

FISHERIES 2

1. GENRAL PERFORMANCE

The standard of the paper was at par with the previous years and the performance was slightly higher than the previous year.

2. SUMMARY OF CANDIDATES' STRENGTHS

Candidates had very little difficulties answering the following questions:

- i. Types of fishery habitats and examples of fishes found in them;
- ii. Characteristics of fin fishes, crustaceans and molluscs;
- iii. Job opportunities in the fisheries sector in Ghana;
- iv. Criteria to consider when selecting fish for stocking a pond;
- v. The types of fish farming in Ghana.

3. SUMMARY OF CANDIDATES' WEAKNESSES

Areas that posed much problems to the candidates include:

- i. Description of measures to control aquatic invasive alien species;
- ii. Classification of fishes based on their habitats;
- iii. Factors to consider in the establishment of a fishery business enterprise;
- iv. Environmental factors which affect the growth of fish,

4. SUGGESTED REMEDIES FOR CANDIDATES' WEAKNESSES

- Teachers should make every effort to cover the topics in the syllabus to avoid the ignorance exhibited by the candidates in some topics.
- Teacher should help candidates understand terms like 'explain', 'state', 'discuss' etc as used in the questions.
- Candidates should be taught how to select questions appropriately in examination.

4. DETAILED COMMENTS

Question 1

1. (a) Describe two measures that could be used to prevent and control aquatic invasive alien species in fishery habitats.
- (b) (i) Name three fishery habitats.
(ii) Give one example each of the three fishery habitats named in b(i).
- (c) Group the following fishery organisms according to the three fishery habitats named in b(i):
 - (i) Tilapia;
 - (ii) Tuna;
 - (iii) Clarias;
 - (iv) Heterobranchus;
 - (v) Sardinella;
 - (vi) Shrimp;
 - (vii) Grey mullet;
 - (viii) Cassava fish;
 - (ix) Prawn;
 - (x) Oyster.

(a) Most of the candidates were able to describe the measures used to prevent and control aquatic alien species in fishery habitat. Their explanations however, was not sufficient and therefore scored low marks.

The expected response was;

Measures to prevent and control aquatic invasive alien species in a fishery habitat

Education

By radio programs, television, print media and flyers.

This could make the public aware of the damages they pose to the environment and what should be done when they are spotted.

Mechanical removal

- It is the most attractive method
- It involves the use of machines to pull out the entire plant during dredging, drying the plant, fruit and seed and completely burning the dried plant.

Manual removal

The use of fishers to remove the species with their hands from habitats where they fish

Biological control

- It involves the introduction of specific insects which may feed on the parts of the plant e.g., leaves, flower;
- Some herbivorous fish may also be introduced.

Quarantine / Regulatory laws

- This involves an embargo on the use of fishing gear and craft bought from the environment from which such species are known.

(b) (i) Candidates were able to name fishery habitats and examples as follows;

The three fishery habitats

- Fresh water
- Brackish water
- Marine

(ii) Examples of the fishery habitats

- | | | |
|----------------|---|-----------------------|
| Fresh water | - | River, lakes, streams |
| Brackish water | - | Estuaries, Lagoon |
| Marine | - | Sea, ocean |

(c) Candidates were asked to group a list of fishery organisms. Most of the candidates were able to group them as follows;

Fresh water

Tilapia
Clarias
Heterobranchus

Brackish

Tilapia
Grey mullet
Prawn
Shrimps
Oysters

Marine

Sardinella
Tuna
Cassava fish

Question 2

(a) As a prefect of the SHS 3 Fisheries class in your school planning an excursion to a fish landing site in Ghana, give your colleagues the following information before the trip:

- (i) four types of fish landing sites that could be visited;
- (ii) four facilities likely to be found at the fish landing sites;
- (iii) four activities that are likely to take place at the fish landing sites.

(b) Distinguish between the following pairs of terms:

- (i) fishery and fisheries;
- (ii) aquaculture and fishing;
- (iii) subsistence and commercial fisheries;
- (iv) artisanal and industrial fisheries.

- (a) Most candidates answered this question and did quite well.

