangular tank measuring 11 m by 2m by 7m is filled completely with engine oil. The value of the oil is ---- m^3.
   A. 154
   B. 100
   C. 140
   D. 220
8. If sin y = $\frac{1}{3}$, $0^0 < y < 90^0$, calculate the value of cos y.
   A. 91.6
   B. 0.33
   C. 0.94
   D. 19.47
9. If a die is rolled once, find the probability that 7 is obtained.
   A. 0.5
   B. 2
   C. 1
   D. 0

10. Given that p varies inversely as the square of q. If q = 3, when p = 100, find the equation connecting p and q.
    A. $\frac{900}{q^2}$
    B. $\frac{100q}{q}$
    C. $\frac{300}{q^2}$
    D. $900q^2$

11. If f = $\frac{9}{5}$ c + 32, find f when c = 100.
    A. 212
    B. 273
    C. 200
    D. 100

12. If x:y:z = 2:3:4, evaluate; $\frac{9x+3y}{6z-2y}$
    A. 2
    B. 3
    C. $2\frac{1}{2}$
    D. $1\frac{1}{2}$

13. The angles of a polygon are; 5x, 2x, 2x, (x + 2^0) and 20^0. If the total sum of interior angle of the polygon is 540^0, find the value of x.
    A. 50^0
    B. 60^0
    C. 43^0
    D. 34^0

14. Given that P = {-2 < x ≤ 3}, where x is an integer, list the members of P.
    A. {-2,-1, 0, 1, 2, 3}
    B. {-1,0, 1, 2}
    C. {-2, 0, 2, 4}
    D. {-1, 0, 1, 2, 3}

15. Solve the equation:$(x + 6)^2 = 12$
    A. $-\frac{5}{2}$ or $-\frac{19}{2}$
    B. $\frac{5}{2}$ or $\frac{19}{2}$
    C. $\frac{2}{5}$ or $\frac{2}{19}$
    D. $\frac{5}{2}$ or $\frac{3}{19}$

16. Find the sum to infinity of the sequence $\frac{1}{2}$, $\frac{1}{6}$, $\frac{1}{18}$, ……..
    A. $\frac{1}{4}$
    B. $\frac{1}{2}$
    C. $\frac{1}{7}$
    D. $\frac{3}{4}$

17. Factorize: $4a^2 + 12a + 9$
    A. $(2a + 3)^2$
    B. $(2a + 4)^2$
    C. $(a + 3)^2$
    D. $(2a + 5)^2$

18. Find the terms that must be added to the quadratic expressions and $x^2 + 12$ to make it perfect square?
    A. 36
    B. 48
    C. 24
    D. 12

19. Find the quadratic equation whose roots are $\frac{4}{3}$ and $\frac{1}{3}$.
    A. $x^2 - 3x - 10$
    B. $6x^2 + 3x - 11$
    C. $9x^2 - 12x + 6$
    D. $9x^2 - 15x + 4$

20. Round 16418.39 to 3 significant figures.
    A. 16400
    B. 16000
    C. 20000
    D. 16420

21. If p = $\sqrt{x-y}$, find x in terms of p and y.

A. $\sqrt{p-y}$

B. p^2 + y

C. $\sqrt{p^2-y}$

D. p + y^2

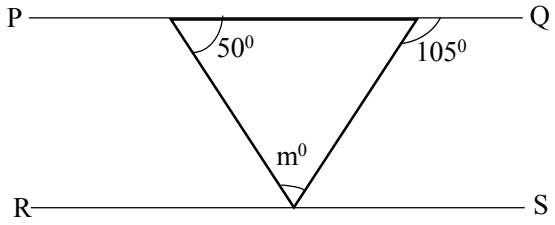
22. If $5p^{-3} = 8 \times 5^{-2}$, find the value of p.

A. $\frac{5}{2}$

B. $\frac{8}{125}$

C. $\frac{8}{5}$

D. $\frac{7}{27}$



23. In the diagram above, **PQ** is parallel to **RS** < ***QFG*** = 105^0 and < ***FEG*** = 50^0. Find the value of m.

A. 130^0

B. 55^0

C. 105^0

D. 75^0

24. Express 24 as a binary number.

A. 11000_2

B. 11101_2

C. 11001_2

D. 10111_2

25. The fourth term of an AP is 37 and first term is -20. Find the common difference.

A. 17

B. 19

C. 57

D. 63

26. Given that $5^n = k$, find 5^{n+1} in terms of k.

A. 1 + k

B. 5k

C. nk

D. k – 1

27. In a right – angled triangle, tan $\theta = \frac{4}{3}$, what is the value of sin θ – cos θ?

A. $\frac{1}{5}$

B. $\frac{3}{5}$

C. $\frac{1}{4}$

D. $\frac{5}{12}$

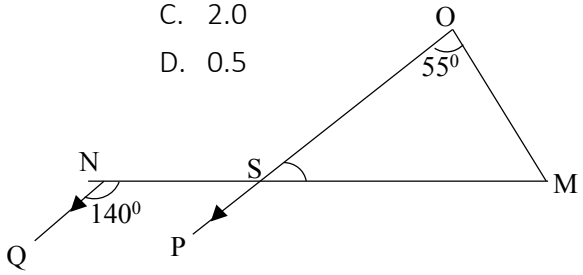
28. Simplify $9^{(2x+1)} = 27^{(x+1)}$.

