

THE NATIONAL COUNCIL OF EXAMINERS FOR ENGINEERING AND SURVEYING
PRINCIPLES AND PRACTICE OF ENGINEERING EXAMINATION

AGRICULTURAL

EFFECTIVE October 2001

Approximate
Percentage of
Examination

I. Soil and Water	19%
A. Hydrology	6%
1. Principles of hydrology	
2. Open channel hydraulics	
3. Hydrogeology	
4. Principles of surface and subsurface drainage	
B. Soil Conservation Systems	5%
1. Principles of soil physics	
2. Soil mechanics	
3. Sediment transport	
4. Erosion control and slope stabilization	
C. Water Management	8%
1. Water quality	
2. Evapotranspiration	
3. Principles of nutrient management/loading rates in soils	
4. Principles of irrigation	
II. Power and Machinery	17%
A. Machinery Systems	6%
1. Agricultural mechanization	
2. Machine/commodity interactions	
3. Machine/soil interactions	
4. Stability analysis	
B. Machine Design	5%
1. Machine component design	
2. Understand stress/strain relationships	
3. Materials selection	
4. Fatigue analysis	
C. Power and Energy Systems	6%
1. Internal combustion engines	
2. Electrical circuit analysis	
3. Hydraulic power circuits	
4. Power requirement analysis	
5. Mechanical power transmission	
III. Processing/Handling of Biological Products	12%
A. Unit Operations	8%
1. Mass transfer between phases	
2. Principles of unit operations	
3. Standards, codes, and regulations	
4. Principles of post harvest storage	
B. Characterization of Biological Products	4%
1. Fundamental physical chemistry	
2. Particle characterization and dynamics	
3. Bulk solids characterization	
4. Compatibility of biological materials	

	Approximate Percentage of <u>Examination</u>
IV. Structures and Environment	19%
A. Structural Systems	7%
1. Structural loads and standards	
2. Structural analysis	
3. Foundation design	
4. Provisions of structural materials design specification/codes	
5. Standards for post-frame building design	
B. Environmental Systems	7%
1. Steady state heat and mass balances	
2. Ventilation rate requirements	
3. Ventilation system requirements	
4. Insulation requirements	
5. Moisture control standards for building construction	
6. Air quality standards/requirements in agricultural buildings/confined spaces for humans, animals, plants, and produce	
C. Facilities Planning	5%
1. Functional and space requirements for agricultural production facilities	
2. Electrical wiring/lighting devices	
3. Construction materials	
4. Requirements for hazardous materials storage facilities	
V. Biological Systems	10%
A. Biological Processes	6%
1. Principles of organic and biochemistry	
2. Aerobic and Anaerobic Processes	
3. Ergonomics	
B. Environmental and Ecological Systems	4%
1. Environmental assessment techniques	
2. Awareness of ecological processes	
VI. Agricultural Engineering Principles	23%
A. Core Agricultural Engineering Knowledges	13%
1. Applied fluid mechanics	
2. Psychrometric processes	
3. Heat transfer applications	
4. Structural and Materials Analysis	
5. Mass and energy balances	
6. Water relationships	
B. Equipment Applications	8%
1. Pump applications	
2. Fan applications	
3. Sensors, instrumentation, and control systems	
C. Professional Practice	2%
1. Engineering practice including knowledge of Canon of Ethics, engineering economics, communication, role of codes, standards and specifications	
TOTAL	100%

NOTES:

1. The knowledge areas specified under A, B, C, ... etc., are examples of kinds of knowledge, but they are not exclusive or exhaustive categories.
2. This exam contains 80 multiple-choice questions. Examinee works all questions.