**SHOOL OF PURE AND APPLIED SCIENCES**

**DIPLOMA IN APPLIED BIOLOGY**

**TERM2 MATHEMATICS EXAMINATION MARCH 2015**

**UNIT CODE: ASB 1101**

**CLASS: AS/BIO/13D**

DATE TIME: $2\frac{1}{2}$ HRS

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*Answer all questions*

1. (i) solve the following:

X - 2y+5z= 21
3x + y – 2z= -6
2x + 3y + z = 3 (10 marks)

(ii) Solve the following using matrix method:

4x -3y = 18
x + 2y = -1 (6marks)

(iii) The determinant of the matrix below is 6, find the value of x.

$$\begin{bmatrix} X & X \\ 4 & 2X \end{bmatrix}$$ (4marks)

2. The following numbers give the weight of 55 students of a class.

42 74 40 60 82 115 41 61 75 83 63 53 110 76 84 50 67 65 78 77 56 95 68 69 104 80 79 79 54 73 59 81 100 66 49 77 90 84 76 42 64 69 70 80 72 50 79 52 103 96 51 86 78 94 71

(i) Construct a frequency distribution with class intervals starting from 40-49, 50- 59, 60-69, … and state the modal class [4marks]

(ii) calculate the mean, the median and standard deviation [16marks]

3. (a) Given that $\frac{D}{d} = \sqrt{\frac{f+p}{f-p}}$ make p the subject of the formula 5mks

(b) The matrix below is singular find the unknown.

$$\begin{bmatrix} 4x & 2 \\ 5 & 2 \end{bmatrix}$$ (3mks)

(c) Find $\begin{bmatrix} 5 & -2 & 4 \\ 2 & -3 & 7 \end{bmatrix} \times \begin{bmatrix} 1 & 3 \\ -5 & 2 \\ 4 & 6 \end{bmatrix}$ (3mks)

(d) Given I = $\frac{PRT}{100}$ make T the subject of the formula. (3mks)

(c) Solve the following equation using completing of the square method. 6marks

$$\frac{x-1}{2} + \frac{x+3}{4} = \frac{1}{x-1}$$

4. (a) Given that y varies directly as x and when x=2, y=3. Find y when x=12. (3mks)

(b) Given that y varies inversely as x and that when y=6, x=44 find;

(i) equation connecting x and y

(ii) y when x=2 (4mks)

(c) 16 men working in a factory produce 300 articles in 5 working days. How long would it take 24 men to produce the same amount? (3mks)

(d) Given the ratio of a is to b is 2:3 and the ratio of b is to c is 4:5 and the ratio of c is to d is 1:4. Find the ratio of a is to d. ( 4mks)

(e) A famer has enough feed for 54 heads of cattle for 5 weeks. For how many days should it last if sells 12 of his cattle. (3mks)

(f) A piece of work takes 31 men 6 days at 10 hours a day. How many men would be needed if they worked for 8 days at 9 hours? [3mks]

5. (a) A basket contains 5 red balls, 4 green balls and 3 blue balls. If a ball is picked at random from the basket find:

(i) The probability of picking a blue ball
(ii) The probability of not picking a red ball (4mks)

(b) The probability that a day will be rainy is $\frac{1}{4}$ . The probability that I carry an umbrella on a rainy day is $\frac{1}{7}$ and that I carry an umbrella on a non-rainy day is $\frac{2}{7}$. Find the probability that;

(i) It will not be rainy and I carry an umbrella

(i) I shall carry an umbrella (4mks)

(c) If a child is selected at random, what is the probability that it was born on a Monday? (1mks)

(d) The roots of quadratic equation $x^2 + Px - Q = 0$ are 2 and -7. Find the value of P and Q. (4mks)

(e) Solve the following using factorization method: $x^2 - 5x - 6 = 0$ (3mks)

(f) A gardener sets 180 plants in rows. Each row containing the same number of plants. If there were 40 more plants in each row, the gardener would need 6 fewer rows. How many rows are there? (4mks)