NATIONAL BUSINESS AND TECHNICAL EXAMINATIONS BOARD AGRICULTURAL SCIENCE (195) - SYLLABUS

INTRODUCTION

The content of this syllabus is divided into nine sections on the conceptual framework on which the teaching syllabus is organized.

The sections include; Basic concepts, Agricultural Ecology, Agricultural Engineering and Mechanization, Crop Production, Forestry, Ornamental Plants, Crop Protection, Animal Production and Agricultural Economics and Extension.

AIMS

The aims of the syllabus are to:-

a) Impart in the candidates a functional knowledge and practical skills in Agriculture.
b) Prepare candidates for further studies in Agriculture.
c) Prepare candidates for occupation in Agriculture.
d) Stimulate and sustain candidates' interest in Agriculture.
e) Enable the candidates to explore the rich Agricultural resources of Nigeria environment.

EXAMINATION SCHEME

There will be two papers: paper1 (Objective and Essay) and paper 2 (Practical), both of which must be taken. The total marks for both papers is 200 marks.

195 -1 P per 1 (Objective and Essay)

This paper consist of two sections; A and B.

Section A consists of fifty (50) multiple choice questions to be attempted in 50 minutes. The marks allocated is 50 marks

Section B consists of SEVEN (7) Essay questions drawn from nine sections of the syllabus. Candidates are expected to answer five questions in 1 hour 40 minutes and the total is 90 marks.

195-2 P per 2 (Test of Practical)

This shall be a 2 hour practical test, either the actual practical or alternative to practical. It shall consist of four (4) compulsory questions, for a total of 60marks. The actual practical shall be taken by schools during May/June Examinations WHILE the alternative to practical shall be taken by private candidates during Nov/Dec Examinations.

S/N	TOPIC/OBJECTIVE	CONTENTS	ACTIVITIES
1.	**A. BASIC CONCEPTS**		
1.0	**1. Meaning and importance of agriculture.** 1.1 Define agriculture 1.2 Identify the different branches/areas of agriculture	a) Definition and branches of agricultural science b) Importance of agriculture to the individual, community and nation.	Ask the student for definition and branches of Agriculture
2.0	**1. Problems of agricultural development and possible solutions** 1.1 Identify and discuss problems of agriculture development in Nigeria	a) Problems related to: i. Land tenure ii. Basic amenities iii. Finance iv. Transportation v. Storage and processing facilities vi. Agricultural education and extension vii. Tools and machinery viii. Farm inputs Marketing	Assessment would include: incidence of pests and diseases, vagaries of weather, labour and government policy.
3.0	**1. Meaning and differences between subsistence and commercial agriculture** 1.1 Student should explain the meaning of subsistence and commercial agriculture	a) Meaning of subsistence and commercial agriculture b) Difference between subsistence and commercial agriculture based on their characteristics c) Advantages and disadvantages of subsistence and commercial agriculture d) Problems of subsistence and commercial agriculture	Discuss the meaning and the differences between subsistence and commercial agriculture
4.0	**1. Roles of government in agricultural development** 1.1 State roles of government in provision of: i. Agricultural finance ii. Agricultural education etc	**a) Agricultural finance:** (i) Credit (ii) Subsidy **b)** Agricultural education **c)** Agricultural extension services **d)** Agricultural policies and programmes	Guide discussion on Agricultural finance and Agricultural Education etc. Assessment would cover past and present programme e.g OFN., ADP, Farm settlement, Agricultural sector Rehabilitation Project (ASRP) and National Aids Co-ordination.
5.0	**1. Role of non-governmental organization in agricultural development** 1.1. Explain the meaning and importance of NGOs	a) Meaning of non-governmental organization (NGOs) b) Roles of NGOs in agricultural Association	Examples of NGOs west African rice development (WARDA), International institute for tropical agriculture (IITA), International livestock centre for Africa (ILCA), International Crop Research Institute for semi-arid tropics (ICRISAT) would be assessed.