The expected responses were;

(i) Types of fish landing sites that could be visited

- Beaches
- Harbours
- Lagoon shores
- River banks
- Lake shores

(ii) Facilities likely to be found at fish landing sites

- Winches
- Cold store
- Ice plants
- Fuel stations
- Slipway
- Dry dock
- Jetty
- Breakwater

(iii) Activity likely to take place at the landing site

- Loading of fish from vessel
- Fueling vessel
- Loading ice into vessel
- Beaching of vessels for repairs
- Repair and maintenance of vessels
- Maintenance of gear
- Fish processing
- Fish marketing
- Production of ice

- (b) Candidates could not explicitly distinguish terms and lost marks.

The expected responses were;

Distinguishing between terms

(i) Fishery and fisheries

Fishery refers to one aspect of fish production **while** Fisheries refers to all processes involved in fish production.

(ii) Aquaculture and fishing

Aquaculture is the rearing of aquatic organisms in an enclosed environment such as pond, tanks, pens, cage etc.

Fishing on the other hand is the method and processes involved in the catching / hunting of fish.

(iii) Subsistence and commercial farming

Subsistence fisheries is the fishery where the fish caught are shared and consumed directly by the family of the fisher rather than sold at the market.

Commercial fisheries on the other hand are taken for profit. The objective is to catch and sell.

(iv) Artisanal and Industrial fisheries

Artisanal fisheries is the traditional fisheries involving fishing households. They usually fish close to the shore and catch is mainly for local consumption.

Industrial fisheries on the other hand use relatively large vessels and high degree of mechanization, large production capacity and are capital intensive

Question 3

(a) Give three characteristics each of the following fishery organisms:

- (i) fin fishes;**
- (ii) crustaceans;**
- (iii) molluscs.**

(b) Give two examples each of the group of fishery organisms in (a).

(c) List five job opportunities in the fisheries sector in Ghana.

- (a) Candidates were asked to give characteristics of the following fishery organisms: fin fishes, crustaceans and molluscs. The question was not well answered by candidates.

The expected responses were;

Characteristics of fishery organisms

(i) Fin fishes

- Usually have fins;
- Some have scales others have not;
- They are usually vertebrates;
- They have streamline body;
- They have gills;
- They have lateral line.

(ii) Crustaceans

- have chitinous / calcareous exoskeleton
- usually have two pairs of antennae
- usually have segmented body
- jointed appendages / limbs
- they have gills
- they are invertebrates

(iii) Molluscs

- Usually have soft body
- Are unsegmented
- Usually have shells
- They are invertebrates
- Body organized into muscular foot, head and visceral mass containing most of the organ system

(b) Candidates were able to give examples of each fishery group without any problem as follows:

Examples

Fin fishes	Crustaceans	Molluscs
Sardinella	Shrimp	clams
Tilapia	Prawns	Scallopes
Tuna	Lobsters	Oysters
Heterobranchus	Crabs	Cuttle fish / squid

(c) Majority of the candidates were able to give job opportunities in the fisheries sector in Ghana as follows:

Job opportunities in the fisheries sector in Ghana

- Teaching
- Fish farming
- Research
- Fish pond engineer
- Fish imports
- Cold store operation
- Fish export
- Fish trader
- Fisheries extension

Question 4

- (a) Discuss three factors that are considered before the establishment of a fishery business enterprise.**
- (b) Outline four procedures for establishing a fishery business enterprise.**
- (c) Distinguish between the following pairs of terms as used in Fisheries:**
 - (i) fishing craft and fishing gear;**
 - (ii) turbidity and transparency.**
- (d) List three cultural taboos that are beneficial to fisheries management.**
- (e) State three environmental factors which affect the growth of fish.**

- (a) Candidates were required to discuss the factors that are considered before establishing a fishery business. Candidates could not vividly discuss the various factors to consider.