A. 1.5

B. 1.0

C. 2.0

D. 0.5



29. In the diagram above, **OP**//**NQ**, $\mathbf{M\hat{P}P}$ = 55^0, $\mathbf{S\hat{N}Q}$ =140^0. Find $\boldsymbol{Q\hat{M}S}$.

A. 42^0

B. 85^0

C. 130^0

D. 55^0

30. If the first term of an AP is -1 and the common difference is 0.5, the 6^{th} term is ----.

A. 1.5

B. 1.0

C. 0.5

D. 2.5

31. Find the median of 2, 1, 0, 3, 1, 1, 4, 0, 1 and 2.

A. 0.1

B. 0.5
C. 1.5
D. 1.0

32. The angle of elevation on the top of a tower from a point 100 m away from the base is 45^0. Find the tower's height to the nearest meters.
A. 70
B. 58
C. 50
D. 80

33. Express 0.00005854 in standard form.
A. 5.854×10^{-5}
B. 58.54×10^{-4}
C. 5.854×10^{-4}
D. 5.854×10^{5}

34. Find the common ratio in the series; 18, 9, $4\frac{1}{2}$, $2\frac{1}{4}$, ……
A. $\frac{1}{3}$
B. $-\frac{1}{2}$
C. 2
D. $\frac{1}{2}$
E. 1

35. Find the 7^{th} term of the GP; 81, 27, 9
A. $\frac{1}{9}$
B. $\frac{1}{97}$
C. $\frac{1}{27}$
D. $\frac{1}{81}$

36. If set C = {2, 3, 4, 5, 7, 11} and D = {1, 2, 3, 5}. Find $\cap$ (C $\cup$ D).
A. 7
B. 8
C. 6
D. 5

37. Given that $\frac{5^{n+2}}{25^{2n-2}} = 5^0$, find n.
A. 5
B. 4
C. 3
D. 2

38. Make V the subject of the relation;
$$r = \frac{VR}{E-V}$$
A. $\frac{Er}{R+r}$
B. $\frac{R+r}{E}$
C. $\frac{r(E-V)}{R}$
D. $\frac{Er}{R-V}$

39. Find the length of an arc of a circle of radius 7 cm which subtends an angle of 72^0 at the center of the center of the circle.
{Take $\pi = \frac{22}{7}$}
A. 9
B. 12
C. 7.7
D. 8.8

40. Let μ = {1,2,3, 4….10}, A = {odd number up to 9}, B = {number Lee than 7}. Find A $\cap$ B.
A. {1,3,5}
B. {1,2,3,4,5}
C. {3,5}
D. {1,3,5, 7}

41. Determine the coefficient of m in the expression of $\left(\frac{m}{2} - 1\frac{1}{2}\right)\left(m + \frac{2}{3}\right)$.
A. $-\frac{1}{6}$
B. $-\frac{1}{2}$
C. -1

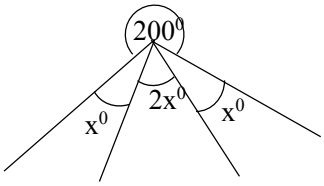
D. $-1\frac{1}{6}$

42. The sum of 9 and a certain number is one and half times the original number.
    A. 18
    B. 16
    C. 17
    D. 9

43. Which of the following is root of the quadratic equation?
    A. $2x^2 - 5x$
    B. $x(x-5)$
    C. $x^2 - 5$
    D. $5(x-1)$

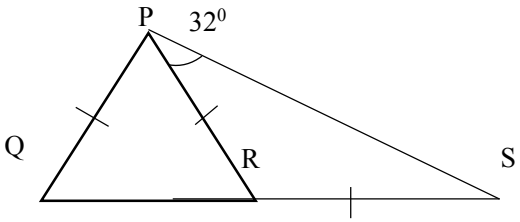
44. The length and width of a rectangle are in the ratio 5:3. If the perimeter is 80 cm, calculate the width -----cm.
    A. 37
    B. 22
    C. 15
    D. 20