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6.0	1. Agricultural laws and reforms 1.1 List land tenure system 1.2 Explain a) Inheritance b) Individual	a) Land tenure system in west Africa b) Government laws on land use in (Decree). Land reforms West Africa. c) Advantages and disadvantages of land (Decree) and reforms in West Africa.	Assessment would include land use act in West Africa.
	B. AGRICULTURAL ECOLOGY		
7.0	**1. Meaning and importance of agriculture ecology** 1.1 Define agricultural ecology and ecosystem 1.2 Explain some basic concepts in ecology	a) Meaning of agricultural ecology and ecosystem. b) Components of farm ecosystem e.g. biotic and abiotic. c) Interactions of the components in interaction of farm the terrestrial and aquatic agro-crops/animals with ecosystem, other components of the ecosystem in farm settling such as mono or sole cropping system, mixed cropping system, mixed farming system, fish ponds and forest (rain or savannah)	
8.0	1. Land and its uses 1.1 Students should be able state a) Meaning of land b) Characteristics of land	a) Meaning of land b) Characteristics of land free gift of nature, immobile, limited supply etc. i. Agricultural purposes:- crop production; - Wild life conservation/game, reserve;- livestock production etc. ii. Non-agricultural purposes: - Industry - Housing - Transport etc	Assessment would include of uses of land forestry and agriculture for agriculture. Non-agricultural uses of land such as Health Centres, Mosques, Mining, Recreational schools and Markets would be assessed
9.0	Factors Affecting land Availability for Agricultural purpose:- ➢ Identify factors affecting land availability for agricultural purpose	a) Physical factors - Soil type - Topography - Land degradation - Soil pollution b) Economic factors - Pressure - Of industries - Mining/mineral exploitation - Recreation/tourism c) Socio-cultural factors - Land tenure system - Religious purpose (church, mosque and shrine) etc	Student should be guided on this discussion.

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10.0	**1. Agro-allied industries and relationship between agriculture and industry** 1.1 List the agro-based industries 1.2 State raw materials in each industry	a) Agro-based industries and raw materials, pulp wood; - Beverage industry – cocoa soap industry-oil b) Relationship between agriculture and industries. Agriculture provides market for industrial products e.g. Farm machinery, chemicals, ship	Assessment would include other agro-based industries and raw materials e.g. Leather industry meat and fish. Assessment includes other between agriculture industrial workers.
11.0	**1. Environmental factors affecting crop and animal distribution and production** 1.1 state and explain climatic factors affecting crop and animal distribution and production	a) Climatic factors e.g. rainfall, temperature, light, wind, relative humidity. b) Biotic factors e.g. predators, parasites, soil micro-organisms, pests, pathogens and weeds, interrelationship such as competition, parasitism, mutualism (symbiosis). c) Edaphic factors: soil pH, soil texture, soil structure, soil type etc.	The student should be guided on the practical activity
12.0	**1. Rock formation** 1.1 student should be able to a. Define rock b. Identify types of rocks	**A. Types of rock:** i. Igneous ii. Sedimentary iii. Metamorphic **B.** Process of rock formation	Assessment would cover identification, description and examples of rock types. Assessment would cover how igneous, sedimentary and metamorphic rocks are formed.
13.0	**Soil formation and profile development** 1. Define soil 2. List factors of soil formation	a) Factors of soil formation, the parent rock, organisms, climate, topography factor in soil formation and time. b) Processes of soil formation; i. Physical weathering ii. Chemical weathering c) Soil profile development	The role played by each would be assessed. The meaning importance and description.
14.0	**Types composition and properties of soil.** 1. Students should be able to recognize the different type of soil 2. Define soil pH 3. Determine pH of different soil types 4. State ways of correcting soil acidity	a) Types of soil b) Chemical and biological composition of soil i. Soil macro and micro nutrients, fractions, water holding ii. Soil water; capacity, porosity iii. Soil macro-organisms; capillarity, consistency iv. Soil microbes, etc v. Soil air c) Soil pH d) Physical properties of soil; i. Soil texture ii. Soil structure	Assessment would cover types of soil and their separation into sand, silt and clay. Determination of soil causes and correction of soil acidity/alkalinity would be assessed.

