NAME	
SUBJECT	**MATHEMATICS** | **CLASS** | **SS** 1 | **DURATION** | **1 ½ HOURS**

Answer all the questions in this part. All questions carry equal marks. [40 marks]

1. **a)** Simplify $2^x(2^{-14}) = 2$ and $3^{-x}(9^{-2y}) = 3$ simultaneously. **WAEC 2019**

   b) A meeting started at 2pm on Friday and lasted for 1250minutes. At what time and day of the week will the meeting end.

   c) Mrs Maureen spent $\frac{1}{4}$ of here monthly in come at a shopping mall, $\frac{1}{3}$ at an open market and $\frac{2}{3}$ of the remaining amount at a mechanic workshop. If she had N222,000.00 left, find
   i) her monthly income
   ii) the amount spent at the open market **WAEC 2020**

2. **a)** Find the value of x if $\dfrac{9^{2x-3}}{3^{x+3}} = 1$ **WAEC 2006**

   b) Given the equation $P = \left[\dfrac{rk}{q} - ms\right]^{\frac{2}{3}}$

   i. Make q the subject of the relation

   ii. Find correct to two decimal places, the value of q when P=3, m=15 and s=0.2, k=4 and r=10 **WAEC 2020**

3. a) The volume of v cm^3 of a metal used to make a pipe r cm long is given by the formula:

   $v = \pi r(R^2 - r^2)$

   where R is the external radius of the pipe and r is the internal radius
   i) make R the subject of the formula
   ii) find R where v = 2500, r=7cm and $\pi = \dfrac{22}{7}$

   b) If $1342_{five} - 241_{five} = X_{ten}$, find the value of X **WAEC 2019**

4. **a)** Given that $110_x = 40_{five}$. Find the value of x **WAEC 2019**

   b) i. draw a table for multiplication ✕ in modulo 8 on the set T= {2,3,5,7}.
   ii. use the table to find the solution set of:
       i.   3 ✕ n = 5
       ii.   n ✕ n=1
   WAEC 2019

5.   **a)** x varies jointly as the square of m and the cube of n. when x=9, m=$\frac{3}{4}$ and n=$\frac{1}{2}$. Determine the relationship between x, m and n and calculate correctly to 3 significant figures, the value of [i] x when m=$\frac{2}{3}$ and n=$\frac{1}{5}$ [ii] m when x=5 and n= $\frac{1}{8}$ ***WAEC 2013***

    b)   Evaluate with the use of four figure table

$$\sqrt{\frac{55.3 \; x \; \sqrt[3]{18.5}}{1.38^5 \; x \; 2.02}}$$

    NECO 2004

Section B
Answer any three [3] questions in this section. {each question carries equal marks} [30mrks]

6. **a)**   Without using mathematical tables or calculators, evaluate
$$\frac{0.6 \; x \; 32 \; x \; 0.004}{1.2 \; x \; 0.008 \; x \; 0.16}$$
    leaving the answer in standard form.   ***WAEC 2014***

  b) An operation $*$ is defined on the set X = {1, 3, 5, 6} by m$*$n = m+n+2(mod 7) where m,n $\in$ X
    i.   draw a table for the operation
    ii.   using the table, find the truth set of
        a)   3 $*$ n = 3
        b)   n $*$ n = 3   ***WAEC 2015***

7.   a)   If $9^{(1-x)} = 27^y$ and $x - y = -1\frac{1}{2}$, find the value of x +y   ***WAEC 2011***

    b.   The formula $b = 40 + \dfrac{2w}{3}$ is used for working out the electricity bill of b naira for a

    Month in which W kilowatt per hours of electricity is used.

    (i)Find the bill for a month in which 2430 kilowatt-hours of electricity is used.
    (ii)Find the number of kilowatt- hours used by a consumer who received a bill of N2456.

8.   a)   Given that $\log_3 81$=m, find the value of m
    b)   Determine the value of the bases x and y in the following simultaneous equation;
    $31_x + 20_y = 23_{ten}$ and $23_x + 11_y = 5_{ten}$

9.   a) Given that $2^m \; x \; \left(\frac{1}{8}\right)^n = 128$ and $4^m \; x \; 2^{-4n} = \frac{1}{16}$, find the value of (m-n) ***WAEC 2019***

    b) i)   copy and complete the following table for multiplication modulo 11

x	1	5	9	10
1	1	5	9	10
5				
9				
10				

2

ii) Use the table to

a) evaluate (9 x 5) x (10 x 10) (mod 11)
b) find the truth set of
    a. 10 x m = 2
    b. n x n =4

10. a) If $2^{x+y} = 16$ and $4^{x-y} = \frac{1}{32}$, find the value of x and y.   *WAEC 2016*

  b) copy and complete the addition and multiplication in modulo 5 on the set {2,3,4}.

