

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව  
 இலங்கைப் பரீட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம்  
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අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2018 දෙසැම්බර්  
 கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2018 டிசெம்பர்  
 General Certificate of Education (Ord. Level) Examination, December 2018

ජලජ ජීව සම්පත් තාක්ෂණවේදය I, II  
 நீருயிரினவளத் தொழினுட்பவியல் I, II  
 Aquatic Bioresources Technology I, II

07.12.2018 / 0830 – 1140

පැය තුනයි  
 மூன்று மணித்தியாலம்  
 Three hours





අමතර කියවීමේ කාලය - මිනිත්තු 10 යි  
 மேலதிக வாசிப்பு நேரம் - 10 நிமிடங்கள்  
 Additional Reading Time - 10 minutes

Use additional reading time to go through the question paper, select the questions and decide on the questions that you give priority in answering.

### Aquatic Bioresources Technology - I

#### Note :

- Answer **all** questions.
- In each of the questions from 1 to 40, pick one of the alternatives (1), (2), (3), (4), which is **correct or most appropriate**.
- Mark a cross (X) on the number corresponding to your choice in the answer sheet provided.
- Further instructions are given on the back of the answer sheet. Follow them carefully.

- An example for a direct employment related to aquatic bioresources is  
 (1) aquatic plant industry. (2) dry fish industry.  
 (3) boats and fishing net industry. (4) lime industry.
- A country to which Sri Lanka mainly exports ornamental fish is  
 (1) Philippines. (2) South Africa. (3) New Zealand. (4) United States of America.
- The aquatic plant species used in Agar preparation is  
 (1) *Ulva*. (2) *Gracilaria*. (3) *Sargassum*. (4) *Padina*.
- Main vitamins contained in fish oil are  
 (1) A and B. (2) A and C. (3) A and D. (4) B and D.
- Select the equipment that can be used in excavation and earth removal in construction of a fish pond.  
 (1)  (2)  (3)  (4) 
- Select the correct statement regarding 'salt marshes'.  
 (1) A submerged ecosystem associated with sea water.  
 (2) Found in intertidal zone.  
 (3) Mainly reported from North-western region of Sri Lanka.  
 (4) Perennial plants are found abundantly in the vicinity.
- Which of the following fish species has been banned to export from Sri Lanka?  
 (1) Black ruby barb (*Pethia nigrofasciata*) (2) Mangrove red snapper (*Lutjanus argentimaculatus*)  
 (3) Cherry barb (*Puntius titteya*) (4) Spotted gourami (*Malpulutta kretseri*)
- The fish species that shows a very slow mobility is  
 (1) shark. (2) skipjack tuna. (3) grouper. (4) flat fish.
- The fish species which has scales of the shape shown in the picture is  
 (1) white sardine. (2) mullet. (3) shark. (4) eel.



[see page two]

10. What is the concentration of the chlorine solution that an ornamental freshwater fish is initially immersed to prevent infestation of diseases?

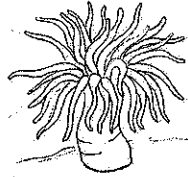
- (1) 5 - 10 ppm      (2) 20 - 30 ppm      (3) 30 - 40 ppm      (4) >40 ppm

11. In bio-filtering process, the nitrites convert into,

- (1) ammonia.      (2) nitrates.      (3) nitrogen gas.      (4) nitrous oxide gas.

12. What is shown in the picture is a

- (1) sea anemone.      (2) jellyfish.  
(3) starfish.      (4) sea cucumber.



13. Select the option that gives correct combination of a parameter which influences the water quality of a fish pond and the unit used to measure the parameter.

	Parameter	Unit
(1)	Hardness	cm <sup>3</sup> /g
(2)	pH value	ppt
(3)	Salinity	l/mg
(4)	Turbidity	cm

14. What is the hand-held satellite system used in navigation?

- (1) VMS      (2) GPS      (3) SONAR      (4) RADAR

15. Active fishing gears are more efficient than passive fishing gears. The main reason for this is that active fishing gears

- (1) are larger in size.      (2) mislead fish easily.  
(3) catch fish by chasing behind them.      (4) attract fish.

16. The gear mostly used in catching larger pelagic fish like Skipjack tuna, Yellowfin tuna is

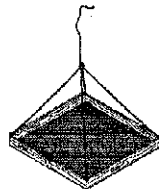
- (1) trammel net.      (2) drift gill net.      (3) trawl net.      (4) stake net.