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15.0	**Plant nutrients and nutrients cycle** 1. Students should be able to distinguish between macro and micro nutrients 2. List the macro nutrients 3. State the functions of each macro nutrient 4. State their deficiency symptoms	a) Macro and micro nutrients; macro-nutrients such their functions and deficiency as N, P, H, Ca, S and symptoms in crops. Micro-nutrients such as && b) Factors affecting availability of Zn, Fe, Mo, Co, Bo, Cu nutrients in soil such as pH, excess of other nutrients, leaching crop removal, oxidation and burning. c) Methods of replenishing last types of fertilizers and nutrients, e.g. crop rotation, methods of fertilizer organic manuring, fertilizer application, application would be fallowing, liming, cover-cropping assessed. d) Nitrogen, carbon, water and phosphorus cycles. e) Organic agriculture meaning and importance include the description and importance of nitrogen, carbon and water cycles	Assessment should be on the preparation of water/sand culture to demonstrate deficiency of various elements in different crops. Charts should be prepared for each nutrient cycle. Assist the students to prepare compost manure and farm yard manure.
16.0	**Irrigation** 1. Define irrigation 2. Describe underground irrigation	a) Meaning of irrigation system b) Types of irrigation system i. Overhead e.g. sprinkler ii. Surface e.g. flooding, furrow/channel, basin, border, iii. Underground e.g. perforated pipes, dripes. c) Advantages and disadvantages of irrigation system d) Importance of irrigation e) Problems associated with irrigation	Assessment should be based on charts to show types of irrigation system.
17.0	**Drainage** 1. Students should be able to a) Define drainage b) State importance of drainage	a) Meaning of drainage b) Importance of drainage c) Types of drainage systems; i. Surface drainage e.g. channel, furrow ii. Surbsurface/underground drainage d) Advantages and disadvantages of drainage system.	Demonstrates the various drainage system on the water logged areas of the school farm.
18.0	**Agricultural pollution** 1. Student should be able to a. Define pollution b. State the causes of agricultural land pollution	a) Meaning of agricultural pollution b) Causes/sources of pollution of agricultural lands and fish ponds; i. Excessive application of agricultural chemicals ii. Marine and soil spillage iii. Livestock waste and drug disposal etc. c) Effects of land/pond pollution. Ways of minimizing land, on farmers and agricultural pond pollution.	Student should be shown around some polluted land/pond in the locality.

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	C. AGRICULTURAL ENGINEERING MECHANISM		Assessment would include identification, description and uses of each of the tools.
19.0	**Simple farm tools** 1. Describe simple farm tools	a) Meaning of simple farm tools. b) Types of simple farm tools-cutlass, hoe, spade, shovel etc. c) General maintenance of simple farm tools	Assessment would include the meaning uses/functions and identification of different parts of each of the farm machinery and implements. Engineering details are however not required.
20.0	**Farm machinery and implements** 1. Identify types of farm machinery 2. State the uses of farm machine	**a) Farm machinery;** i. Tractor ii. Bulldozer iii. Shellers iv. Dryers v. Incubators vi. Milking machines vii. Combine harvester etc viii. Sprayers etc	Assessment would include precaution measures in the use of farm machinery
21.0	**Maintenance practices and precautionary measures** 1. Explain the meaning of tractor/coupled 2. List the parts and functions of a plough, harrow and ridgers	a) Reasons for maintaining farm b) Maintenance of farm machinery i. Check water and oil levels regularly	Assessment would include precautionary measures in the use of farm machinery
22.0	**Agricultural mechanization** 1. List the disadvantages of agricultural mechanization	a) Meaning of agricultural mechanization b) Mechanized agricultural operations c) Advantages and disadvantages of agricultural mechanization d) Limitations of agricultural mechanization	Mechanized agricultural operations; ploughing, harrowing, planting or harvesting, milking etc.
	Prospects of agricultural mechanism	Possible ways of improving agricultural mechanization such as developing less expensive machines and establishing agricultural engineering schools for personnel and fabricate simple machine, etc.	Guides class discussion
23.0	**Farm power** 1. Define farm power 2. Explain and state the advantages of human power	a) Sources of farm power b) Advantages and disadvantages of different sources of farm power	Guides class discussion
24.0	**Farm surveying** 1. Define farm surveying 2. Survey equipment	a) Farm survey i. Meaning of farm surveying ii. Common survey equipment iii. Uses of farm survey equipment iv. Maintenance of farm survey equipment v. Importance of farm survey b) Farm planning i. Meaning of farm planning Engineering details ii. Importance of farmstead planning	Assessment would cover site selection, location of structures, sketching of farm layout

