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Uganda Advanced Certificate of Education
SUBSIDIARY MATHEMATICS
Paper 1

Instructions

Research the following items and establish feasible solutions

Item 1

A youth group based in Mbale industrial park assembles rechargeable solar lamps for sale to schools and rural households. Before supplying a large consignment to a nearby secondary school, the product manager carries out quality-control inspection. Previous records show that any lamp selected from the production has a probability of 0.1 of being defective. During inspection, the manager randomly selects 8 lamps from a large consignment. The manager insists that the lamps will not be supplied if;

- (i) the probability that utmost 2 are defective is more 0.9
- (ii) the average number of non-defective lamps is less than 8

In another of inspection, the manager recorded the number of defective solar radios found in several boxes. The probability distribution below was constructed however resources were not enough to determine the probability for for which 4 radios are defective.

Number of defective radios (x)	0	1	2	3	4
Probability $P(X = x)$	0.1	0.2	0.2	0.32	-----

The manager will not supply the radios if the standard deviation of the defective is more than 0.2.

Tasks:

Using evidence from mathematical calculations, help the engineer make valid decisions.

Item 2

The ministry of education and sports is reviewing the living allowance paid to government sponsored students in public universities. The ministry wants to determine whether the current proposal to increase the allowance is sufficient to meet the rising cost of living.

A survey was conducted among 120 government sponsored-students to determine the amount of money (in thousands Uganda shillings) each

student spends on accommodation, meals and transport in one month. The results are summarized below.

Monthly expenditure ugx(000')	300-399	400-499	500-599	600-699	700-799	800-899
Number of students	8	18	36	30	20	8

The ministry also collected information on the average monthly expenditure of students on selected essential items as shown in the table below.

Item	Price in 2025(ugx)	Price in 2026(ugx)	Monthly quantity
Maize flour(kg)	3000	3600	20
Beans(kg)	4000	4600	15
Transport(trips)	2000	2500	40
Electricity(kwh)	900	1050	60
Internet bundles (G.B)	2000	3500	80

The ministry is considering to increase the living allowance but needs information about the;

- (i) the most common expenditure amount
- (ii) the average expenditure amount
- (iii) the cost-of-living index and what it means

Task:

Generate the information needed by the ministry.

END