CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

THIRD YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN AGRICULTURAL ECONOMICS

AGBM 302: AGRICULTURAL INSUARANCE

STREAMS: BSC (AGEC) Y3S2 **TIME: 2 HOURS**

DAY/DATE: WEDNESDAY 15/04/2020 **2.30 P.M. – 4.30 P.M.**

INSTRUCTIONS:

- **Attempt question ONE (30 Marks) and any other TWO questions (20 marks each)**
- **Start each question on a fresh page**

QUESTION ONE (25 MARKS)

(a) Agricultural producers face a variety of risks, explain five sources of risks they face [5 marks]

(b) Explain any two government risk management programs which provide financial risk protection for agricultural producers [4 marks]

(c) Explain the following terms as used in agricultural insurance

(i) Actuarial soundness [2 marks]

(ii) Call options [2 marks]

(iii) Proxy index products [2 marks]

(d) Highlight the advantage and disadvantage of using area-based yield insurance products for agricultural producers [2 marks]

(e) Assume a producer is interested in purchasing a yield insurance product with the following characteristics

Acreage = 1 hectare

Price = 1 UAH per ton

Deductible = 40%

In addition, the producer has the following yield history, for which the indemnity trigger and payments are:

Year	Yield outcome	Indemnity trigger	Indemnity payment
1	2.70	1.8	0.00
2	1.72	1.8	0.00
3	3.24	1.8	0.00
4	4.28	1.8	0.00
5	4.20	1.8	0.00
6	4.73	1.8	0.00
7	0.32	1.8	0.00
8	2.77	1.8	0.00
9	4.10	1.8	0.00
10	1.92	1.8	0.00

Calculate the

(i) Expected yield for the producer [1 mark]

(ii) Coverage [1 mark]

(iii) Liability [2 marks]

(iv) Pure risk rate [4 marks]

QUESTION TWO (15 MARKS)

(a) Discuss six risk management tools used by agricultural producers to manager the variability of net farm revenues [12 marks]

(b) Explain three issues related to product development and delivery that are offered by agricultural insurance companies and government [3 marks]

QUESTION THREE (15 MARKS]

(a) Assuming a producer buys an individual yield based insurance product with the following attributes:

Deductible = 40%

Pure Risk premium rate = 6%

Load rate = 3%

Subsidy rate = 25%

Price of output (wheat) = 1.0 (USD)

1 hectare is insured

Liability is based on expected yields. Suppose that the producer has the following production history:

Year	Historical yield (tons per hectare)
1	2.7
2	3.6
3	2.4
4	3.3

In this case, expected (or average) yield = 3.0 tons/ha

(i) Expected yields are sensitive to sample size. Many countries use a little as four years of data, while others use as many as ten or more years to calculate expected yields. Fewer years of data are subject to outlier (extreme) observations. When longer samples are used, it may be important to account for yield trends resulting from technological change. In our example, calculate the following:

(a) Liability [2 marks]

(b) Total premium rate [1 mark]

(c) Total premium [1 mark]

(d) Subsidy [1 mark]

(e) Producer premium [1 mark]

(f) Trigger yield [2 marks]

(ii) If actual yield is greater than the indemnity trigger, no indemnity will be paid. In our example, if the actual yield is 2.0 tons/ha, then an indemnity is not generated. If actual yield is less than the indemnity trigger, however, then an indemnity is due. Suppose that the actual harvest yield total 1 USD ton per hectare. Calculate the indemnity payment of the farm. [2 marks]

(b) Explain various stakeholders that provide crop insurance products for agricultural producers [5 marks]

QUESTION FOUR (15 MARKS)

(a) Discuss five processes and procedures successful crop insurance programs requires in agricultural production [10 marks]

(b) Underwriting is a critical elements of crop insurance programs, explain issues which must be addressed by underwriting activities. [3 marks]

(c) Differentiate between biological versus sample harvest approaches to loss adjustment [2 marks]

QUESTION FIVE (15MARKS)

(a) The quality and quantity of historical data dictate the choice of rating method. Explain four formal methods that are used to rate crop insurance products. [4 marks]

(b) Data collection analysis and management are central to the success of any insurance program. Discuss who requires these data and educational efforts from agricultural production. [11 marks]