		iii. Importance of farmstead planning	

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		c) Principles of farmstead planning i. Meaning of farmstead ii. Importance of farmstead planning iii. Factors to be considered in the design of a farmstead iv. Farmstead layout	
	D. CROP PRODUCTION		
25.0	**Classification of crops**	a) Classification of crops based on their uses e.g. cereals, pulses, roots, tubers, vegetables etc. b) Classification based on their life cycle crop listed is presumed. E.g. annual, biannual, perennial. c) Classification based on their morphology e.g. monocotyledonous and dicotyledonous crop.	Display of a collection of crop seeds, fruits or leaves.
26.0	**Husbandry of selected crops** 1. Student should be able to describe the production of the selected crops e.g. cereal, groundnut etc, under the following headings - Origin - Local and common name - Varieties/types - Climates/soil requirements	Botanical names and common names of the crops, varieties/types, climatic and soil requirements, land preparation, methods of propagation, planting date, seed rate, spacing, sowing depth and nursery requirements, cultural practices, supplying, thinning, manuring and fertilizer requirement and application, weeding, pests and disease control, harvesting and processing and storage of at least one representative crop from each of the following crop grouping: a) Cereals e.g. maize, rice, guinea corn, millet b) Pulses (grain legumes) e.g. cowpea, soya bean, pigeon pea c) Roots and tubers e.g. cassava, yam, potatoes d) Vegetables e.g. tomatoes, onion, amaranthus, okro, cauliflower, spinach e) Fruits e.g. citrus, banana, pineapple f) Beverages e.g. cocoa, tea, coffee g) Spices e.g. pepper, ginger h) Oils e.g. groundnut, sheabutter, sunflower, oil palm i) Fibres e.g. cotton, jute, sisal hemp j) Latex e.g. rubber k) Others sugar cane etc.	Supervise cultivation of crops suited to local environment
27.0	**Pasture and forage crops** 1. Explain the meaning of pasture and forage crops 2. State uses of forage crops 3. List types of pasture and characteristics of each type 4. Identify the main pasture	a) Meaning of pasture and forage crops. b) Uses of forage crops c) Types of pasture d) Common grasses and legumes of common grasses used for grazing livestock. e) Factors affecting the distribution	Assessment would include the botanical names and characteristics

		grazing livestock and productivity of pasture f) Establishment of pasture g) Management practices of pasture	

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28.0	**Crop improvement.** 1. Student should be able to; i. Enumerate the aims of crop improvement ii. Explain the methods of crop improvement iii. State the mendels law	a) Aims of crop improvement b) Methods/processes of crop improvement e.g. introduction, selection, breeding. c) Mendels laws of inheritance d) Advantages and disadvantages of crop improvement	Assessment would include the meaning of crop improvement. Mendels 1st and 2nd of genes would be assessed.
	E. FORESTRY		
29.0	**1. Forest management** Students should be able to; 1.1 Define the meaning if forest and forestry 1.2 State the importance of the forest and forestry 1.3 State forest regulations in Nigeria 1.4 State and discuss forest management practices in Nigeria	a) Meaning of forest and forestry b) Importance of forestry c) Forest regulations d) Forest management practices e) Implications of deforestation Ago-forestry practices in West Africa a) Meaning of agro-forestry b) Agro-forestry practices i. Taungya syatem ii. Alley cropping iii. Ley farming etc.	Common tree species suitable for agro-forestry would be assessed.
	F. ORNAMENTAL PLANTS		
30.0	**1. Meaning and importance of ornamental plants** 1.1 Explain the meaning of ornamental plants 1.2 Identify local ornamental plants	a) Meaning of ornamental plants b) Importance of ornamental plants	Ornamental plants found in locality would be assessed
31.0	**1. Common types of ornamental plants** 1.1 Mention ornamental plants uses for different purpose 1.2 Identify ornamental plants belonging to each category	a) Types of ornamental plants according to their uses i. Bedding (Mostly flowering frication plants) ii. Hedging plants iii. Lawn grasses etc b) The common and botanical names	Assessment would cover identification of various types of ornamental plants. Examples of ornamental plant for each setting or location
32.0	**1. Settings and location for planting ornamental plants.** Students should be able to; 1.1 Identify locations or settings requiring ornamental plants 1.2 Determines ornamental plant for each location.	Location/settings and types of ornamental plants needed:- - Avenues - In front of building etc.	Provide representative of ornamental plant for each setting or location

33.0	**Methods of cultivation ornamental plants and importance of each method and examples of ornamental** 1.1 Mention methods of propagating	i. By seed ii. Vegetative propagation	Propagated through such method would be assessed.

