NATIONAL OPEN UNIVERSITY OF NIGERIA
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF ECONOMICS
2023_1 POP EXAMINATION

COURSE TITLE: APPLIED QUANTITATIVE ANALYSIS
COURSE CODE: ECO 729
UNITS: 2
TIME ALLOWED: 3 HOURS
INSTRUCTION: ANSWER ANY THREE QUESTIONS: ALL QUESTIONS CARRY EQUAL MARKS

QUESTION ONE

2a. Given a mean score of 300 days and a standard deviation of 50 days, we want to find the cumulative probability that bulb life is less than or equal to 365 days. **(15 Marks)**

2b) The number of traffic citations issued during the last five months in Abuja, Nigeria is: 39, 27, 14, 42, and 23. Compute the population variance. **(8.3 Marks)**

QUESTION TWO

2a. Evans Medical Plc. has established that annual quantity for a given item is 3000 units, cost of ordering is ₦4500 and carrying cost percentage of 15% of unit cost with unit purchase cost, of ₦150. Calculate:

- **i.** Quantity to order (EOQ)
- **ii.** Frequency of ordering
- **iii.** Re-order level /re-order point (ROP)
- **iv.** Total Cost (TC)

(16 Marks)

2b. Describe (i) Discrete data and (ii) Continuous data **(7.3 Marks):**

QUESTION THREE

3a. Define the following terms **(4.5Marks)**:

- i. A sample space
- ii. A sample point
- iii. An event

3b. Consider the following finite population that has these observations: 2, 4, 6, 8, and 10. Calculatethe variance and the standard deviation for this population. **(8 Marks)**

3c. Consider the experiment for counting the number of heads in tossing a fair coin twice. **(5 Marks)**

3d. List five (5) procedures for constructing an initial solution using the North West Corner rule. **(5.8 Marks)**

QUESTION FOUR

4a. Determine the sample space of the following experiments **(5.3 Marks):**

i. Tossing a normal coin is an experiment.

ii. Taking a test, as a student in any course, is an experiment.

4b. A company assembles four products (1, 2, 3, 4) from delivered components. The profit per unit for each product (1, 2, 3, 4) is ₦10, ₦15, N22 and ₦17 respectively. The maximum demand in the next week for each product (1, 2, 3, 4) is 50, 60, 85 and 70 units respectively.

There are three stages (A, B, C) in the manual assembly of each product and the man-hours needed for each stage per unit of product are shown below:

		Product			
		1	2	3	4
Stage	A	2	2	1	1
	B	2	4	1	2
	C	3	6	1	5

The nominal time available in the next week for assembly at each stage (A, B, C) is 160, 200 and 80 man-hours respectively.

It is possible to vary the man-hours spent on assembly at each stage such that workers previously employed on stage B assembly could spend up to 20% of their time on stage A assembly and workers previously employed on stage C assembly could spend up to 30% of their time on stage A assembly.

Production constraints also require that the ratio (product 1 units assembled)/(product 4 units assembled) must lie between 0.9 and 1.15.

Formulate the problem of deciding how much to produce next week as a linear program **(18 Marks)**.