**ADV. MATHEMATICS FORM 5-2019/2020**

1. (a) There are two types of fertilizers F1 and F2. F1 consists of 10% nitrogen and 6%

phosphoric acid and F2 consists of 5% nitrogen and 10% phosphoric acid. After testing the soil conditions, a farmer finds that she needs at least 14kg. of nitrogen and 14kg of phosphoric acid for her crop. If F1 costs Tshs. 60/= per kg and F1costs Tshs. 50/= per kg, determine how much of each type of fertilizer should be used so that nutrient requirements are met at a minimum cost.

(b) Two godowns A and B have grain capacity of 100 quintals and 50 quintals respectively. They supply to 3 ration shops, D, E and F, whose requirements are 60, 50 and 40 quintals respectively. The costs of transportation per quintal from the godowns to the shops are given in the following table.

|  |  |  |
| --- | --- | --- |
| From/to | A | B |
| D | 600/= | 400/= |
| E | 300/= | 200/= |
| F | 250/= | 300/= |

How supplies should be transported in order that the transportation cost is minimum. What is the minimum cost?

1. (a) An analysis of monthly wages paid to the workers in two firms A and B with the following results:-

|  |  |  |
| --- | --- | --- |
|  | **Firm A** | **Firm B** |
| No. of workers | 500 | 600 |
| Average monthly wages | Tshs. 186/= | Tshs. 175/= |
| Variance | 81 | 100 |

Find the average monthly wage and the variance of the combined firms A and B

(b) Given the following data:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Classes | 0-30 | 30-60 | 60-90 | 90-120 | 120-150 | 150-180 | 180-210 |
| Frequency (f) | 2 | 3 | 5 | 10 | 3 | 5 | 2 |

Find:- (a) Upper quartile

(b) 75th percentile

(c) 4th Decide

1. (a) If A =

B =

And Find:- (i) (ii)

(b) Use the basic properties of sets to prove that

(c) Out of 130 students, 10 study physics and Mathematics while 20 study neither of the two subjects. Those who study physics only are three times as many as those who study mathematics only. How many study mathematics?

1. (a) Find the derivative of x from the first principles.

(b) Find the coordinates of any stationary points on the curve y=5x6 – 12x5 and distinguish between them. Hence sketch the curve.

(c) If prove the

1. (a) If

(b) If

(c) Verify that

(d) If

(e) Find the maximum and minimum value s of the following functions stating the values

(from 00 to 3600) of at which the turning points occur

1. (a) Solve the equation

(b) Simplify the expression

(c) Prove the following identity

(d) By eliminating from the following pairs of parametric equations, find the corresponding Cartesian equation:

(e) Find the general solution of the equation Write your answer in radian form.

1. (a) Given the and find the value of
2. fog (25)
3. gof (14)
4. Find the value of ‘a’ that satisfies the equation 0 when and

(b) A function is defined as given that Find the value

(c) Sketch the graph of

(d) Sketch the graphs of on the same plane, stating the domain and range of each

1. (a) Find the coefficient of the term containing in the expression of

(b) If is not an integral multiple of , use mathematical induction to prove that

(c) Resolve into partial fractions

(d) If prove that

(e) The remainder obtained when is divided by is twice the remainder obtained when the same expression is divided by Find the value of .

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