+	2	3	4
2			
3			
4			

X	2	3	4
2			
3			
4			

ii) use the table to:

a) solve the equation 3 x n + 2 ≡ 1 (mod 5):

b) find the value of n, if 4 + n x 2 ≡ 1 (mod 5)   *WAEC 2018*

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SUBJECT	**MATHEMATICS** CLASS SS 1 DURATION 1 ½ HOURS

Part A: Multiple choice (50 marks)

Answer all questions: *Each* question is followed by *four* options lettered A to D. Find out the correct option for *each* question and *shade in pencil* on your answer space which bears the same letter as the option you have chosen. Give only *one* answer to *each* question.

1. Convert 211_3 to a number in base 2

    A. 1000_2

    B. 11000_2

    C. 10110_2

    D. 100000_2

2. If 0.075 is express as a fraction in its lowest form, what is its denominator?

    A. 40

    B. 9

    C. 3

    D. 5

3. What is the simplest positive form of -35(mod 6)

    A. 1

    B. 0

    C. 4

    D. 2

4. Find the value of $5 \div 4 \ (mod \ 7)$

    A. 1,6

    B. 2,3

    C. 3

    D. 5

5. The interior angles of a polygon are x, 2x, 3x, (x+30), (x-10). Find the value of x

    A. 45^0

    B. 84^0

    C. 65^0

    D. 95^0

6. If x: y: z = 2:3:4, evaluate $\frac{9x+3y}{6z-2y}$

    A. $1\frac{1}{2}$

    B. 2

    C. $2\frac{1}{2}$

    D. 3

7. Expand (2x – 3y)(x-5y).

    A. $2x^2 + 13xy – 15y^2$

    B. $2x^2 - 13xy – 15y^2$

    C. $2x^2 + 13xy + 15y^2$

    D. $2x^2 - 13xy + 15y^2$

8. Make f the subject of the relation

    v= u + ft.

4

A. $\frac{v-u}{t}$

B. $\frac{u-v}{t}$

C. $\frac{v}{u}$ - t

D. t (v + u)

9. If $\log_9 x = 1.5$. Find x

A. 36

B. 27

C. 24.5

D. 13.5

10. If today is Wednesday, what day of the week will it be in 100 days' time?

A. Monday

B. Tuesday

C. Wednesday

D. Friday

11. Simplify $(11_{two})^2$

A. 1001_{two}

B. 1101_{two}

C. 101_{two}

D. 10001_{two}

12. Sum (2x+6) and (6x+2) (mod 7)

A. 2x+1(mod 7)

B. x+1 (mod 7)

C. x+2(mod 7)

D. 2x+2(mod7)

13. The temperature of a place from

-5^{0}C to 2^{0}C. What is the temperature increase?

A. 3^{0}C

B. -7^{0}C

C. -3^{0}C

D. 7^{0}C

14. Solve: $2^{\sqrt{2x+1}} = 32$

A. 13

B. 17.5

C. 12

D. 11

15. The angle of elevation of the top of a cliff 15 meters high from a landmark is 60^0. How far is the landmark from the foot of the cliff? Leave your answer in surd form.

A. $5\sqrt{3}$m

B. $15\sqrt{2}$ m

C. $10\sqrt{3}$m

D. $4\sqrt{3}$m

16. If $16 * 2^{(x+1)} = 4^x * 8^{(1-x)}$, find the value of x

A. -4

B. 4

C. 1

D. -1

17. If 4x +2y=6 and 6x-2y =4, find the value of (y-x)

A. 8

B. 2

C. 4

D. 0

5

18. Express 302.10495 correct to five significant figures.

   A. 302.10

   B. 302.11

   C. 302.105

   D. 302.1049

19. Convert 35_{10} to a number in base two.

   A. 1011

   B. 10011

   C. 100011

   D. 11001

20. The diagonal of a rhombus are 12cm and 5cm. calculate its perimeter

   A. 26cm

   B. 24cm

   C. 17cm

   D. 34cm

21. Solve for x in the equation: $\frac{1}{x} + \frac{2}{3x} = \frac{1}{3}$

   A. 5

   B. 4

   C. 3

   D. 1

22. If $3^{2x} = 27$, what is x

   A. 1

   B. 1.5

   C. 4.5

   D. 1

23. If x +y= 2y-x + 1= 5, find the value of x.

   A. 3

   B. 2

   C. 1

   D. -1

24. A kite flies on a taut string of length 50m inclined at an angle of 54^0 to the horizontal ground. The height of the kite above the ground is

