

FISHERIES 2

1. GENERAL COMMENTS

The standard of the paper compared favourably with that of previous years with respect to content syllabus coverage and level of difficulty.

The performance of candidates was better than last year.

2. SUMMARY OF CANDIDATES' STRENGTHS

- (1) Majority of candidates showed scholarship in having read or undergone good tuition in the course work.
- (2) There was ample display of familiarity with the topics and the course work.
- (3) Candidates were familiar with topics such as 'what to consider when selecting fish species for stocking' and 'the role of extension services in the development of the fishing industry.'

3. SUMMARY OF CANDIDATES' WEAKNESSES

- (1) A few questions were not numbered. This wasted valuable time of examiner in sorting out the question numbers.
- (2) Whether questions are numbered or not, it is helpful to introduce the answer in a very short sentence, not more than a sentence. It assists the examiner in recognizing the question being answered quickly.
- (3) Some candidates failed to read the questions well. Thus, some gave more points than required. This is a waste of time for both candidates and examiners.
- (4) Some answers could not be recognized quickly because of poor English expressions. This is not an English paper, but marks can only be awarded when the point is made right

4. SUGGESTED REMEDIES

Candidates must simply take a few minutes to read the questions and the instructions very well and carry out these instructions

5. DETAILED COMMENTS

QUESTION 1

- (a) Explain five factors to be considered in selecting fish species to stock a pond.
- (b) Name five fisheries research and training institutions in Ghana.
- (c) List five daily activities related to fishing in freshwater communities in Ghana.

- (a) The candidates were able to list the factors to consider when selecting fish species to stock a pond, however, the explanation was not well given.

Expected Response

Factors to consider when selecting fish species to stock a pond

- Adaptability to the environment/hardiness
- Prolificacy
- Marketing opportunities
- Acceptability
- Disease resistance
- Fast growth
- Ability to accept artificial feed
- Resistance for parasites

- (b) The candidates could mention 'universities' but not the specific university. They could not mention any other training institution and hence those who attempted this sub question scored low marks.

Expected Response

Fisheries Research and training institutions in Ghana

- University of Development Studies
- Department of Fisheries, University of Cape Coast
- Faculty of Renewable Natural Resources, KNUST
- Water Research Institute
- Marine Fisheries Research Division of Fisheries Commission
- Department of Oceanography, University of Ghana, Legon

- (c) This question was answered by most candidates. However, candidates could only mention “fish marketing” and “net mending”.

Expected Responses

Daily activities related to fishing in fresh water fishing communities in Ghana

- Net mending / Gear repairs
- Boat mending
- Going fishing
- Fish processing
- Fish preservation
- Fish marketing
- Fueling outboard motors
- Fishing craft construction

QUESTION 2

- (a) **Discuss five roles played by Extension Services in the development of fishing industry in Ghana.**
- (b) **Discuss three effects of fish spoilage on the client of the fisheries business.**
- (c) **Name four fishing crafts.**

- (a) All the candidates who attempted this question answered it well. The common answers they provided included 'Linking fishers to research' and 'Education of fisher folks' on fishery regulations'

Expected Responses

Role played by Extension services in the Development of the fisheries industry

- Linking fishers to research / extension workers
 - Linking fishers to marketing opportunities
 - Education of fisher folks on fishery regulations
 - Training / Fishers adopt improved fishing techniques and innovations
 - Dissemination of information / enable fishers to be aware of support services available to them
 - Job creation
- (b) The candidates who attempted this question had challenges with understanding the sub question. Some understood it as causes of spoilage.

Expected Responses

Effect of fish spoilage on the clients of fish business

- Reduction in revenue
 - Loss of customers
 - Increase in operational cost
 - Health hazards
 - Loss of taste of the fish
- (c) Candidates who answered this question produced good responses. The common ones mentioned by candidates included “dugout canoe”, “planked canoe” and trawler.

