NATIONAL EXAMINATIONS COUNCIL
2023 BASIC EDUCATION CERTIFICATE EXAMINATION

B1021 & B1022
MATHEMATICS

2 hours 40 minutes **I&II**

Please do not open this question booklet until you are told to do so.
While waiting, read the following instructions carefully.

There are two papers of **sixty (60) multiple-choice** questions each. **Paper I** will last for **1 hour** 20 **minutes** after which the OMR sheet will be collected. **Paper II** will also last for 1 hour 20 minutes. **ALL DIAGRAM ARE NOT DRAWN TO SCALE**

PAPER I

Time Allowed: 1 hour 20 minutes

INSTRUCTIONS TO CANDIDATES

1. Answer **all** questions,

2. Use **HB pencil** only.

3. Write your **Name** and **School Name** on the answer sheet provided. Also, write and shade appropriately your **Registration Number** in the spaces provided.

4. Answer each question by shading the box that corresponds to the option you have chosen.

5. Do **not** waste time on any question. If you find any difficult, go to the others and finish them before you come back to the difficult one(s).

6. There must **not** be more than one shading for an answer. Any answer with shading of more than one box will be marked wrong.

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PAPER I

1. What is the square of 30?
    A.   60
    B.   90
    C.   270
    D.   810
    E.   900

2. Find the square root of $\frac{75}{300}$
    A. $\frac{1}{2}$
    B. $\frac{1}{5}$
    C.   2
    D.   4
    E.   5

3. Express 61782 in standard form.
    A. 6.1782×10^{-4}
    B. 6.1782×10^{-2}
    C. 6.1782×10^{0}
    D. 6.1782×10^{2}
    E. 6.1782×10^{4}

4. Express 0.0030752 to three significant figures.
    A.   0.003
    B.   0.003075
    C.   0.00308
    D.   0.0031
    E.   0.00375

5. Simplify $\frac{7}{13} \div \frac{3}{4}$.
    A. $\frac{39}{28}$
    B. $\frac{28}{39}$
    C. $\frac{21}{52}$
    D. $\frac{52}{28}$
    E. $\frac{27}{38}$
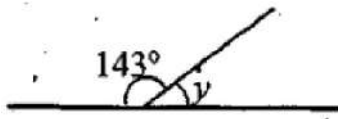
6. Simplify $\frac{2}{3} \div \frac{1}{5}$.
    A. $\frac{13}{15}$
    B. $\frac{15}{13}$
    C. $\frac{17}{15}$
    D. $\frac{10}{15}$
    E. $\frac{3}{15}$

7. Express 108 as a product of its prime factors.
    A. 2×3
    B. $2^{2} \times 3^{3}$
    C. $2^{3} \times 2^{2}$
    D. 2×3^{3}
    E. $2^{2} \times 3^{4}$

8.   Convert $9\frac{1}{7}$ to improper fraction.

A. $\frac{9}{7}$

B. $\frac{10}{7}$

C. $\frac{17}{7}$

D. $\frac{63}{7}$

E. $\frac{64}{7}$

9.   Divide 100 by the positive difference between 65 and 75.
A.   5
B.   10
C.   15
D.   20
E.   25

10.   Express 46_{eight} as denary
A.   30
B.   38
C.   42
D.   48
E.   50

11.   If 30% of a number is 900, find the number.
A.   600
B.   900
C.   2,100
D.   2,700
E.   3,000

12.   Simplify $2\frac{2}{5} \times 1\frac{1}{4}$
A.   7
B.   6
C.   5
D.   4
E.   7

13.   Express 0.24 in the form $\frac{p}{q}$ in its lowest terms.

A. $\frac{1}{25}$

B. $\frac{1}{24}$

C. $\frac{4}{25}$

D. $\frac{6}{2}$

E. $\frac{1}{6}$

14.   Find the HC.F. of 224 and 168.
A.   20
B.   44
C.   54
D.   56
E.   72

15. Determine the L.C.M. of 12, 24 and 36.
    A.   10
    B.   12
    C.   26
    D.   54
    E.   72

16. Subtract 1101_{two} from 11011_{two}
    A. 10_{two}
    B. 11_{two}
    C. 110_{two}
    D. 111_{two}
    E. 1110_{two}