   A. $50 \tan 36^0$

   B. $50 \sin 36^0$

   C. $50 \tan 54^0$

   D. $50 \sin 54^0$

25. If $101_{two} + 12_y = 35_{five}$. Find the value of y

   A. 8

   B. 7

   C. 6

   D. 13

26. Simplify $0.027^{-\frac{1}{3}}$

   A. $3\frac{1}{3}$

   B. 3

   C. $\frac{3}{10}$

   D. $\frac{1}{9}$

27. Simplify $(\frac{1}{343})^{1/3} + 64^{-1/3} - (\frac{4}{9})^{-\frac{1}{2}}$

   A. $1\frac{7}{36}$

6

B. $-1\frac{3}{28}$

C. $1\frac{3}{28}$

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

28. The sum of the interior angles of a regular polygon is 1800^0. How many sides have the polygon?

A. 16

B. 12

C. 10

D. 8

29. A side and diagonal of a rhombus are 10cm and 12cm respectively. Find its area.

A. $20cm^2$

B. $24cm^2$

C. $48cm^2$

D. $60cm^2$

30. If $\log_a x = p$, express x in term of a and p

A. x= u + p

B. $x = \frac{a}{p}$

C. $x = p^a$

D. x= a^p

31. Express 0.000834 in standard form

A. 8.34 x 10^{-4}

B. 8.34 x 10^{-3}

C. 8.34 x 10^3

D. 8.34 x 10^5

32. Express the product of 0.06 and 0.09 in standard form

A. 5.4 x 10^{-1}

B. 5.4 x 10^{-2}

C. 5.4 x 10^{-3}

D. 5.4 x 10^{-4}

33. Evaluate $(20_{three})^2 - (11_{three})^2$ in base three

A. 101

B. 121

C. 202

D. 2020

34. Factorize $6x^2 - x -2$

A. (6x -5)(x+4)

B. 2(3x-5)(x + 2)

C. (3x +4)(2x-5)

D. (3x -2)(2x+1)

35. If $\frac{4m+3n}{4m-3n} = \frac{5}{2}$, Find the ratio of m:n

A. 7: 4

B. 4 : 3

C. 3 : 4

D. 4 : 7

36. Simplify $2\frac{1}{3} \div 2\frac{2}{3} \times 1\frac{1}{7}$

A. 0

B. 1

C. 2

7

D. 3

37. Which of the following is equal to $\frac{72}{125}$?

   A. $\frac{2^3 X 3^2}{5^3}$

   B. $\frac{2^4 X 3^1}{5^3}$

   C. $\frac{2^3 X 3^2}{5^3}$

   D. $\frac{2^5 X 3^2}{5^3}$

38. Express $\frac{8.75}{0.025}$ in standard form.

   A. 3.5 x 10^{-3}

   B. 3.5 x 10^{-2}

   C. 3.5 x 10^{1}

   D. 3.5 x 10^{2}

39. Evaluate: $\frac{27^{1/3}}{16^{1/4}}$

   A. 6/8

   B. 5/4

   C. 4/7

   D. 3/2

40. Simplify: $16^{5/4} X 2^{-3} X 3^{0}$

   A. 0

   B. 2

   C. 4

   D. 10

41. Convert 592 base 10 to octal

   A.   1200

   B.   1120

   C.   1112

D.   1020

42. If $7 + y = 4 \pmod 8$, find the least value of y, $10 \le y \le 30$

   A. 11

   B. 13

   C. 19

   D. 21

43. A house bought for #100,000 was later auctioned for #80,000. Find the loss percent.

   A. 20%

   B. 30%

   C. 40%

   D. 50%

44. If 71_{nine} is converted to a number in base eight, the result is

   A. 701_{eight}

   B. 100_{eight}

   C. 25_{eight}

   D. 64_{eight}

45. Given that $2p - m = 6$ and $2p + 4m = 1$, find the value of $(4p + 3m)$.

   A. 1

   B. 3

   C. 5

   D. 7

46. If $104_x = 68$, find the value of x

   A. 5

   B. 7

   C. 8

   D. 9

47. If $8x - 4 = 6x - 10$, find the value of 5x.

8

A. -35

B. -15

C. -3

D. 3

48. Which of the following is not necessarily true of a rectangle?

A. the diagonals are equal

B. the diagonals bisect each other

C. the diagonals are perpendicular

D. each diagonal divides the area of the rectangle equally

49. Express the true bearing of 250^0 as a compass bearing

A. N 20° E

B. S 70° E

C. N 20° W

D. S 70° W

50. A bag contain 3 white, 6 red and 5 blue identical balls. A ball is picked at random from the bag. What is the probability that it is either white or blue?

A. $\frac{9}{14}$

B. $\frac{4}{7}$

C. $\frac{5}{14}$

D. $\frac{3}{14}$