Expected Responses

Examples of fishing crafts

- purse seiner
- long liner
- pole and line vessel
- trawler
- rafts
- dugout canoes
- outrigger canoes
- planked canoes
- inshore vessels

QUESTION 3

- (a) (i) State five effects of aquatic alien plant species on fishery habitat.
(ii) Give the common and scientific names of three aquatic alien plant species.
- (b) (i) Describe three ways of improving the quality of water in a fish pond.
(ii) Name three fishing gear.

(a) (i) This sub question was not well answered. Candidates could only have mentioned 'Spreads to cover water surfaces' and 'Decreases light penetration'

Expected Responses

Effects of Aquatic alien plant species on fishery habitat

- Spreads to cover water surfaces
- Decreases light penetration
- Reduces dissolved oxygen (DO) content
- Increases acidity of pond water
- Sedimentation through decay
- Rapid water loss through transpiration

- (ii) In answering this sub question, the candidates who attempted it could only mention the common names but had challenges with the correct spelling of the scientific names.

Expected Responses

Common and scientific names of aquatic alien plant species

<u>Common Name</u>	<u>Scientific Name</u>
1. Water hyacinth	<i>Eichornia crassipes</i>
2. Water Lettuce	<i>Pistia stratiotes</i>
3. Water ferns	<i>Azolla filiculoides</i>
4. Filamentous Algae	<i>Enteromorpha flexura</i>
5. Hornwort	<i>Ceratophyllum sp.</i>
6. Kariba weed	<i>Salvinia molesta</i>

- (b) Candidates had challenges understanding this sub question. However, a few of them could mention 'stirring the water' and 'adding more water'

Expected Responses

(i) Ways of improving water quality in a fish pond

- Stirring water to increase dissolved oxygen (D.O.) content
- Application of lime to correct pond water pH
- Application of lime to destroy pathogens
- Application of manure to increase phytoplankton population
- Reduce turbidity / add water

- (ii) All the candidates who attempted this sub question did not have any challenge in answering it.

Expected Responses

Examples of fishing gear

- Hook and line
- Cast net
- Seine net
- Traps
- Gill net
- Purse seine
- Trawl
- Spear
- Harpoon

QUESTION 4

- (a) State five daily management practices carried out in a fish pond.
- (b) Explain how each of the following processes preserve fish:
- (i) salting;
 - (ii) drying;
 - (iii) freezing.
- (c) (i) State three characteristics of artisanal fisheries.
- (ii) State three objectives of fisheries management.

Most of the candidates did not answer this question. Those who did attempted only part (a). Candidates were familiar with the methods of fish preservation but not how the method preserves the fish.

(a) Expected Responses

Daily management practices carried out in a fish pond

- checking for leakage / monitoring water level
- cleaning filters / surrounding of pond
- observing fish behaviour
- feeding of fish
- watching out for predators
- monitoring water quality parameters
- manuring
- harvesting

(b) Expected Responses

(i) How drying preserves fish

- create unfavourable conditions for microbes
- microbes cannot grow
- drying kill microbe
- enzymes become inactive when dry
- decrease water content

(ii) How Freezing preserves fish

- microbes rendered inactive
- flesh of fish hardens to lowering ease of microbes' invasion
- enzyme activities is reduced

(iii) How Salting preserves fish

- dries up fish flesh / extracts moisture from the fish flesh
- salt kills microbes
- salt prevent entry of microbes

(c) (i) **Expected Responses**

Characteristics of Artisanal fishery

- gear used are simple / hand operated
- crafts used are simple and traditional
- labour intensive
- very low capital investment
- poorly developed infrastructure
- difficulty in accessing credit
- marketing and distribution of products is difficult

(ii) **Expected Responses**

Objectives of fishery management

- maximization of fish production / yield
- maintenance of stock levels
- conservation of fishery resources
- conservation of fishery environment
- maintenance of spawning stocks

QUESTION 5

- (a) **State five items of expenditure for culture fisheries.**
- (b) **Draw and label the external features of a bony fish.**
- (c) (i) **Name two diseases of fish.**
- (ii) **State three fisheries policies in Ghana.**

Question 5 was answered well by the candidates who attempted it. However, some had challenges with 5 C (i), fishery policy in Ghana.