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	Ornamental plants 1.2 Discuss importance of each method 1.3 Give examples of ornamental plants propagated through each method		
34.0	**Maintenance of ornamental plants** **Students should be able to;** 1.1 List maintenance operations of ornamental plants 1.2 Discuss reasons for carrying out each operations 1.3 Carry out the operations in any established ornamental site.	Maintenance operations/Activities of ornamental plants:- - Watering - Mulching - Pruning, etc.	**Reasons for carrying out maintenance operations:** watering, mulching, pruning etc would be assessed
	G. CROP PRODUCTION		
35.0	**DISEASES OF CROPS** **Student should be able to;** 1.1 State the meaning of disease 1.2 List the effects of disease on crop production 1.3 Name the important diseases of major crops 1.4 State the causal organism of each disease 1.5 State the preventive and control measures	a) Meaning of disease b) General effects of disease on crop production c) Disease: causal organism economic, prevention Importance, mode of transmission, symptoms, and control. i. Cereal smut, rice blast, leaf rust etc ii. Legumes cerospora leaf spot, rosette etc iii. Beverages- cocoa black pod, swollen shoot, coffee leaf rust etc iv. Tubers in cassava mosaic, bacterial, leaf blight etc v. Fruits citrus gummosis, dieback vi. Fibre black arm/bacteria blight of cotton etc vii. Vegetables root knot of tomato and damping off, Onion twister etc viii. Stored produce mould etc	Assessment would include at least two fungal, two viral, two bacterial and one nematode disease of the crops chosen from the list
36.0	**Pest of crops** **Students should be able to;** 1.1 Classify pests into insects and non-insects pests 1.2 Classify insects pests based on their mode of mouth part 1.3 Discuss the important insect pests of major crops 1.4 Recognize and name the important storage insect pests of farm produce	a) Meaning of pests b) Classification of pests i. Insect pests ii. Non-insect pests c) Classification of insect-pest based on mouth parts with examples; i. Biting and chewing ii. Piercing and sucking iii. Boring d) Important of insect-pests of	Nature of damage, economic importance, preventive and control measures of each of the non-insect pests would be assessed.

	1.5 State the meaning of pests	major crops, field and storage pests, life cycle, economic importance, nature of damage, preventive and control measures of the following major insect-pests of crops;	

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		i. Cereals stem borer, army worm, earthworm etc ii. Legumes pod borer, aphids, sucking bugs and leaf beetle iii. Beverages cocoa myrids (capsids) iv. Tubers yam beetle, cassava mealy bugs, green spider mites, variegated grass hopper v. Fibre cotton stained, bull worms vi. Fruits and vegetable trips Leaf beetle, scale insect, grasshopper, leaf roller, vii. Stored produce grain weevils, bean beetle e) Non insect pest e.g. birds, rodents etc f) Side effects of preventive and control methods i. Chemical pollution, poisoning ii. Biological iii. Cultural harmful effects of burning etc g) General effects/economic importance of pests.	
37.0	**Weeds** **Students should be able to;** 1.1 Define weeds 1.2 List various types of weeds with their botanical names 1.3 List the various features of weeds	a) Meaning of weeds b) Types of weeds c) Effects of weeds on crops and economy d) Characteristics features of weeds e) Methods of controlling weeds; cultural, biological, chemical, physical and mechanical methods	**Common and botanical names would be assessed**
	H. ANIMAL PRODUCTION		
38.0	**Types and classification of farm animals** 1.1 List the different types of farm animals	a) Types of farm animals: cattle, sheep, goat, poultry, pig, rabbit, fish etc b) Classification of farm animals according to: i. Habitat, terrestrial and aquatic ii. Uses, food, protection, pet etc	**Drawing and labelling of parts of farm animals would be assessed identification of important organs and their functions would be assessed**
39.0	**Anatomy and physiology of farm animals** 1.1 Draw and label parts of a farm	a) Parts of farm animals b) Organs of farm animals e.g. heart, liver, lungs	**Assessment would include the digestive system of poultry, differences**

	animals 1.2 Dissect a farm animal 1.3 Sketch these parts and mention their functions	c) Systems of farm animals e.g. digestive system, circulatory system, respiratory system	**monogastric and ruminant systems**