The expected responses were;

Discussion of factors to be considered before establishing a fishery enterprise

1. Identification of Business opportunity
 - Study trends in the fisheries industry
 - identify the gap / problem to be solved
 - think of possible solution to the gap / problem identified
 - make a decision on type of business opportunity
2. Identification of fisheries product or service needed in the locality
 - Survey the locality to identify service(s) or product(s) that is/are needed.
 - make a decision on the product or service identified.
3. Availability of a market for the product or service

Once the product or service is identified, the market availability within the locality and its neighbourhood should be assessed.
4. Demand for product or service

Will the product or service be patronized by the people in the locality or neighbourhood.
5. Siting the Business
 - Availability of access road
 - Utilities e.g., water, electricity, communication etc.
 - Availability of storage facilities
 - Source of raw materials

- (b) Candidates appeared not to have a grasp of this topic and could not provide appropriate responses.

The expected answer was;

Outline of procedure for establishing fisheries business enterprise

- Identification of business opportunity
- Write a business plan
- Choose a business location
- Choose a business structure (i.e., sole proprietorship, partnership, limited liability company etc.)
- Choose business name
- Register the business
- Manage the business

- (c) Candidates could not distinctly distinguish terms and lost marks.

The expected responses were;

Distinguishing between terms

- (i) Fishing craft and fishing gear
Fishing crafts are vehicles or platform produced for carrying fishing crew, gear and catch
WHILE
Fishing gears are equipment / devices used for catching fish.
- (ii) Turbidity and Transparency
Turbidity is the amount of suspended particles or matter in a water body
WHILE
Transparency refers to the measure or extent of clarity of a water body.
The light penetration into a water body.

- (d) Candidates answered this question very well and scored high marks.

The expected answers were;

Cultural taboos beneficial to fisheries management

- Ownership of water bodies
- Closures
- Fishing holidays
- Fish sanctuaries

- (e) Candidates were able to state environmental factors which affect fish growth as follows:

Environmental factors which affect fish growth

- | | |
|---------------|-------------------|
| - Temperature | - Nitrate |
| - pH | - food / feed |
| - Salinity | - Space |
| - Ammonia | - Other organisms |

Question 5

- (a) (i) **Describe the osmo-regulation in freshwater fishes.**
(ii) **Name two excretory products of fish.**
(b) **List five protein-yielding feed ingredients that could be used to prepare fish feed.**
(c) (i) **Name three fish diseases**
(ii) **State two ways of preventing fish diseases.**
(d) **List three fish species that are culturable in Ghana.**

- (a) Candidates could not describe osmo-regulation properly and name excretory products of fish.

The expected answers were;

- (i) Description of osmo-regulation in freshwater fishes
- Process of regulating body fluids
 - The kidney in the fish is the organs that is involved in osmo-regulation
 - The blood in freshwater fishes is more concentrated than the surrounding water
 - Freshwater fishes are in danger of taking in too much water by osmosis
 - They then excrete large amount / volume of diluted urine to solve the problem
 - They also reabsorb ions across the nephron tubules back into the blood
- (ii) Excretory products of fish
- Water
 - Ammonia
 - Urea
 - Carbon dioxide

- (b) Candidates listed protein yielding fish feed ingredients, fish diseases and ways of preventing fish diseases as follows:

Protein yielding fish feed ingredients

- Fish meal
- Groundnut cake
- Soyabean
- Copra cake
- Palm kernel cake
- Cotton seed
- Pigeon pea cake

(c) (i) Fish diseases

- Ich
- Furunculosis
- Gill rot

(ii) Ways of preventing fish diseases

- Minimal handling
- Suitable diet
- Regular disinfection of fish farm
- Use of resistant strains
- Maintenance of good water quality
- Maintenance of good hygiene
- Provide foot bath

(c) Most candidates were able to list culturable species in Ghana as follows:

Culturable fish species in Ghana

- Clarias
- Tilapia
- Heterotis
- Lates
- Chrysithes

Question 6

(a) **Explain the following terms:**

- (i) **Fish processing;**
- (ii) **Fish preservation.**

(b) **State two ways in which fish processing is of importance.**

(c) **Give three examples of each of the following methods of fish preservation:**

- (i) **Traditional method;**
- (ii) **Modern method.**

(d) **Mention five criteria that should be considered in selecting a fish species for stocking a pond.**

(e) **What are the three types of fish farming?**

- (a) Candidates explained the terms but failed to mention the processes used to process and preserve fish.