17. Find the product of 10_{two} and 11_{two}.
    A. 100_{two}
    B. 101_{two}
    C. 110_{two}
    D. 111_{two}
    E. 1011_{two}

18. Find the reciprocal of 0.65, correct to three significant figures.
    A.   1.52
    B.   1.53
    C.   1.54
    D.   1.500
    E.   1.538

19. If 6 men can do a job in 4 days, how many days will it take 8 men to do the same job if they work at the same rate?
    A.   2
    B.   3
    C.   4
    D.   6
    E.   8

20. The ratio of boys to girls in a mixed school is 4:5. If there are 375 girls in the school, how many are boys?
    A.   275
    B.   300
    C.   325
    D.   375
    E.   675

21. At what rate per annum will ₦1, 600.00 give ₦400.00 as simple interest in 2 years?
    A.   5.5%
    B.   7.2%
    C.   8.0%
    D.   10.5%
    E.   12.5%

22. A trader borrows ₦200, 000.00 at a compound interest of 3% per annum. How much does he pay back after 2 years?
    A.   ₦12, 180.00
    B.   ₦121, 180.00
    C.   ₦206, 000.00
    D.   ₦206, 180.00
    E.   ₦212, 180.00

23. If 6 packets of cream cost ₦450.00, find the cost of 3 packets.
    A.   ₦200.00
    B.   ₦215.00
    C.   ₦225.00
    D.   ₦335.00
    E.   ₦345.00

24. Find the amount of energy in units used by a customer, if his present and previous meter readings are 85,402 units and 74,012 units respectively.
    A.   12,500
    B.   11,390
    C.   10,400
    D.   9,000
    E.   8,000

25: Find the value of y in the figure below.

    A.   27°
    B.   37°
    C.   47°
    D.   57°
    E.   67°

PAPER II

Time Allowed: 1 hour 20 minutes

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7. If you change your mind about an answer, completely erase the first shading.

8. Use of Mathematical table is allowed.

9. Use of calculator is allowed

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1. Factorize $mx - my - nx + ny$
    A. $(m + n)(x + y)$
    B. $(m + n)(x - y)$
    C. $(m - n)(x + y)$
    D. $(m - n)(x - y)$
    E. $(n - m)(x - y)$

2. Factorize $3a^2 + 7a - 6$.
    A. $(a - 3)(a + 3)$
    B. $(3a + 2)(a + 3)$
    C. $(3a - 2)(a + 3)$
    D. $(a + 3)(3fl + 3)$
    E. $(3a + 2)(a - 3)$

3. Simplify $\frac{3}{5x} - \frac{2x-1}{x}$

    A. $\frac{4-2x}{5x}$

    B. $\frac{4+2x}{5x}$

    C. $\frac{2x-4}{5x}$

    D. $\frac{2-10x}{5x}$

    E. $\frac{8-10x}{5x}$

4. Solve $3 - \frac{k}{3} = 1$
    A. 3
    B. 4
    C. 6
    b. 8
    E. 9

5. Solve $2(x - 1) > 3$.

    A. $x > -3\frac{1}{2}$

    B. $x > -2\frac{1}{2}$

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

    D. $x > 2^3/_4$

    E. $x < 2\frac{1}{2}$

6. When 15 is added to $\frac{1}{4}$ of a number, the result is 4 times the number. Find the number.
    A. 3
    B. 4
    C. 5
    D. 6
    E. 7

7. Find the value of p if $2p = 15 - p$
    A. 1
    B. 2
    C. 3
    D. 5
    E. 8

8. Solve the equations $2x + y = 4$ and $x + y = 2$ simultaneously.
    A. $x = -1, y = -1$
    B. $x = 0, y = -1$
    C. $x = 1, y = 0$
    D. $x = 2, y = 0$
    E. $x = 2, y = 2$