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40.0	**Animal reproduction** Student should be able to; 1.1 Explain the role of sex hormones in reproduction 1.2 Describe process of egg formation 1.3 Explain the process of reproduction in mammals and poultry 1.4 Draw and labels the parts of the male and female reproductive systems.	a) Meaning of reproduction b) Roles of hormones in reproduction of farm animals c) Reproductive systems of farm animals d) Process of reproduction in farm animals e) Egg formation in poultry	Assessment would include oestrus cycle, heat period, mating, gestation period, parturition, lactation, colostrums, mammary glands, signs of heat, ovulation etc. Assessment would include extensive, intensive and semi-intensive system of management and record keeping in livestock management.
41.0	**Environmental physiology** Students should be able to; 1.1 Explain the meaning of environmental physiology 1.2 State the effects of climate changes	a) Meaning of environmental physiology b) Effects o changes in climatic factors such as i. Temperature ii. Relative humidity iii. Light on; growth, reproduction, milk production, egg production etc.	Students should be guided on this discussion.
42.0	**Livestock management** Student should be able to; 1.1 State the meaning of livestock management 1.2 State the requirement for good livestock management 1.3 Explain the importance of these management practices to livestock	a) Meaning of livestock management b) Requirements for livestock management; housing, feeding, hygiene and finishing of at least one ruminant and one non-ruminant from birth to market weight c) Importance of management practices	The biochemical details of the nutrients are not required. Assessment would include the types of diet for the various classes of animals, their characteristics and supplementary feeding
43.0	**Animal nutrition** **Student should be able to:** 1.1 Classify feeds 1.2 Mention sources and functions of food nutrients 1.3 State the different types of rations/diet and their uses 1.4 State causes and symptoms of malnutrition and their corrections in farm animals	a) Meaning of animal nutrition b) Classification of feeds c) Sources and functions of feed nutrients d) Types of ration/diet and their uses; components of a balanced diet, production and maintenance rations. e) Causes and symptoms of malnutrition and their correction in farm animals	Assessment would include malnutrition related conditions such as ketosis, rickets. Assessment would also include differences and similarities between breeds (local, exotic and cross/hybrid) and performance of animals.

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44.0	**Rangeland and pasture** Students should be able to; 1.1 State the meaning of range land 1.2 List the importance of range land 1.3 State the characteristics of range land 1.4 Mention some common grasses of livestock range land 1.5 State factors affecting the level of production of herbage	a) Meaning and importance of rangeland/pasture to livestock and the characteristics of range land. b) Common grasses and legumes in range land c) Factors affecting the level of production of herbage, rainfall, grass/legume composition, grazing etc. d) Methods of range land and pasture improvement: controlled stocking, rotational grazing, use of fertilizers, introduction of legumes, reseeding, weed control, burning, pest and disease control.	
45.0	**Animal improvement** Students should be able to; 1.1 explain the meaning of animal improvement 1.2 State the aims of animal improvement 1.3 Describe the various methods of animal improvement 1.4 State the effects of each method and process on animal improvement.	a) Meaning of animal improvement b) Aims of animal improvement c) Methods of animal improvement i. Introduction ii. Selection iii. Breeding d) Artificial insemination i. Meaning of artificial insemination ii. Methods of collecting semen iii. Advantages and disadvantages of artificial insemination	**The economic importance of the diseases would be assessed.**
46.0	**Animal health management** Students should be able to; 1.1 Define diseases 1.2 State the causal organisms of animal diseases 1.3 Identify some ecto and endo-parasites of livestock 1.4 Name some important diseases of livestock and their causal organism	a) Meaning of disease b) Causal organisms: viruses, bacteria, fungi and protozoa c) Factors that could predispose animals to diseases: health status of animals, nutrition, management etc d) Reaction of animal to diseases: susceptibility and resistance to diseases e) Causal organism, symptoms, mode of transmission, effects, prevention and control of the following selected livestock diseases: i. Viral foot and mouth, rinderpest, Newcastle ii. Bacterial anthrax, brucellosis, tuberculosis iii. Fungal-aspergilosis, ring worm, scabies iv. Protozoa-trypanomiasis, coccidiosis f) Parasites i. Meaning of parasite ii. Types of parasites iii. Mode of transmission, life cycle, economic importance and control of the following selected livestock parasites liverfluke and roundworm, ectoparasites ticks, lice	**Assessment would include identification, specimens of common endo and ecto-parasites, and charts for life cycles of selected endo and ecto-parasites.**