Explanation of terms

(i) Fish processing

These are activities carried out to prepare fish for consumption or marketing. The process includes scaling, washing, gutting, filleting, cutting, smoking, canning etc.

(ii) Fish preservation

It refers to all activities carried out to extend the shelf life of the fish. It includes drying, salting, smoking etc.

- (b) Most candidates were able to state the importance of processing fish.

Importance of fish processing

- To prevent spoilage
- To increase shelf life
- To add value

- (c) Candidates listed traditional and modern methods of preserving fish.

(i) Examples of traditional fish preservation methods

- Smoking
- Boiling
- Salting
- Drying
- Frying

(ii) Examples of modern fish preservation methods

- Freezing
- Canning
- Irradiation
- Use of chemicals e.g., pickling

- (d) Candidates provided scanty responses to this question.

The expected responses were;

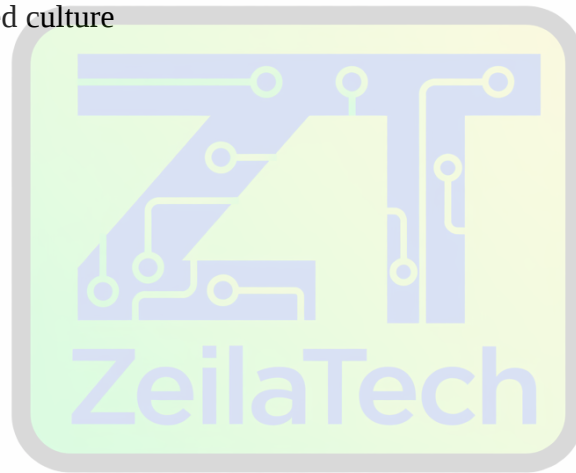
Criteria to be considered in selecting fish species for stocking a pond

- Fish feeding habit
- Availability of fingerlings / fish seed
- Growth rate of the fish
- Adaptability of the fish / hardiness
- Market demand / consumer preferences
- Acceptability of artificial feed
- Survival of the species

(e) A few candidates could not mention the types of fish farming.

The three types of fish farming

- Monoculture
- Polyculture
- Integrated culture



Smart Learning Tools

FISHERIES 3

1. GENRAL PERFORMANCE

The standard of the paper was comparable to the previous years and the performance was slightly better than the previous year.

2. SUMMARY OF CANDIDATES' STRENGTHS

Candidates had very little difficulties answering the following questions:

- Classification of specimens A (scoop net), B (cast net), C (hook-and-line) and D (gill net) as active or passive gears
- Drawing of specimen B (cast net)
- Function of parts of specimens A (scoop net) and B (cast net)
- Differences between specimens A (scoop net) and B (cast net)
- Stating the materials used to construct specimen C (hook-and-line)
- Ways of maintaining specimen specimen C (hook-and-line)
- Common names of specimens E and F

3. SUMMARY OF CANDIDATES' WEAKNESSES

Areas that posed much problems to the candidates include:

- Description of how specimen C is used to catch fish
- Description of how specimen D is used to catch fish

4. SUGGESTED REMEDIES FOR CANDIDATES' WEAKNESSES

- Teachers should make every effort to cover the topics in the syllabus to avoid the ignorance exhibited by the candidates in some topics.
- Teacher should help candidates understand terms like 'explain', 'state', 'discuss' etc as used in the questions
- Candidates should be taught how to select questions appropriately in examination

5. DETAILED COMMENTS

Question 1

- (a) (i) Classify specimens A, B, C and D into active and passive gear.
- (ii) Draw and label specimens A and B.
- (b) (i) State one function each of two of the parts labelled in Specimen A.
- (ii) State one function each of two of the parts labelled in Specimen B.
- (c) State two differences between specimens A and B.

