CONFAB SECONDARY SCHOOL

SECOND TERM EXAMINATION 2019/2020 SESSION

SUBJECT: **FURTHER MATHEMATICS**
CLASS: **S.S.S. 2**
DURATION: **2 HOURS (120 MINUTES)**
OBJECTIVES: **SECTION A:**
INSTRUCTION: **Answer all questions in this section.**

1) 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. $\sim p \rightarrow \sim q$ c. $\sim p \rightarrow \sim q$ d. $\sim p \rightarrow \sim q$

2) In function y = f(x), ' f ' is classified as
   a. Name of the function B. value of function C. upper limit of function D. lower limit of function

3) Notation of mapping input values to output values is written as
   a. $f: x \rightarrow y$ B. f: y→x C. x:y→f D. $y: x \rightarrow f$

4) The function which is considered as function of values of another function is classified as
   a. composite function b. exchange function c. change function d. view function
5) The mapping which associate each state in Nigeria with its Governor is a --------
   a. One-one mapping b. onto mapping c. composite mapping d. none of the above
6) What is the common difference of sequence 5, 8, 11, 14, . . .
   a. 3 b. -3 c. 0 d. 1
7) 5^{th} term of G.P 3, 6, 12, . . . is
   a. 15 b. 48 c. 2 d. 3
8) Series obtained by adding term of arithmetic sequence is called
   a. Harmonic series b. geometric series c. arithmetic series d. infinite series
9) The sum of the first fifteen terms of series 3 + 19 + 35+…. is
   a. 1725 b. 345 c. 69 d. 23
10) 2, 4, 6, 8, 10, 12,. . . is
   a. G.P b. A.P c. Geometric series d. arithmetic series
11) Second term of sequence with general term $n^2 - \frac{4}{2}$ is
   a. 3 b. -3 c. 2 d. -2
12) By solving inequality 6x – 7 > 5
   a. X > 6 b. x < 5 c. x < 7 d. x > 2

13) By solving inequality $\frac{(2-x)}{4} > \frac{(4-x)}{3} + \frac{1}{2}$

a. X > 18 b. x > 16 c. x > 14 d. x > 11

14) Which of the following is the negation of the statement.

P: Azeezat is brilliant

a. Azeezat is dull b. Azeezat is intelligent c. Azeezat is not brilliant d. Azeezat is good

15) In the implication C: **X→Y**, the sub statement **X** is called

a. Consequent b. conditional statement c. antecedent d. implication

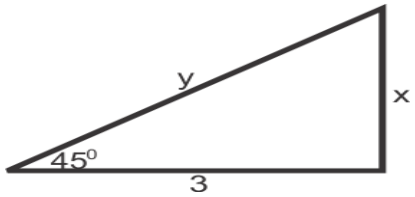
16) The ratio of the sides of an isosceles triangle is 7 : 6 : 7. What is the base angle to the nearest degree

a. 63^0 b. 64^0 c. 65^0 d. 66^0

17) The bearing of **X** from **Y** is 046^0. What is the bearing of **Y** from **X**?

a. **100^0** **b. 126^0** **c. 226^0** **d.** 46^0

The diagram below dimension is in cm, use it to answer **18** and **19**



18) What is the value of x?

a. 1 b. 2 c. 3 d. 4

19) What is the value of y?

a. $2\sqrt{2}$ b. $2\sqrt{3}$ c. $3\sqrt{2}$ d. $3\sqrt{3}$

20) An arc subtends an angle of 105^0 at the center of a circle of radius 6cm. what is the length of the arc if $\prod$ is $\frac{22}{7}$?

a. 9cm b. 10cm c. 11cm d.12cm

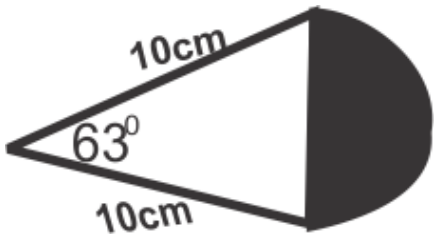
21) Calculate the perimeter of a sector of a circle of radius 7cm, the angle of the sector being 108^0 if $\prod$ is $\frac{22}{7}$

a. 20cm b. 27cm c. 27.2cm d. 27.4cm

22) A sector of 80^0 is removed from a circle of radius 12cm. What is the area of the circle left? Use $\prod$ is $\frac{22}{7}$

a. $300cm^2$ b. $350cm^2$ c. $352cm^2$ d. $362cm^2$

23) Calculate the area of the shaded segment of the circle shown below if $\prod$ is $\frac{22}{7}$



a. **10.15cm** b. **10.35cm** c. **10.45cm** d. **10.55cm**

24) What is the value of **α** if cos **α = sin 40^0?**

a. 30^0 b. 40^0 c. 50^0 d. 60^0

25) If sin P $= \frac{3}{5}$ and P is an acute angle, what is the value of tan P?

