



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

**SS 1 PAPER I FURTHER
MATHEMATICS, SECOND
TERM EXAMINATION
2024/2025 ACADEMIC
SESSION**

**SUBJECT: FURTHER
MATHEMATICS PAPER I
CLASS: SS 1
TIME: 2 Hours**

NAME.....

CANDIDATE'S ADMISSION NO.

INSTRUCTION

Write your name and number in the space
provided on your answer booklet.

The paper I is objective test (50 questions)

Use **HB pencil** throughout and shade
properly.

Calculator and Mathematical tables may be
used in any question.

Think carefully before you shade the answer
spaces; erase completely any answer you
wish to change.

Now answer all the following questions.

FOR EXAMINER'S USE	
Total Score:	+

PAPER I(OBJ) (50 MARKS)

1. Find the mid-point of points P(1,3) and Q(3,1).
 - A. (1,1)
 - B. (2,2)
 - C. (3,3)
 - D. (1,3)
 - E. (3,1)
2. The equation of the line parallel to $y = -4x + 2$ passing through (2,3) is
 - A. $y - 4x + 11 = 0$
 - B. $y + 4x - 23 = 0$
 - C. $y + 4x + 11 = 0$
 - D. $y + 4x - 11 = 0$
 - E. $y + 4x - 2 = 0$
3. Find the gradient of the line passing through point P(1,1) and Q(2,3)
 - A. 4
 - B. 5
 - C. 6
 - D. 2
 - E. -2
4. If The line $3y = 4x - 1$ and $qy = x + 3$ are parallel to each other , then the value of q is
 - A. $-\frac{4}{3}$
 - B. $-\frac{3}{4}$
 - C. $\frac{4}{3}$
 - D. $\frac{3}{4}$
 - E. $\frac{1}{3}$
5. Calculate the distance between N(1,6) and M(3,5).
 - A. $\sqrt{5}$
 - B. $\sqrt{6}$
 - C. $\sqrt{20}$
 - D. $\sqrt{23}$
 - E. $\sqrt{7}$

6. Which of the following pairs of points has a slope of $\frac{2}{9}$?
- A. (1,3) and (2,-7)
 - B. (1,2) and (3,-7)
 - C. (-2,0) and (7,2)
 - D. (3,1) and (-7, 2)
 - E. (1,2) and (3,4)
7. Write the equation of the line passing through (-3,7) with a slope of zero
- A. $x = -3$
 - B. $y = -3$
 - C. $x = 7$
 - D. $y = 7$
 - E. $x = -7$
8. The following are vectors *EXCEPT*.....
- A. Displacement
 - B. velocity
 - C. density
 - D. momentum
 - E. moment
9. Given that $\mathbf{p} = 4\mathbf{i} + 3\mathbf{j}$, find the unit vector in the direction of \mathbf{p} .
- A. $\frac{1}{3}(4\mathbf{i} + 3\mathbf{j})$
 - B. $\frac{1}{5}(4\mathbf{i} + 3\mathbf{j})$
 - C. $\frac{1}{5}(3\mathbf{i} + 4\mathbf{j})$
 - D. $\frac{1}{7}(4\mathbf{i} + 3\mathbf{j})$
 - E. $\frac{1}{2}(4\mathbf{i} + 5\mathbf{j})$
10. A vector whose magnitude is one is known as
- A. Null vector
 - B. Unit vector
 - C. Free vector
 - D. Position vector
 - E. Orthogonal vectors
11. A vector whose magnitude is zero is known as
- A. Null vector
 - B. Unit vector
 - C. Free vector

- D. Position vector
- E. Orthogonal vectors

12. The sum of two vectors is known as

- A. Resultant vectors
- B. Unit vector
- C. free
- D. Position vector
- E. Orthogonal vectors