9. If $x = \frac{24y}{pr}$, make y the subject of the relation.

    A. $y = \frac{24x}{pr}$

    B. $y = \frac{xpr}{24}$

    C. $y = \frac{24r}{px}$

    D. $y = \frac{pr}{24}$

    E. $y = \frac{px}{24}$

10. Solve the equation $\frac{x+1}{5x-1} = \frac{1}{6}$
    A. -7
    B. -1
    C. 1
    D. 7
    E. 11

11. Expand $(x + 2)(2x - 1)$
    A. $2x^2 + 3x - 2$
    B. $2x^2 + 3x + 2$
    C. $2x^2 - 3x - 2$
    D. $2x^2 + 5x - 2$
    E. $2x^2 - 5x + 2$

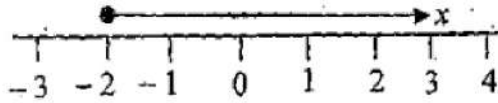   Use the table below to answer questions **12** and **13** for the relation $y = 2x + 5$.

x	-4	-3	-2	-1	0	1	2	3	4
y	-3	A	1	B	5	C	9	D	13

12. Find the value of A
    A. -3
    B. -1
    C. 1
    D. 2
    E. 3

13. Find the value of $B \times C + D$.
    A. 7
    B. 9
    C. 10
    D. 13
    E. 32

14. The figure below represents which of the following inequalities

    A. $x < -2$
    B. $x \leq -2$
    C. $x > -2$
    D. $x \geq -2$
    E. $x > 3$

15. Two-thirds of a certain number is greater than 6. Find the range of values of the number
    A. $x > 18$
    B. $x > 9$
    C. $x < 18$
    D. $x < 9$
    E. $x < 6$

16. The sum of two numbers is 9 and their difference is 3. Find the numbers.
    A. 6, 2
    B. 7, 2
    C. 8, 1
    D. 6, 3
    E. 5, 4

17. Solve the simultaneous equations; $3x + 2y = 6, 2x + y - 4$.
    A. $x = -1, y = -1$
    B. $x - 0, y = -1$
    C. $x \ 1, y = 0$
    D. $x = 0, y = 2$
    E. $x = 2, y = 0$

18. Simplify $(x^2 - 1) - (x + 2)^2$.
    A. $-(4x - 5)$
    B. $3x + 4$
    C. $4x + 1$
    D. $-(4x + 5)$
    E. $5x + 3$

19. Simplify $72pqr \div (-9q)$.
    A. 8pr
    B. 8qr
    C. −8pr
    D. −8qr
    E. −8pqr

20. If 3 is divided by the sum of x and 1, the result equals to 3 divided by 5. Find the value of x.
    A. -2
    B. 1
    C. 2
    D. 3
    E. 4

21. Solve the equation $\frac{x+2}{3} + 2x - 5 = 5$.
    A. 4
    B. 6
    C. 7
    D. 8
    E. 10

22. Ade's age is 56 years more than his son. If the son's age is w years, find the value of w when the sum of their ages is 76 years.
    A. 6
    B. 7
    C. 8
    D. 9
    E. 10

23. If $x = 2$, $y = 6$ and z = 4, evaluate $\frac{4y+2z}{x+y}$.
    A. 3
    B. 4
    C. 5
    D. 6
    E. 7

24. Expand $(2a - 3)(1 + a)$.
    A. $2a^2 - a + 3$
    B. $2a^2 - a - 3$
    C. $2a^2 + 5a + 3$
    D. $2a^2 + a - 3$
    E. $2a^2 - 5a - 3$