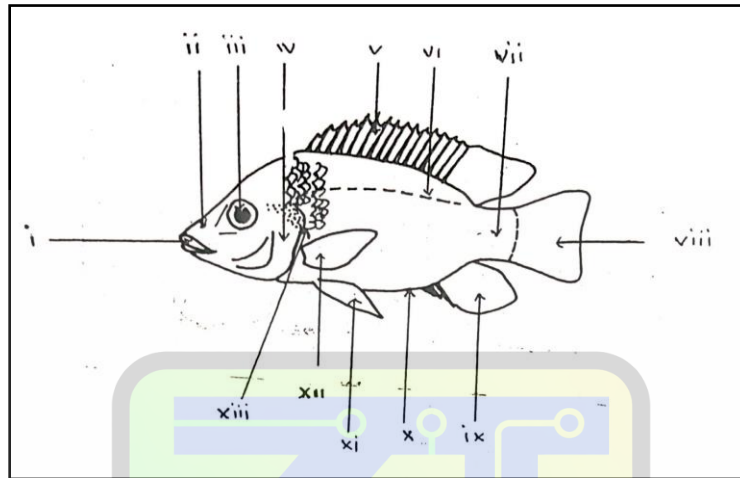
(a) **Expected Responses**

Items of expenditure for culture fisheries

- land
- pond construction
- fingerlings / fish seed
- medication
- labour costs / salaries and allowances
- maintenance of facilities

- tax
- fish feed
- harvesting tools

(b) Diagram of a bony fish



Expected labeling

- | | | | |
|------|-----------------|-------|---------------------|
| i. | mouth | viii. | tail fin/caudal fin |
| ii. | nostril | ix. | anal fin |
| iii. | eye | x. | anus |
| iv. | operculum | xi. | pectoral fin |
| v. | dorsal fin | xii. | pelvic fin |
| vi. | lateral line | xiii. | scale |
| vii. | caudal peduncle | | |

(c) (i) Expected Responses

Diseases of fish

- gill rot
- furunculosis
- ich

(ii) Expected Responses

Fisheries Policies in Ghana

- subsidy on fuel
- no import duty on gear
- zonation of areas for aquaculture
- limiting number of fishing units
- fishing closures
- catch quotas
- licensing of fishing vessels

QUESTION 6

(a) Name three fish species which live in each of the following habitats:

(i) marine;

(ii) freshwater.

(b) (i) List three ways of controlling the population of tilapia in a pond.

(ii) Mention three facilities necessary for the smooth functioning of a modern fish landing site.

(c) List four fish products.

(d) State two reasons for seasonal variation in fish catch.

(a) Candidates had challenges differentiating fish species based on their habitats.

(i) Expected Responses

Marine Fish species

- Cassava fish
- Anchovies
- Chub mackerel
- Sardines
- Red snappers
- Skip jack tuna
- Yellow fin tuna
- Grey mullet

(ii) Fresh water Fish species

- Tilapia
- African catfish
- Mud fish
- Tiger fish
- Butter fish
- African carp
- Electric catfish

- (b) (i) Candidates could only mention harvesting as the only means of controlling the population of tilapia in a pond.

Expected Responses

Control of Tilapia population in a fish pond

- continuous harvesting
 - fry harvesting
 - use of predator e.g. catfish
 - stocking unisex (monosex population)
- (ii) Candidates were only familiar with fuel pump and source of water as the facilities needed for proper functioning of a modern landing site.

Expected Responses

Facilities necessary for the smooth functioning of a modern landing site

- source of water
- cold storage
- slip way
- breakwater
- dry dock
- jetty
- fuel pump

- (c) Candidates were familiar with the traditional fish products like smoked fish, dry fish and salted fish.