13. Find the resultant of the vectors

$$\vec{BC}, \vec{-DC} \text{ and } \vec{-FD}$$

- A. \vec{BD}
- B. \vec{BF}
- C. \vec{CF}
- D. \vec{CD}
- E. \vec{FD}

14. Given the progression 7, 12, 17 and 22. What is the expression for the n th term of the progression?

- A. $11n - 2$
- B. $11n + 2$
- C. $6n + 3$
- D. $5n + 2$
- E. $2n + 5$

15. The 10th term of an A.P. is 65 and the common difference is 9. What is the first term?

- A. -16
- B. 11
- C. -11
- D. 16
- E. 10

16. The 100th term of an A.P. is 300 and the common difference is 3, calculate its first term.

- A. 4
- B. 6
- C. 3
- D. 2
- E. 1

17. What is the sum of the first six terms of the geometric progression: 81, 27, 9, 3, 1,,?
- 121.33
 - 131.22
 - 121.33
 - 131.22
 - 141.22
18. What is the sum of infinity of the following series $3 + 2 + \frac{4}{3} + \frac{8}{9} + \frac{16}{27} + \dots$?
- 4
 - 19
 - 9
 - 29
 - 39
19. The magnitude of the vector $a = 2i - 7j - 3k$ is
- $\sqrt{61}$
 - $\sqrt{62}$
 - $\sqrt{63}$
 - $\sqrt{65}$
 - $\sqrt{66}$
20. The magnitude of the vector $a = \frac{1}{\sqrt{3}}i + \frac{1}{\sqrt{3}}j + \frac{1}{\sqrt{3}}k$ is
- $\sqrt{3}$
 - 1
 - $\frac{1}{2}$
 - $1\frac{1}{2}$
 - $2\frac{1}{2}$
21. Find the value of x and y so that the vector $2i + 3j$ and $xi + yj$ are equal.
- x=3,y=2
 - x=-3,y=-2
 - x=2,y=3
 - x=-2,y=-3
 - x=-3,y=-3
22. The dot product of vectors $a = i + 4j$ and $b = 5i - 3j$ is
- 7
 - 10
 - 10

D. -7

E. 11

23. Given that $|p| = 3$; $|q| = 4$ and

$p \cdot q = -6$. Find the angle between p and q .

A. 120°

B. 130°

C. 90°

D. 60°

E. 30°

24. The common difference of the A.P: 50, 40, 30, 20 is.....

A. 10

B. -10

C. 5

D. -5

E. 20

25. The 6th term of a linear sequence is 7. Find the 20th term of the sequence if the first term is - 8.

A. 52

B. 49

C. 46

D. 43

E. 40

26. Given the statements: x : He is a philosopher, y : He is a historian.

Use a logical connective to describe the statement "If he is a philosopher, then he is a historian".

A. $x \Leftrightarrow y$

B. $x \Rightarrow y$

C. $x \vee y$

D. $x \wedge y$

E. $\sim x \Rightarrow y$

27. For what range of values of x is $3x^2 + 5x - 2$ positive?

A. $x < 3$ or $x > 5$

B. $x < -3$ or $x > \frac{1}{2}$

C. $x < 2$ or $x > 6$

D. $x < -2$ or $x > \frac{1}{3}$

E. $x < 1$ or $x > 3$

28. If θ is acute and $\cos \theta = \frac{1}{2}$, find the value of $\cot^2 \theta$

- A. $\frac{1}{\sqrt{3}}$
- B. $\frac{1}{3}$
- C. $\frac{2}{\sqrt{3}}$
- D. $\frac{1}{2}$
- E. 3

29. If $\sin \theta = \frac{1}{2}$ and $\theta^0 < \theta < 270^0$, find θ

- A. 30^0
- B. 60^0
- C. 120^0
- D. 150^0
- E. 210^0

30. Find all real numbers x which satisfy the inequality $\frac{1}{3}(x + 1) -$

$$1 > \frac{1}{5}(x + 4)$$

- A. $x < 11$
- B. $x < -1$
- C. $x > 6$
- D. $x > 11$
- E. $x < 1$

31. If x is a positive real number, find the range of values for which

$$\frac{1}{3x} + \frac{1}{2} > \frac{1}{4x}$$

- A. $x > -\frac{1}{6}$
- B. $x > 0$
- C. $x < 4$
- D. $0 < x < 4$
- E. $0 < x < \frac{1}{6}$

32. The statements $K \wedge L$ is said to be true when

- A. The result is contradiction
- B. k is false and L is false
- C. K is true and L is false
- D. The result is tautology
- E. K is true and L is true

33. If P and Q are two statements, under what condition would $P \Rightarrow Q$ be false.

- A. If p is true q is true
- B. If p is true and q is false
- C. If p is false and q is false
- D. If p is false and q is true
- E. If p and q are the same

34. The connective \leftrightarrow stands for

- A. Conjunction
- B. Disjunction
- C. Implication
- D. Bi-implication
- E. Multi-implication

35. If $q \Rightarrow p$, then

- A. $\sim p \Rightarrow \sim q$
- B. $p \Rightarrow q$
- C. $\sim p \Rightarrow p$
- D. $\sim p \Rightarrow q$
- E. $p \Leftrightarrow q$

36. Let p and q be the statements:

p: He is lazy,

q: He will be a successful businessman

Which of the following symbols represents the statement?

‘He will be successful businessman if and only if he is hardworking’.