a. $\frac{3}{5}$ b. $\frac{2}{5}$ c. $\frac{3}{4}$ d. $\frac{2}{4}$

26) Which of the following is the general formulae of a quadratic equation $ax^2 + bx + c = 0$.

a. $\frac{-a\pm\sqrt{a^2-4bc}}{2a}$ b. $\frac{-c\pm\sqrt{c^2-4cb}}{2a}$ c. $\frac{-b\pm\sqrt{b^2-4ac}}{2a}$ d. $\sqrt{a^2+b^2}$

27) Evaluate $3y^2 - 5y - 6$ when y = - 2

a. – 8 b. – 4 c. 16 d. 8

28) If N = {odd numbers greater than 11}, which one of the following is an element of N?

a. 10 b. 12 c. 13 d. 14

Use the table below to answer question 29 and 30

Given the tables of values for $y = x^2 + x - 8$ from x = - 4 to x = +3 as

X	-4	-3	-2	-1	0	1
Y	4	-2	- 6	-8	**a**	**b**

29) What is the value of **a?**

a. **-6** **b.** -7 c. – 8 d. – 9

30) What is the value of **b?**

a. **– 8** **b. – 7** **c. -6** **d. -5**

SECTION B(THEORY)

INSTRUCTION: Answer any 4 questions only but no 1 is compulsory

Question 1

(a) Mention three properties of the general equation of a circle. **($1\frac{1}{2}$ marks)**

(b) Find the equation of the circle whose center is (5, -4) and which passes through (-3,2) **(2 marks)**

(c) Find the center and radius of the circle $36x^2 + 36y^2 - 24x - 36y - 23 = 0$. **(3 marks)**

(d) Given the circle $x^2 + y^2 - 3x + 4y - 19 = 0$, determine the equation of the tangent to the circle at the point (2,3).

($3\frac{1}{2}$ *marks*)

Question 2

A fair die with six faces numbered 1, 2, 3, 4, 5 and 6 is tossed twice.

a) Obtain all the possible outcomes of the magnitude of the difference between numbers showing. **(4 marks)**
b) What is the most likely difference and its probability? **(2 marks)**
c) What is the probability of difference of 2? **(2 marks)**
d) Find the mean difference. **(2 marks)**

Question 3

A boy has 10 identical marbles in a container, consisting of a 6 red and 4 blue marbles. He draws two marbles at random one after the other from the container without any replacement. Find the probability that:

a) The first draw is red while the second is blue **(3 marks)**
b) Both draws are of the same color **(3 marks)**
c) Both draws are of different colors **(4 marks)**

Question 4

a) what is the permutation of picking an even numbers from 4, 5, 7, 8, and 9 **(5 marks)**

b) Calculate the number of ways of the letters of the word **SOWEMIMO** can be permuted if ' M' would always be apart. **(2 marks)**

c) Out of seven women and nine men, a committee, consisting of three women and four men is to be formed. In how many ways can this be done if:

I. any woman and any man may be included **($1\frac{1}{2}$ *marks*)**
II. one particular man must be on the committee. **($1\frac{1}{2}$ *marks*)**

Question 5

a) A committee of 4 people is to be selected from 5 married couples. Find in how many ways the committee can be chosen if:
   i. Everyone is equally eligible. **(2 marks)**
   ii. The committee should include at least on two woman. **(3marks)**
b) A committee consisting of 3 men and 5 women is selected from 5 men and 10 women. Find how many ways this committee can be formed. **(2 marks)**
c) Find the number of ways of ways of forming an executive committee of four, in a social club consisting of 15 members, if a particular man must be in the committee. **(3 marks)**

Question 6

The distance between two railway stations Ajabu and Kondise is 900m. A train starts from the rest at Ajabu and accelerates uniformly until it reaches its maximum speed of $20ms^{-1}$. It maintains this speed for a time and then retards uniformly to a stop at Kondise. The ratio of times taken during the periods of acceleration, constant speed and retardation is 2 : 3 : 1. Find:

d) the acceleration; **(2 marks)**
e) the retardation; **(2 marks)**
f) the total time taken for the journey **(2 marks)**
(Diagrams and other calculations) **(4 marks)**