45. Find the average of 2,4,7,8 and 9.
    A. 6.0
    B. 5.6
    C. 7.2
    D. 3.5



46. Find the value of x in the diagram above.
    A. 40^0
    B. 50^0
    C. 60^0
    D. 70^0

47. If $5x - 3y = 21$ and $4x + 5y = 2$. Find the value of y.
    A. -2
    B. -3
    C. 3
    D. 2



48. In the diagram, $|\boldsymbol{PQ}| = |\boldsymbol{RS}|$ and $\boldsymbol{S\hat{P}R} = 32^0$. Find the value of $\boldsymbol{Q\hat{P}R}$.
    A. 72^0
    B. 64^0
    C. 52^0
    D. 32^0

49. Which of the following is not a rational number?
    A. $\sqrt{3}$
    B. 1
    C. $\sqrt{16}$
    D. $\frac{1}{3}$

50. If $(0.25)^y = 32$, find the value of y.
    A. $\frac{3}{2}$
    B. $-\frac{5}{2}$
    C. $\frac{5}{2}$
    D. $-\frac{3}{2}$

SECTION B: **THEORY**

DURATION: $1\frac{1}{4}$ hours.

Instructions: Answer ***ten*** questions from all

Part A: Answer ***all*** (All questions carries equal marks) {40%}

1. (a) The 16th term of an AP is 93 and its common difference is 6. Find the first term of the AP and hence, calculate the 30th term of the AP.
   (b) The 9th and 22nd terms of an AP are 29 and 55, respectively. Find the sum of its 70 terms.
2. Use the completing the square method to solve the quadratic expressions: $5p^2 - 5 = 2p$.
3. Solve the following equations;
   a) $5^{2(x-1)} \times 5^{x+1} = 0.04$
   b) $9^{2(x-1)} \times 3^{3x-1} = 27^{x+3}$
4. Evaluate the following using logarithms table to 2 d.p.
   a. $\sqrt[3]{972.7}$
   b. $\frac{35.20^2 \ x \ 17.45^{\frac{1}{2}}}{3.15^4 \ x \ 8.150}$
5. Simplify the following;
   a) $log_3^{\frac{1}{27}}$
   b) $log_{0.5}^{32}$
   c) log_2^8

Part B: Answer ***any*** *five* questions (All questions carries equal marks) {60%}

6. (a) Given the equation $\frac{1}{u} = \frac{1}{f} - \frac{1}{v}$, make v the subject
   (b) Make 'g' the subject of the relation in the equation.

   $T = 2A\sqrt{\frac{h^2 + k^2}{gh}}$

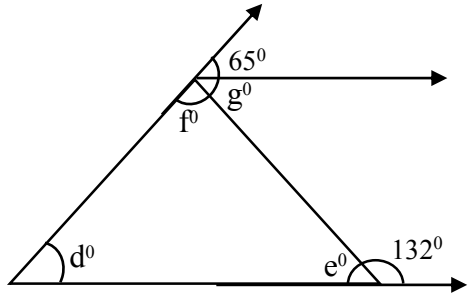
7. The resistance R in ohms of an electrical conductor of fixed length and uniform cross-section varies inversely as the square of the diameter d in cm of its cross-section. If the resistance is 0.32 ohms when the diameter is 1.5 cm, find;
   i. the relationship between R and d.
   ii. the value of d when R is 18 ohms.
8. (a) Draw the graph of the function $y = 2x^2 - x - 10$ for value of x from -3 to +3.
   (b) Use the graph to find solutions to the questions below;
   i. What is the minimum value of the function?
   ii. What is the range of the function?
   iii. What are values of x when you = -5?

iv. What is the value of y when X = 0?

v. What are the roots of the equation $2x^2 - x - 10 = 0$?

9. (a) If the exterior angles of a quadrilateral are y^0, $(2y + 5)^0$, $(y + 15)^0$. Find y.

(b) Find the sizes of each marked angles in the figure below.



10. Evaluate

a) $2 \sin 60^0 + \tan 45^0 + \cos^2 60^0$

b) $\frac{\cos x + \sin x}{2 \sin x + \cos x}$ given that tan x = 0.5 when x is acute.

11. The table below shows the monthly contribution and expenditure pattern of an employee in 1999.

Pension	5
Income tax	25
Food	40
Transport	10
Rent	12.5
Others	7.5

a) Draw a pie chart to illustrate the data.

b) If the employee gross monthly salary was ₦10,800, calculate the pension contribution of the employees.

c) Calculate the income tax paid by the employee.

12. (a) In a classroom of 500 final year students in a school, I 350 study chemistry and 200 study physics. If 90 study neither chemistry nor physics. Using Venn diagram.

i. How many students study both subjects?

ii. How many students study only one subject?

iii. How many students study at least one subject?

(b) In a class of 40 students, a student can study French or History or both. If 20 study French, 23 students study History and 6 study neither. Use Venn diagram, how many students study both subjects?