**CHRIST HIGH SCHOOL PLOT 5, CHS STREET, KM 32, ABUJA-KEFFI ROAD UKE, NASARAWA STATE**

# SS 3 PAPER II GENERAL MATHEMATICS, SECOND TERM EXAMINATION 2024/2025 ACADEMIC SESSION

**SUBJECT: GENERAL MATHEMATICS PAPER II**
**CLASS: SS 3**
**TIME: 2 hours 30 minutes**

*Extract from NECO SSCE Exam 2021*

**NAME……**

**CANDIDATE'S ADMISSION NO.**

## INSTRUCTION

Write your name and number in the space provided on your answer booklet. Write your name on any extra sheet used.

The paper is in two parts: **I and II**, and will last for 2 hours 30 minutes.

Answer all the questions in part I and five (5) questions in part II.

Write your answer in blue or black ink in your answer booklet.

At the end of the examination, staple all your work securely together.

**Use of scientific calculator is allowed.**

| FOR EXAMINER'S USE | |
|---|---|
| Total Score: | + |

**PAPER II**

**PART I (THEORY)**

**INSTRUCTION: Attempt all questions in this part**

**1.** (a) without using mathematical tables, find the value of

$\log_{10} 6 + \log_{10} 45 - \log_{10} 27$

(b) Solve the equation $8^x = 32$

(c) Simplify $\frac{81^{\frac{1}{6}}}{27^{-\frac{1}{9}}}$. **[8marks]**

**2.** (a) A straight line passes through the points $\mathrm{A}(3,0)$ and $\mathrm{B}(2,-1)$.

Find the:

(i) Gradient of the line

(ii) Equation of the line

(b) ABCD is a parallelogram with $|AD| = 8\ cm$, $|AB| = 6\ cm\ and\ A\hat{B}C = 60^0$. Calculate, correct to 3 significant figures, the area of :

(i) Triangle ABC

(ii) Parallelogram ABCD **[8marks]**

**3.** (a) A villager P is 12 km from village Q. It takes 3 hours 20 minutes to travel from Q to P and back to Q by a boat. If the boat travels at a speed of 6 km/h from P to Q and $(6 + x)\ km/h$ back to P, find the value of x.

(b) Find the quadratic equation whose roots are $\frac{2}{3}\ and\ \frac{3}{4}$ **[8marks]**

**4.** (a) Differentiate $y = \frac{x^2}{1+x^2}$ with respect to x.

(b) Solve the equation $\frac{2}{3}(3x + 2) = \frac{3}{4}(2x - 3)$. **[8marks]**

**5.** (a) The table below shows the mass of logs of wood to the nearest Kilogram.

| Mass(kg) | $31-40$ | $41-50$ | $51-60$ | $61-70$ | $71-80$ | $81-90$ |
|---|---|---|---|---|---|---|
| Frequency | 3 | 10 | 15 | 12 | 6 | 4 |

Calculate the :

(i) Mean

(ii) Mode **[8marks]**

**PART II**

**INSTRUCTION: Attempt any five (5) questions from this part.**

**6.** (a) If the 2nd term of a Geometric Progression (G.P) is 6 and the 4th term is 54, find the:

(i) 1st term

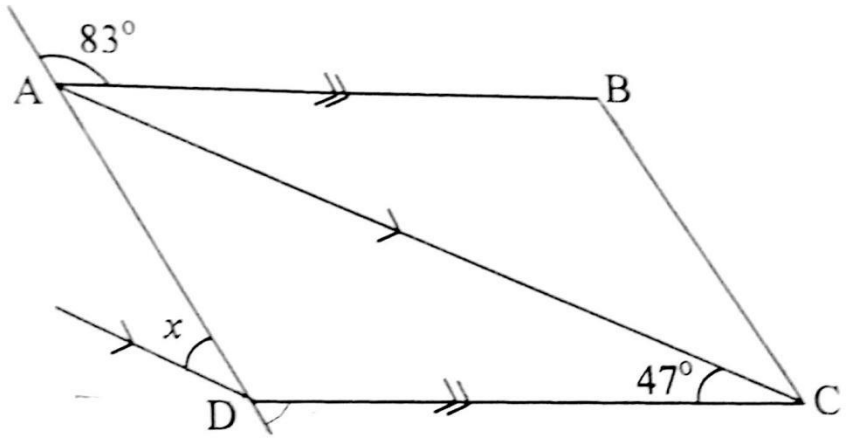
(ii) 5th term

(b) In a school of 160 pupils, 75 have pencils, 87 have pens and 93 have rulers. 25 have both pencils and pens, 30 have both pencils and rulers while 47 have both pens and rulers. Each pupils has at least one of the three items.