- (a) Majority of the candidates were able to classify the specimens A, B, C and D as active and passive gears as follows:

- (i) Classification of specimens into active and passive

Active

A - Scoop net
C - Cast net

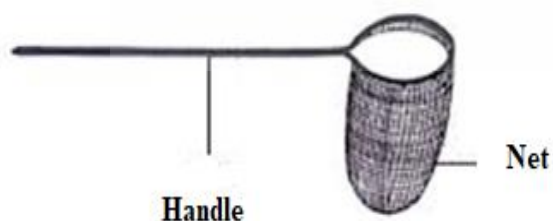
Passive

B - Hook-and-line
D - Gill net

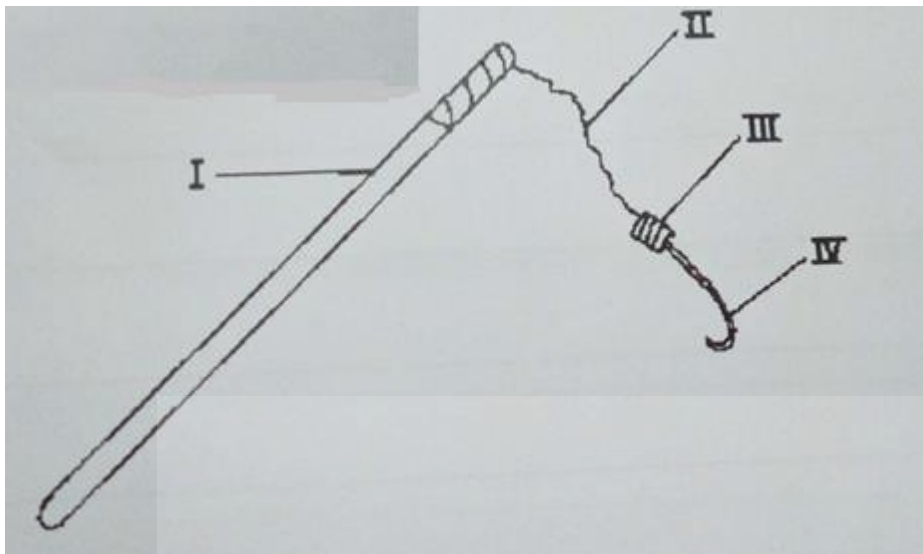
- (ii) Most candidates could make a drawing of specimen A and B appropriately and labelled.

A few candidates however, could not make the required drawings

Drawing of Specimen A (Scoop net)



(iii) Drawing of specimen B (hook-and-line)



(b) Most candidates were able to state the function of the parts of specimen A (scoop net) and specimen B (hook and line)

(i) Parts of specimen A (scoop net) and their functions

- Frame: - provides shape for the net
- provides support for the net
- Net bag - catches and holds fish
- Mesh/net - allow water to pass through when holding the fish
- Handle - allows fisher to scoop the fish

(ii) Parts of specimen B (hook and line) and their functions

- Hook - Catches fish by piercing
- Fishing line - transfers force from the fisher to the hook
- Bait - attracts fish to the hook
- Sinker - sinks hook and line to desired depth

(c) Only a few candidates were not able to state the differences in specimen A (scoop net) and B (hook and line)

Differences between specimen A (Scoop net) and specimen B (hook-and-line)

Specimen A

Catches fish using netting
It is an active gear
Often used in shallow waters

specimen B

Relies on bait
It is a passive gear
Used in deeper waters

Question 2

- (a) (i) Name three materials that have been used in the construction of specimen C.
- (ii) State one function each of the materials named in (i),
- (b) (i) Describe how specimen C is used to catch fish.
- (ii) Describe how specimen D is used to catch fish.
- (c) Give two differences between specimens C and D.
- (d) State four ways of maintaining specimen C.

(a) Majority of the candidates were able to list the materials used to construct specimen C (cast net) and stated the functions as follows;

- (i) Materials used to construct Specimen C
(Cast net)

- Twine
- Metal / Lead
- Rope

- (ii) Functions of the listed materials in a(i)

- | | | |
|--------------|---|---|
| Twine | - | For making nets |
| Metal / Lead | - | To enable the net to sink |
| Rope | - | Enables the net to be thrown into the water |
| | - | Hold the net in position |
| | - | Draws the net out of water |

(b) A few candidates could not describe vividly how specimens C (cast net) and D (gill net) are used to catch fish.