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		g) General methods of prevention and control of diseases and parasites; quarantine, inoculation/immunization, hygiene, breeding for resistance etc.	
47.0	**Aquaculture** Student should be able to; 1.1 Define aquaculture and name different types of aquaculture. 1.2 Explain the meaning of fish farming 1.3 State the importance of farming 1.4 State the conditions necessary for sitting a fish pond 1.5 Establish and maintain a fishpond 1.6 Identify different fishing tools and their uses.	a) Meaning of agriculture b) Different types of agriculture; i. Fish farming ii. Shrimp farming iii. Crab farming c) Meaning and importance of fish farming d) Conditions necessary for sitting a fish pond e) Establishment and maintenance of fish pond f) Fishery regulations g) Fishing methods and tools	Assessment would include aeration, stocking, feeding, harvesting, processing and preservation of fish
48.0	**Agriculture or bee keeping** Students should be able to; 1.1 State the meaning of agriculture 1.2 List different types of bees 1.3 State importance of bee keeping 1.4 Prepare equipment for bee keeping and produce quality honey 1.5 State various methods of bee keeping and their uses.	a) Meaning of apiculture or bee keeping b) Types of bees i. Indigenous bees ii. Exotic bees c) Importance of bee keeping d) Methods of bee keeping i. Traditional method ii. Modern bee keeping hives, hive tools like suits, smokers, jungle boots, brushes etc e) Precautionary measures in bee keeping i. Locate apiaries are from human dwellings ii. Put warning symbols near apiary etc	Charts or pictures bee should be displayed.
	I. AGRICULTURAL ECONOMICS AND EXTENSION		
49.0	**Basic economic principles** Students should be able to; 1.1 List the basic economic principles 1.2 Discuss the basic economic principles	a) Scarcity b) Choice c) Scale of preference d) Law of diminishing returns	Assessment would be on discussion and demonstration
50.0	**Factors of production** 1.1 Define factors of production 1.2 Mention examples of factors of production 1.3 Discuss each factor of production	a) Land b) Capital c) Labour characteristics and classification d) Management or entrepreneur	Assessment would be based on the factors of production.

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51.0	**Principles of demand** 1.1 State the meaning of demand 1.2 State the law of demand 1.3 List the factors that affect the demand for agricultural goods and services.	a) Definition of demand b) Law of demand c) Factors affecting demand for agriculture d) Movements along the demand curve e) Shifts in the demand curve	
52.0	**Principles of supply** 1.1 State the law of supply 1.2 List the factors that affect supply; movements along the supply curve and the shift variables	a) Definition of supply b) Law of supply c) Movements along supply curve d) Shifts in the supply curve e) Factors affecting the supply of agricultural produce	
53.0	**Implications of demand and supply for agricultural production** 1.1 To discuss the meaning of price support 1.2 Explain the meaning of price stabilization and control	a) Price support b) Price control c) Subsidy programme and its effects on agricultural production	Discussion by drawing examples from real life situation e.g buffer stock, grain release by government.
54.0	**Functions of a farm manager** 1.1 explain meaning of farm manager 1.2 State the functions of a farm manger	a) Meaning of a farm manager b) Functions of a farm manager	Use concept map to outline the function of Manager and relationship in the detailed activities
55.0	**Problems faced by farm manager** 1.1 State the problems that farm managers face in the production process	Problem of farm Managers:- - Inadequate farm - Inadequate information about sources of inputs.	Discussion and exposition
56.0	**Agricultural finance** Student should be able to; 1.1 Define agricultural finance 1.2 State and discuss the importance of agricultural finance 1.3 Determine and discuss sources of farm financing 1.4 Mention types of credit based on periods and sources of credit 1.5 Mention problems faced by farmers in procuring agricultural credit 1.6 State the meaning agric-business 1.7 State the source of fund for capital market	a) Meaning of agricultural finance b) Importance of agricultural finance c) Sources of farm finance d) Classes of farm credit i. Classification based on length of time; - Short-term credit - Medium term credit - Long-term credit ii. Classification based on source of credit - Institution credit iii. Classification based on liquidity; - Loan-in cash - Loan in kind	Assessment would include the meaning of agric-business.