25. Solve the equation $\frac{1}{p+2} = \frac{8}{3p+1}$.
    A. -5
    B. -3
    C. 3
    D. 5
    E. 9

26. Find the value of x if $3x + 5 = 4x - 7$.
    A. -12
    B. -2
    C. 0
    D. 2
    E. 12

27. Factorize $16a^2 - 9b^2$.
    A. $(4a + 3b)(4a + 3b)$
    B. $(4a + 3b)(4a - 3b)$
    C. $(4b + 3a)(4b - 3a)$
    D. $(4a - 3b)(4a - 3b)$
    E. $(4b - 3a)(4b - 3a)$

28. Find the coefficient of xy in the expansion of $(3x + 2y)(5x - 3y)$.
    A. -9
    B. -6
    C. 1
    D. 10
    E. 15

29. Express as $\frac{3}{y} - \frac{5}{y} + 2$ a single fraction.

    A. $\frac{2}{y}(y - 1)$

    B. $\frac{2}{y}(y + 1)$

    C. $\frac{2}{y}(1 - y)$

    D. $\frac{3}{y}(y - 1)$

    E. $\frac{5}{y}(y + 1)$

30. Simplify $\frac{x+3}{3} + \frac{x-3}{4}$

    A. $\frac{7-3x}{4}$

    B. $\frac{7x-3}{4}$

    C. $\frac{7x+3}{4}$

    D. $\frac{7x+3}{12}$

    E. $\frac{7x-3}{12}$

31. If $\frac{3}{8}$ of Olu's monthly savings is ₦24, 000.00, find his monthly savings.
    A.   ₦7, 200.00
    B.   ₦9, 000.00
    C.   ₦5, 200.00
    D.   ₦64, 000.00
    E.   ₦80, 000.00

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PAPER III

Answer **all** questions.

1   (a)   Simplify $1\frac{1}{2} \times \left(\frac{2}{3} - \frac{1}{4}\right) \div 2\frac{1}{2}$

       (b)   A piece of wood is 220 cm long. If 66 cm is cut away from the
                wood, what percentage of it remains?   **(10 marks)**

2.   The table below shows the ages of children in a particular
       orphanage home.

Ages	1	2	3	4	5	6
Number of children	10	15	21	20	16	18

       Use the information to find the:
       (i)   Mean
       (ii)   Median
       (iii)   Mode
       (iv)   Range   **(10 marks)**

MATHEMATICS PAPER I   2023

01.E	7.B	13.D	19.B	25.B	31.B	37.C	43.C	49.C	55.B
02.A	8.E	14.D	20.B	26.D	32.C	38.B	44.B	50.B	56.C
03.E	9.B	15.E	21.E	27.A	33.D	39.A	45.D	51.D	57.B
04.C	10.B	16.E	22.E	28.B	34.D	40.C	46.B	52.C	58.D
05.B	11.E	17.C	23.C	29.A	35.B	41.C	47.B	53.C	59.D
06.A	12.E	18.E	24.B	30.D	36.B	42B	48.A	54.B	60.D

MATHEMATICS PAPER II   2023

1.D	7.D	13.E	19.C	25.B	31.D	37.E	43.D	49.C	55.B
2.C	8.D	14.D	20.E	26.E	32.C	38.B	44.D	50.D	56.A
3.E	9.B	15.B	21.A	27.B	33.C	39.C	45.D	51.B	57.C
4.C	10.A	16.D	22.E	28.C	34.E	40.D	46.D	52.A	58.A
5.C	11.A	17.E	23.B	29.A	35.B	41.E	47.B	53.D	59.E
6.B	12.B	18.D	24.B	30.D	36.C	42.D	48.D	54.B	60.C

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02	**Business Studies**
03	**Cultural and Creative Art (CCA)**
04	**Christian Religious Studies/IRS**
05	**English Studies**
06	**French**
07	**History**
08	**Mathematics**
09	**National Value Education (NVE)** i. Civic Education, ii. Security Education, ii. Social Studies,
10	**Pre-Vocational Studies (PVS)** i. Agriculture, ii. Home Economics
11	**Nigerian Languages**