Expected Responses

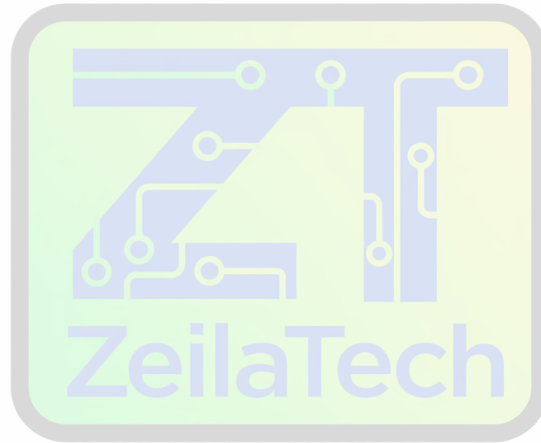
Fish products

- Fish fillets
- Fish chunks
- Fish flakes
- Canned fish
- Smoked fish
- Dried fish
- Salted fish
- Pickled fish
- Marinated fish
- Fried fish

- (d) This question was not attempted by most candidates

Expected ResponsesReasons for seasonal variation in fish catch

- Variation in spawning of fishes
- Seasonal upwelling
- Differences in climatic factors
- Differences in the breeding cycle of fish



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FISHERIES 3

1. GENERAL COMMENTS

The standard of the paper compared favourably with that of previous years.

The performance of candidates was slightly higher than the previous years.

2. SUMMARY OF CANDIDATES' STRENGTHS

- (1) Candidates were able to identify specimens properly.
- (2) Candidates used the appropriate terms in the subject.
- (3) They were precise and straight to the point.

3. SUMMARY OF WEAKNESSES

- (1) Candidates understood the demand of the question 1(b) to mean the methods by which the fish was obtained from water. Some indicated cast net, trawl etc.
- (2) Scientific names and some fisheries terminologies were wrongly spelt and used respectively.
- (3) Candidates were unable to apply their knowledge in theory to the practical work.

4. SUGGESTED REMEDIES

- (1) Teachers must endeavour to expose the candidates to indepth theoretical knowledge to enable them apply it to the practical work.
- (2) Candidates should make conscious effort to learn and use terminologies appropriately.

5. DETAILED COMMENTS

QUESTION 1

- (a) Identify each of the specimens labelled A, B, C and D.
- (b) State the method of producing each of the specimens labelled A and C.
- (c) Describe the processes through which specimens C and D were obtained.
- (d) Name two equipment that could be used to obtain specimen C.

- (a) Generally, this sub question was well answered except Specimen D which was identified by most candidates as frozen fish.

Expected Responses

Identification

Specimen A	=	Gutted fish
Specimen B	=	Scaled tilapia fish
Specimen C	=	Sun dried tilapia fish
Specimen D	=	Chilled tilapia fish

- (b) This sub question was not answered well. Candidates understood the demand of the question to mean the methods by which the fish was obtained from water. Some indicated cast net, trawl etc.

Expected Responses

Method of production

(i) Specimen A (Gutted fish)

- Gutting / Fishing processing

(ii) Specimen C (Sun dried fish)

- Sun drying / Preservation

- (c) This question was well answered, however, there were a few challenges. For instance, candidates mentioned the use of brine instead of dry salt for specimen C and in the case of specimen D, candidates indicated the use of deep freezer instead of the use of ice to chill the fish.

Expected Responses

(i) Description of process of achieving Specimen C (Sun dried fish)

- scale the fish / Fish not scaled
- gut the fish
- wash fish to remove blood
- rub with salt / not salted
- place on mat in the sun or solar chamber
- turn regularly until very dry
- collect and pack

(ii) Description of process of achieving Specimen D (Chilled tilapia fish)

- scale fish
- gut fish
- wash fish
- place fish in a suitable insulated container or ice chest
- place ice in between the layers of fish
- cover / close the container

- (d) This sub question was well answered

Expected Response

Equipment to produce Specimen C (Sun dried fish)

- solar drier
- drying platform / mat

QUESTION 2

- (a) **Identify each of the specimens labelled E, F, G and H.**
(b) **State four functions of specimen F.**
(c) **State two products that could be obtained from each of specimens E, F, G and H.**
(d) **Mention four other by-products of fish.**

- (a) Many of the candidates were able to answer this sub question well. They had no problem identifying the specimens.