17. The natural disaster that has a negative impact on fish harvest in a seasonal tank is

- (1) coastal erosion.      (2) cyclone.      (3) drought.      (4) flood.

18. What is shown in the picture is a

- (1) fish culturing structure.  
(2) fish feeding structure.  
(3) fish harvesting structure.  
(4) waste removal structure of ponds.



19. The propagation method used in producing large number of aquatic plants with a small piece of tissue is

- (1) tissue culture.      (2) sexual propagation.  
(3) rooting stem cuttings.      (4) use of buds.

20. The reason for fixing an out-trigger to a canoe is to,

- (1) increase the space of the canoe.      (2) increase the weight of the canoe.  
(3) improve the stability of the canoe.      (4) facilitate fitting the sails to the canoe.

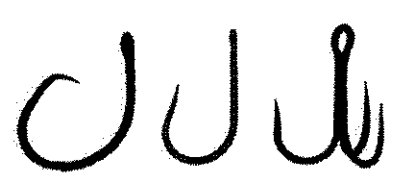
21. What is the storage temperature of frozen fish products?

- (1) 5 °C      (2) 0 °C      (3) -10 °C      (4) -30 °C

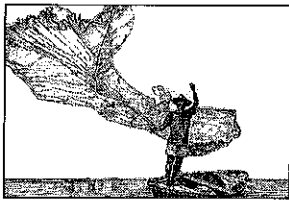
22. Select the combination that indicates the group of aquatic plants according to the place it grow and the correct example for the group.

	Group of aquatic plant	Example
(1)	Floating plants	Ludwigia
(2)	Submerged plants	Cabomba
(3)	Partially submerged plants	Lasia
(4)	Amphibious plants	Lotus

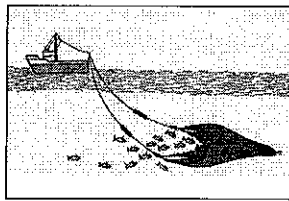
[see page three]

23. Select the correct statement regarding a shrimp pond.
- (1) Breadth of the bunds of the pond should be less than one metre.
  - (2) Bottom of the pond should be inclined towards the discharge gate.
  - (3) Should be built in a land with sandy soil.
  - (4) Water intake gate and the water supply line should be kept in the same direction.
24. Three statements about Artemia are given below.
- A - It is a Crustacean.
  - B - It is abundant in freshwater sources.
  - C - It bears brown colour shells and fish can easily digest.
- Of the above, the correct statement/s is/are
- (1) A only.
  - (2) B only.
  - (3) A and B only.
  - (4) A and C only.
25. Select the answer which indicates the correct sequence of the persons engaged in the activities from unloading fish from a multi-day boat until they reach the consumer.
- (1) Auctioneer → retailer → wholesaler → consumer
  - (2) Wholesaler → auctioneer → retailer → consumer
  - (3) Retailer → wholesaler → auctioneer → consumer
  - (4) Auctioneer → wholesaler → retailer → consumer
26. During the enzymatic spoilage, fish glycogen converts into,
- (1) acetic acid.
  - (2) palmitic acid.
  - (3) lactic acid.
  - (4) linoleic acid.
27. The highest risk of containing Aflatoxin may be in,
- (1) frozen fish.
  - (2) smoked fish.
  - (3) freezed-dried fish.
  - (4) canned fish.
28. The appliances shown in the picture are used to
- (1) catch fish in a river.
  - (2) anchor a boat in deep sea.
  - (3) find the fish abundant areas.
  - (4) tow a boat in distress to the shore.
- 
29. The licenses for fish trap operations are issued by,
- (1) fisheries co-operative societies.
  - (2) the Aquaculture Development Authority.
  - (3) Sri Lanka Fisheries Corporation.
  - (4) the Department of Fisheries and Aquatic Resources.
30. NARA is an institute that
- (1) conducts researches related to aquatic bioresources.
  - (2) conducts degree courses related to aquatic bioresources.
  - (3) constructs gears and crafts related to aquatic bioresources.
  - (4) introduces regulations to conserve ecosystems related to aquatic bioresources.
31. It was observed that all fish in a pond died at once and were floating. The following reasons for this incident have been given by a student.
- A - Fish in the pond are infected with a disease.
  - B - Adding a toxic chemical into the pond.
  - C - Declination of dissolved oxygen in water due to dying of aquatic plants.
- Which of the above statements is/are true?
- (1) A only.
  - (2) B only.
  - (3) A and B only.
  - (4) All A, B and C.
32. Pipe water is stored for some days before releasing to the fish ponds. The main reason for this is to remove
- (1) chlorine in pipe water.
  - (2) sediments in pipe water.
  - (3) microorganisms in pipe water.
  - (4) dyes in pipe water.