S/N	TOPIC/OBJECTIVES	CONTENTS	ACTIVITIES/REMARKS
		e) Problems faced by farmers in procuring agricultural credit • High interest rate • Lack of inadequate collateral etc f) Problems faced by institutions in granting loans to farmers: • Lack of records and accounts etc g) Capital market • Meaning of capital market, institutions that deal with medium and long term loans for agricultural business. • Institution involved in the capital market • Sources of funds for the capital market; - Bonds - Insurance companies Merchant banks The stock exchange (sales and purchases of shares) • Roles of capital markets in agricultural business; - Mobilization of long term funds for on lending - Reduce over reliance on money marker etc	
57.0	**Farm records and accounts** 1.1 State the importance of farm records and account 1.2 State types of farm records. 1.3 Develop a farm record.	a) Importance of farm records b) Types of farm records i. Inventory records ii. Production records iii. Income and expenditure records iv. Supplementary or special records c) Designing farm records d) Farm accounts; i. Expenditure/purchases account ii. Income/sales account iii. Profit and loss account iv. Balance sheet	Assessment would include terms such as salvage value, appreciation, farm budget, depreciation, inventory, their importance and their uses in calculating profit and loss of farm items like crops, livestock, farm machinery and tools in the farm.

S/N	TOPIC/OBJECTIVES	CONTENTS	ACTIVITIES/REMARKS
58.0	**Marketing of agricultural produce** 1.1 State the meaning and importance of agricultural marketing 1.2 List the various marketing agents/channels 1.3 State the advantages and disadvantages of the various channels 1.4 List the functions performed by marketing agents 1.5 Importance of exports to agricultural development	a) Meaning and importance of marketing of agricultural produce b) Marketing agents and their functions c) Marketing functions: i. Assembling ii. Transportation iii. Processing etc d) Marketing of export crop e) Export crop in West Africa f) Guidelines for exporting crops in West Africa g) Cooperate bodies, cooperative societies and individuals engaged in exporting agricultural produce e.g. ANCE- Association of Nigerian Cooperative Exporters h) Importance of exporting agricultural produce i) Problems of marketing agricultural problems	1. Discussion and demonstration of some of the functions of marketing agent. 2. Identification of Marketing problems in and around their locality.
59.0	**Agricultural insurance** Student should be able to; 1.1 Define agricultural insurance 1.2 Name types of insurance that can be taken by agricultural operators	a) Meaning of agricultural insurance b) Importance agricultural insurance c) Types of insurance policies for agricultural production i. Specific enterprise insurance e.g. crop insurance, livestock insurance ii. Farm vehicle insurance iii. Fire disaster insurance or machines and buildings insurance iv. Life assurance (Farmers, farm workers etc d) Insurance premium e) Problems of agricultural insurance; ▪ Uncertainties of weather ▪ Loses due to natural disaster etc	Assessment would be on the meaning, importance and types of agricultural insurance with practical examples.
60.0	Agricultural extension 1.1 State the meaning and importance of agricultural extension. 1.2 List agricultural extension programmes in Nigeria. 1.3 State some methods of disseminating information to farmers. 1.4 State some methods of disseminating information to farmers. 1.5 List problems faced by agricultural extension agents in Nigeria.	a) Meaning and importance of agricultural extension b) Agricultural extension methods; i. Individual contact methods etc ii. Group contact methods etc c) Agricultural extension programmes in west Africa E.g. illiteracy among farmers.	Assessment would include various teaching aids used in extension e.g chart, GSM, TV, etc and field visit with extension agent to farmers.

LIST OF AGRICULTURAL SCIENCE TEXTBOOK

1. Essential Agricultural Science for Senior Secondary School by O.A. IWENA
2. Agricultural Science for Senior Secondary School by M.K. KOMOLAFE & D.C. TOY
3. Senior Secondary Agricultural Science by O.A. AKINSANMI
4. A textbook of Agricultural Science for School & College by A.C. ANYANWU, B.D. ANYANWU, V.A. ANYANWU.
5. Prescribed Agricultural Science for Senior Secondary school by
   S.A. OMORUYI
   U.X. ORHUE
   A.A. AKEROBO
   C.I. AKHIMEN