(i) Draw a venn diagram to illustrate this information.

(ii) How many pupils have pencils only? **[12marks]**

**7.** (a) Use the information in the figure below to find the values of x.




(b) A boat sails 6 km on a bearing of $040^0$ and then 8 km on a bearing of $100^0$.

(i) How far is the boat from its starting point?

(ii) Calculate the bearing of the boat from its starting point.

(Leave your answers to the nearest km and degree) **[12marks]**

**8.** (a) Find the area enclosed by the curve $y = 2x^2 + 3$, the $\mathrm{x} - \mathrm{axis}$ and the ordinates $\mathrm{x} = 2, \mathrm{x} = 1$.

(b) In a community, men contribute ₦ p each and woman ₦ q each towards the Community Development Fund. In a week, 3 men and 5 women contributed a total of ₦ 9 500.00. In another week, 5 men and 10 women contributed a total of ₦ 17 500.00. Find the:

(i) Value of p and q

(ii) Total amount that will be contributed by 8 men and 12 women

**[12marks]**

**9.** An aircraft flies from $\mathrm{P}(12^0N, 11^0W) to\ Q(12^0N, 11^0E)$ in 2 hours and

then changes its course and arrives at $\mathrm{S}(44^0N, 11^0E)$ in 6 hours after leaving Q. Calculate, correct to 3 significant figures, the:

(a) Total distance covered

(b) Average speed of the aircraft

(c) Time difference between Q and S

[Use $\pi = 3.142$ and $\mathrm{R} = 6\,400\mathrm{km}$] **[12marks]**

**10.** (a) copy and complete the table below for the relation $y = x^2 - 2x - 3$.

| x | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|---|---|
| y | 12 | | | -3 | | | | 5 | |

(b) Draw the graph of the relation in (a) above using a scale of 2 cm to 1 unit on $\mathrm{x} - \mathrm{axis}$ and $1\mathrm{cm}$ to $1$ unit on $\mathrm{y} - \mathrm{axis}$. Hence, determine the roots of $x^2 - 2x - 3 = 0$.

(c) Using the same axis, draw the graph of $\mathrm{y} = 2 - 2\mathrm{x}$.

(d) Deduce the roots of the equation $x^2 - 2x - 3 = 2 - 2x$.

(e) Find the minimum value of $y = x^2 - 2x - 3$. **[12marks]**

**11.** (a) Find the inverse of the matrix A where $\mathrm{A} = \begin{pmatrix} 6 & 11 \\ 1 & 2 \end{pmatrix}$.

Hence, solve the matrix equation $\mathrm{AX} = \mathrm{B}$

where $\mathrm{X} = \begin{pmatrix} x \\ y \end{pmatrix}$ and $\mathrm{B} = \begin{pmatrix} 29 \\ 5 \end{pmatrix}$.

(b) The first and last terms of an Arithmetic Progression (A.P.) are 5 and 89 respectively. If the sum of A.P. is 611, find the:

(i) Number of terms in the A.P.

(ii) Common difference **[12marks]**

**12.** The scores of 30 students in a Biology test are given below:

40 74 12 27 34 26

32 77 14 20 11 31

| | | | | | |
|---|---|---|---|---|---|
| 51 | 52 | 19 | 65 | 35 | 30 |
| 19 | 50 | 21 | 38 | 43 | 24 |
| 52 | 64 | 10 | 27 | 90 | 32 |

(a) (i) Construct a frequency table with class interval $1-20, 21-40..$

(ii)Using an assumed mean of 30.5, calculate the standard deviation of the distribution.

(b) Find the probability that a student selected at random scored above 60 marks **[12marks]**

**13.** (a) construct a quadrilateral ABCD such that $|AB| = 6.0\ cm$, $|DB| = 7.5\ cm, < DAB = 60^0, |DC| = 7.0\ cm$ and $\overline{AD}//\overline{BC}$.

(b)Construct a circumcirle to touch the points A, B and C.

(c)Calculate the circumference of the circumcirle, correct to the nearest whole number. **[12marks]**