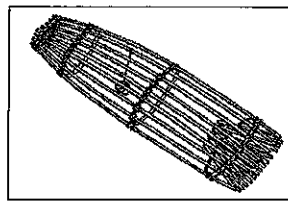
33. Several fishing methods used in catching fish resources are shown in the following pictures.



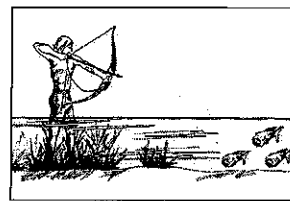
A



B



C



D

Which of the above methods have the highest negative impact on the sustainability of aquatic bioresources?

- (1) A (2) B (3) C (4) D

34. Three statements regarding fish spoilage are given below.

A - Spoilage expedites at high temperature.

B - Spoilage expedites when relative humidity of the environment increases.

C - Small fish spoils earlier than large fish.

Of the above, the true statements are

- (1) A and B only. (2) A and C only. (3) B and C only. (4) All A, B and C.

35. A factor which limits penetration of sunlight to the lower strata of a fish pond is the

- (1) dissolved mineral salts in the water of the pond.  
 (2) suspended sediments in the water of the pond.  
 (3) small plants on the bank of the pond.  
 (4) fish population of the pond.

36. To maintain the water content of the body, higher volume of diluted urine is produced by fish in the

- (1) sea. (2) lagoons. (3) rivers. (4) salt marshes.

37. Consider the following statements regarding the fishing industry in Sri Lanka.

A - Any Sri Lankan fisherman has a right to harvest fish in international seas.

B - Fishing can be carried out up to 300 nautical miles from the North-west coast of Sri Lanka without violating maritime boundaries.

C - Since the Palk Strait area is quite narrow, Sri Lankan fishermen sometimes may violate maritime boundaries while fishing.

Which of the above statements is/are correct?

- (1) A only. (2) C only. (3) A and B only. (4) A and C only.

- Four substances that are added to a fish pond and their quantities are given in the following table. Based on it, answer the questions number 38 and 39.

Substance added to the pond	Quantity added
● Lime	200 g/m <sup>2</sup>
● Bleaching powder	40 g/m <sup>2</sup>
● Urea	3 g/m <sup>2</sup>
● Triple Super Phosphate	2 g/m <sup>2</sup>

38. What is the substance used to destroy pathogens in the pond?

- (1) Lime (2) Bleaching powder  
 (3) Urea (4) Triple Super Phosphate

39. How much lime should be added into a pond of one hectare?

- (1) 2 kg (2) 20 kg (3) 200 kg (4) 2000 kg

40. Some characteristics of a certain fishery are given below.

- Fishing rights transfer only from father to son.
- Especially used in catching prawns.
- Allocation of fishing days to each fisherman is determined through lottery.

The sustainable management process depicted by the above characteristics is

- (1) management by law. (2) community based management.  
 (3) environment associated management. (4) special area management.

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ජලජ ජීව සම්පත් තාක්ෂණවේදය I, II  
நீருயிரினவளத் தொழினுட்பவியல் I, II  
Aquatic Bioresources Technology I, II

Aquatic Bioresources Technology II

\* Answer five questions only, selecting the first question and four others.

1. A. Currently, it is important to popularize freshwater fish farming as a food source in Sri Lanka.

(i) State **four** reasons to show the importance of freshwater fish farming as a food source.

(ii) (a) Mention

- (1) indigenous fish species,
- (2) an introduced fish species

that can be used in freshwater fish farming as a food source.

(b) Give **two** reasons why freshwater fish farming is **not** popular locally.

(iii) (a) Name the institute that is responsible in developing freshwater food fish farming.

(b) State **two** tasks of this institute.

(iv) Represent in a graph the growth pattern of freshwater food fish from fingerling stage to adult stage.