- A. $p \Leftrightarrow \sim q$
- B. $q \Leftrightarrow p$
- C. $q \Leftrightarrow \sim p$
- D. $p \Rightarrow \sim q$
- E. $\sim p \Leftrightarrow \sim q$

37. List all integers' values of x satisfying the inequalities $-1 <$

$$2x - 5 \leq 5$$

- A. 2,3,4,5
- B. 2,5
- C. 3,4,5
- D. 2,3,4
- E. 3,1

38. If $\sin \theta = \frac{m^2 - n^2}{m^2 + n^2}$, find $\cot \theta$ if $m > n$ and θ is acute.

A. $\frac{m^2+n^2}{m^2-n^2}$

B. $\frac{2mn}{m^2+n^2}$

C. $\frac{2mn}{m^2-n^2}$

D. $\frac{m^2-n^2}{2mn}$

E. $\frac{2m^2n^2}{m^2-n^2}$

39. If $\sin x^0 = \frac{a}{b}$, what is $\sin(90 - x)^0$?

A. $\frac{a}{b}$

B. $1 - \frac{a}{b}$

C. $\frac{\sqrt{b^2-a^2}}{b}$

D. $\frac{\sqrt{a^2-b^2}}{b}$

E. $\sqrt{b^2 - a^2}$

40. Given that p and q are statements such that:

P: He is healthy

Q: He is neat

Which of the following represents “he is **unhealthy** only if he is **dirty**”?

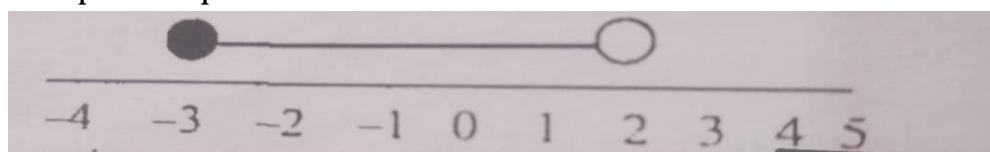
A. $\sim p \Rightarrow \sim q$

B. $\sim p \Rightarrow q$

C. $p \Rightarrow \sim q$

D. $\sim q \Rightarrow \sim p$

E. $\sim p \Rightarrow \sim q$



41. If x varies over the set of real numbers, which of the following is illustrated in the diagram above?

A. $-3 < x \leq 2$

B. $-3 \leq x < 2$

C. $-3 < x < 2$

D. $-3 \leq x \leq 2$

E. $x \geq 2$

42. Given that $\sin(90^\circ - 5\theta) = \cos(180^\circ - \theta)$ find the value of θ .

A. 15°

B. 22.5°

C. 30°

D. 45°

E. 50°

43. Find the fifth term of a sequence whose general term is given by

$$\frac{n-2}{3n+3}$$

A. $\frac{3}{20}$

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

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

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

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

44. The fourth term of an exponential sequence is 25 and its seventh term is $\frac{1}{40}$. Find the common ratio of the sequence.

A. $\frac{1}{85}$

B. $\frac{1}{30}$

C. $\frac{1}{1000}$

D. $\frac{1}{100}$

E. $\frac{1}{10}$

45. Find the equation of a straight line through the point (5,-7) and parallel to the line $2x + 5y = 7$

A. $5y - 2x + 25 = 0$

B. $5y + 2x - 25 = 0$

C. $5y + 2x + 25 = 0$

D. $2x - 5y - 25 = 0$

E. $2x - 5y + 25 = 0$

46. The gradient of a straight line passing through the point P(6,-7) and Q(-4,y) is $-3\frac{1}{5}$, Find the value of y.

A. 30

B. 25

C. 20

D. 15

E. 10

47. If $\mathbf{a} = 5\hat{i} - 4\hat{j} + 2\hat{k}$ and $\mathbf{b} = 6\hat{i} - \hat{j} + 3\hat{k}$, determine the projection of \mathbf{a} on \mathbf{b} .

A. $\frac{40}{\sqrt{46}}$

B. $\frac{60}{\sqrt{50}}$

C. $\frac{2}{\sqrt{5}}$

D. $\sqrt{98}$

E. $\sqrt{146}$

48. If $\mathbf{x} = 2\mathbf{i} + 3\mathbf{j}$ and $\mathbf{y} = 3\mathbf{i} - 2\mathbf{j} + \mathbf{k}$. find the unit the unit vector in the direction of $\mathbf{x} + \mathbf{y}$

A. $\frac{1}{\sqrt{6}}(5\mathbf{i} + \mathbf{j} + \mathbf{k})$

B. $\frac{1}{3\sqrt{3}}(5\mathbf{i} - \mathbf{j} + \mathbf{k})$

C. $\frac{1}{3\sqrt{3}}(5\mathbf{i} + \mathbf{j} + \mathbf{k})$

D. $\frac{1}{5}(5\mathbf{i} - \mathbf{j} + \mathbf{k})$

E. $3\sqrt{3}(5\mathbf{i} + \mathbf{j} + \mathbf{k})$

49. What is the value of $\cos(-840^\circ)$

A. $\frac{-\sqrt{3}}{2}$

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

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

D. $\frac{\sqrt{3}}{2}$

E. $\frac{\sqrt{3}}{2}$

50. Solve the inequality $2(x - 3) < 3(x - 1)$

A. $x > -3$

B. $x < 3$

C. $x > 3$

D. $x < 3$

E. $x \leq 3$