- (i) How specimen C (Cast net) is used to catch fish

- tie the casting rope and the top rope around one hand
- with the other hand, hold the foot rope
- throw the foot rope in a circular form into the water
- allow rope to follow net
- wait for some time
- draw the net gently as the foot rope losses
- remove catch from the net

- (ii) How specimen D (Gill net) is used to catch fish

- open gill net and set vertically in water by the head rope
- keep net in position by anchors
- mark on the surface the location of the net with bouy / flyers
- leave overnight / for sometime
- pull out / lift up net and remove the catch

- (c) Most candidates were able to state the differences between specimens C (cast net) and D (gill net)

Differences between specimen C (Cast net) and Specimen D (Gill net)

Cast net	Gill net
Active fishing gear	Passive fishing gear
Come shaped gear	Rectangular shaped gear
Has only lead	Has lead and floater

- (c) Many of the candidates stated ways of maintaining specimen C (cast net).

Ways of maintaining specimen C (Cast net)

- wash after use
- dry in shape
- mend torn parts
- replace missing lead / weights
- store in dry place

Question 3

- (a) (i) Give the **common names of specimens E and F.**
 (ii) State four **observable similarities between specimens E and F.**
 (iii) Name two **external body features that differentiate Specimen E and F.**
 (iv) State the **functions of each of the two external body features named in (iii).**
- (b) (i) At what stage in fish pond management is each of specimens G, H and J used?
 (ii) Describe how specimen J is used in fish ponds.
 (iii) Describe in three ways what could happen in a fish pond if specimen J is applied in excess.
 (iv) State two ways in which specimens G, H and J are important in fish farming.

- (a) Most candidates were able to give the common names of specimens E and F as follows:

- (i) Common names of specimens E and F

Specimen E (Clarias)	Catfish
Specimen F (Sardinella)	Sardine fish

- (ii) Most candidates were able to provide observable differences between specimens E (Clarias) and F (Sardinella) as follows:

Observable similarities between specimens E (Clarias) and F (Sardinella)

- Presence of lateral line
- Presence of operculum
- Streamlined body shape
- presence of nostrils
- presence of a pair of eyes

- (iii) A few candidates could not differentiate the functions of external body features between specimens E (Clarias) and F (Sardinella)

Functions of External body features that differentiate specimen E (Clarias) and F (Sardinella)

- | | | |
|---------|---|--------------------------|
| Scales | - | For protection |
| Barbels | - | For detection of stimuli |

- (b) Most of the candidates could not state the stages at which specimens G (Ammonia fertilizer), H (Agricultural lime) and J (Poultry manure) were applied to a fish pond.

The expected responses were;

- (i) Stages of application of Specimens G, H and J

Specimen G (Ammonia fertilizer)

- during pond preparation
- during the culture period

Specimen H (Agricultural lime)

- during pond preparation
- during the culture period when pH levels are low / water becomes acidic

Specimen J (Poultry manure)

- during pond preparation
- during culture period when nutrient levels are low / greenness of pond water reduces

- (ii) Almost all the candidates could not describe how specimen J (Poultry manure) is used.

How specimen J (Poultry manure) is used in a fish pond

- put specimen in a sack
- hung on a peg in the pond

OR

- put in a crib in a pond

OR

- broadcast over the pond bottom

- (iii) Most candidates were able to state the effect of applying specimen J (Poultry manure) in excess and stated them as:

Effect of excess of specimen J (poultry manure) in a fish pond

- Algae bloom / eutrophication
- pollution
- increased turbidity
- stunted growth of fish
- increased mortality

- (iv) This question was well answered by almost all the candidates. Candidates stated the importance as:

Importance of Specimen G (Ammonia fertilizer), H (Agricultural lime) and J (poultry manure)

Improves the nutrients content of fish pond
Promotes the growth of phytoplankton in the pond
Regulates pH of pond water.