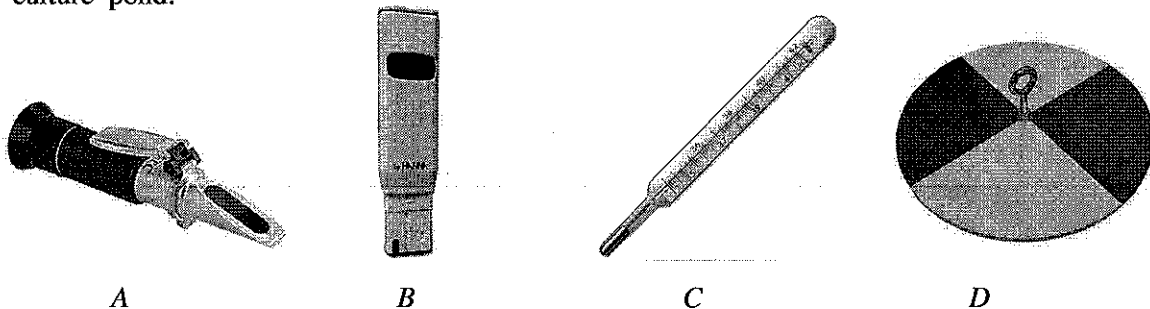
(v) (a) Mention a fishing gear banned in harvesting freshwater food fish.

(b) What is the reason of banning the gear?

(vi) (a) State a traditional method used in preservation of freshwater food fish.

(b) Show in a flow diagram how the fish harvest is preserved using the above method.

B. The picture below depicts the equipment used to determine water quality of freshwater fish culture pond.



(i) Name the parameters measured using the instruments A, B, C and D.

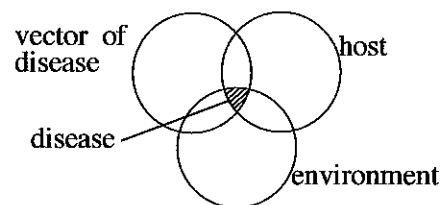
(ii) Describe how the appropriate reading is taken using the instrument D.

(iii) (a) State whether the very low values or very high values of the parameter measured with D adversely affect the fish in the pond?

(b) State a precaution that can be taken to avoid this adverse impact.

(iv) Mention a process that can be followed to normalize the situation, if the value of the parameter measured with B is lower than the optimum level.

2. River based aquatic ecosystems is an example for a freshwater aquatic ecosystems.
- Classify aquatic bio-resources of riverine ecosystems, giving examples.
  - State **four** factors that could destroy aquatic life in riverine aquatic ecosystems.
  - Describe **four** actions that can be taken to make riverine aquatic bio-resources sustainable.
3. The demand for ornamental fish typical on the shapes and colours of the fish fins.
- Draw a diagram of a typical ornamental fish and label the types of fins of it.
    - State the main function of each fin type.
  - State **two** damages that could happen to the fins of ornamental fish.
    - Mention **two** precautions that can be taken to prevent those damages.
  - Describe with examples a process that you can follow to improve the colour of the fins of ornamental fish in the pond.
4. More economic benefits can be earned through ornamental fish culture by managing water, food and health accurately.
- State **four** methods that can be applied to manage water quality in an ornamental fish pond.
  - State **two** types of live feeds that can be used in ornamental fish nutrition.
    - Describe the method of preparing one of the live feed mentioned above.
  - State **four** activities that can be followed to prevent and control fish diseases.
    - The disease triangle that causes a fish disease is shown in the picture.  
Illustrate how the disease triangle changes when the ornamental fish in the pond suffer from the disease severely.



5. Marine and freshwater fish production in past five years is shown in the table below.

Year	2012	2013	2014	2015	2016
Marine (Metric ton)	417 000	446 000	460 000	453 000	457 000
Freshwater (Metric ton)	69 000	67 000	76 000	67 000	74 000

- State **two** reasons that can be presumed for declined fish production in 2015.
  - Describe **two** measures that can be taken to increase each of marine and freshwater fish production in Sri Lanka.
  - Describe **four** reasons why freshwater fish production is relatively lower than the marine fish production.
6. A variety of fishing gears and fishing crafts are used to harvest fish resources and there are classified in different ways.
- State **two** types of fishing nets used in Sri Lanka.
    - Describe how fish is harvested using one of those net types.
    - State **two** fish species that are caught using the mentioned fishing gear.
  - Describe **three** facts that must be considered in selecting appropriate fishing gears for catching target fish.
  - State the classification of modern fishing crafts.
    - Describe **four** relative advantages of traditional fishing crafts compared to modern fishing crafts.
7. The quality of the fish harvest can be maintained by preservation of fish harvest.
- State **two** biological factors which influence fish spoilage.
    - Mention **two** steps that has to be taken at harvesting, in order to maintain the quality of fish harvest.
  - Describe **three** methods to be followed when fish is preserved using ice.
    - State **three** differences between chilling and freezing which are applied in fish preservation.
  - Describe the importance of preservation of fish harvest.