Expected Response

Identification

Specimen E	=	Entrails
Specimen F	=	fish fins
Specimen G	=	fish liver
Specimen H	=	fish skin

- (b) Many of the candidates were able to answer this sub question well. They were able to mention functions such as steering and defense.

Expected Responses

Functions of Specimen F (Fish fins)

- For Steering
- Balancing
- Swimming
- Defense
- Propulsion

- (c) Candidates were able to mention at least one use of each specimen.

Expected Responses

Products obtained from specimens

- Specimen E (Entrails) – fertilizer, fish meal
- Specimen F (fish fins) – fish fin soup, fertilizer
- Specimen G (fish liver) – oil, fish meal
- Specimen H (fish skin) – leather, fish meal

- (d) Instead of candidates mentioning by products other than the ones mentioned, they repeated the ones mentioned already. This means that they did not pay attention to the requirement of the question.

Expected Responses

Other fish by-products

- fish bones
- gills
- fish scales
- opercula

QUESTION 3

- (a) Identify each of the specimens labelled J, K and L.
- (b) (i) State one use each of specimens J, K and L.
(ii) State two methods of applying specimen J.
- (c) Mention two materials that could be used in place of each of the specimens J, K and L in fish culture.
- (d) (i) State four advantages of using specimen J.
(ii) State two ways in which specimen L is important.
- (a) Many of the candidates were able to answer this question well.

Expected Response

Identification

Specimen J = Poultry droppings

Specimen K = N.P.K fertilizer

Specimen L = Lime

- (b) (i) Many of the candidates did not have difficulty in answering this sub question.

Expected Responses

Uses of Specimen J (Poultry droppings)

- for manuring fish pond
- to feed fish

Uses of Specimen K (N.P.K.)

- fertilize fish pond
- fertilize grass on pond walls

Uses of Specimen L (Lime)

- correct pond water pH
- kill micro organism / sterilize pond
- clears humic strains of vegetation origin

(ii) A few candidates wrongly mentioned methods like foliar application which is specific to crop plants.

Expected Responses

Methods of applying Specimen J (Poultry droppings)

- Broadcasting method
- Sack method

(c) Candidates were required to mention substitutes for specimens J, K and L. The candidates could mention only substitute for specimen J and not substitute for specimens K and L.

Expected Responses

(i) Materials that could be used in place of Specimen J (poultry dropping)

- farmyard manure
- compost
- pig droppings

(ii) Materials that could be used in place of Specimen K (N.P.K.)

- Urea
- Phosphate fertilizer

(iii) Materials that could be used in place of Specimen L (Lime)

- Ash
- Ca(OH)_2
- Calcium oxide (CaO)
- Calcium carbonate (CaCO_3)

(d) (i) Candidates were able to mention only two disadvantages of specimen J;” it is cheaper and readily available”.

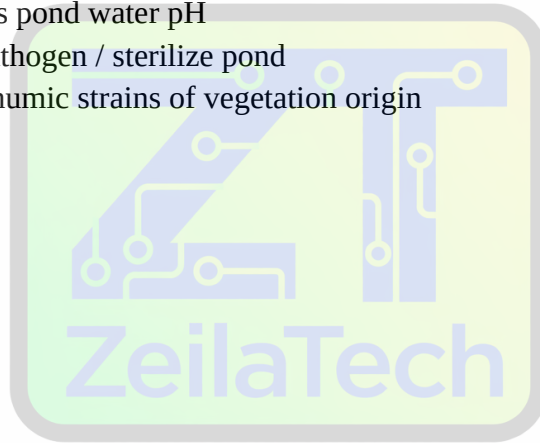
Expected Responses**Advantages of Specimen J (Poultry droppings) in fish culture**

- slow release of mineral salt
- environmentally friendly
- cheaper
- readily available
- poultry droppings could be consumed by fish as feed

- (i) Candidates were required to state the role played by specimen L (Lime) in a fish pond. In other words, how is lime important in a fish pond. This was well answered by the candidates who attempted it.

Expected Responses**Importance of Specimen L (Lime)**

- corrects pond water pH
- kills pathogen / sterilize pond
- clears humic strains of vegetation origin



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