Final Exam
Principles of Aquaculture-Can Tho University
April 29, 2011

NAME: _____

Each question is worth 4 points.

1. Where water quality is <u>not limiting</u> during the culture period, for a pond with a carrying capacity of 10,000 kg/ha, estimate the maximum harvest weight when survival is 80% and stocking density is 10,000 tra/ha.

   a) 1.25 kg b) 1 kg c) 1.5 kg d) 2 kg e) 0.5 kg

2. Which of the following has a higher metabolic rate and lower carrying capacity?

   1. fingerling catfish (45 g each) b) catfish fry (4.5 g each) c) catfish foodfish (450 g each)

3. Which of the following has the higher relative growth?

   a) A fish that is stocked at 10 g and grows to 40 g in 30 days

   b) A fish stocked at 100 g and grown for 30 days to 160 g.

4. Two ponds are equal in every way. Pond A is stocked at a high density and pond B is stocked at a low density with the same fish of the same initial weight. The ponds and fish are managed in the same way and critical standing crop is reached during the culture period. After each question, place A or B to indicate the correct answer (1 point each).
   A = high density B = low density

   a. Density with lowest average final weight? –
   b. Density that takes the longest time to reach carrying capacity? –
   c. Density with lowest standing crop at stocking? –
   d. Density with highest production rate at stocking? –

5. Based upon trophic level, which of the following fishes has the lowest carrying capacity?

   a) tra b) channel catfish c) tilapia d) rainbow trout e) silver carp

6. When doing polyculture of channel catfish and tilapia, which one is the primary species?

   a) channel catfish b) tilapia

7. At what production level does a farmer normally maximize his/her profit?

   a) at critical standing crop b) at carrying capacity c) below critical standing crop
   d) between critical standing crop and carrying capacity e) at stocking

8. If you were managing a farm and had the information listed in the table below, at what density would you stock your fish to produce a fish of at least 350 g and maximize your production rate?

   a) 20,000/ha b) 30,000/ha c) 60,000/ha d) 80,000/ha e) 100,000/ha

Performance Measures[1]	Stocking Density/ha					
	18,000	20,000	30,000	60,000	80,000	100,000
Stocking weight, g	380	279	206	260	150	243
Harvest weight, g	580	399	390	420	354	318
Growth, g/day	2.45	2.60	2.60	2.3	2.0	1.48
Production rate, kg/ha/d	50	46	76	143	163	146
Calculated standing crop at 200 days, kg/ha	10,100	9,200	15,100	28,800	32,600	29,300

9. When culturing a species that will reproduce during grow-out to market size, what are **four** possible ways to limit reproduction or minimize its effects on growth rate?

10. As a farmer trying to maximize growth rate, which of the following water quality parameters is normally **NOT** a concern in freshwater ponds with low alkalinity that are heavily fed?

    a) high pH b) low dissolved oxygen c) high CO_2 d) unionized ammonia e) nitrite

11. In which state did freshwater prawns grow faster and bigger (higher somatic growth-meat production)?

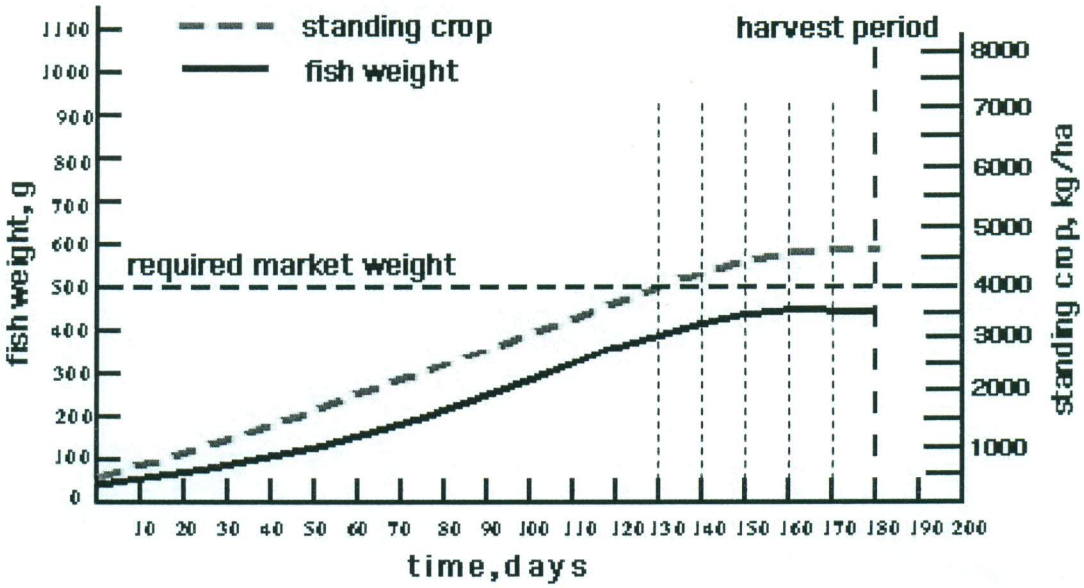
    a) Kentucky (average temperature 25°C)

    b) Mississippi (average temperature 28°C)

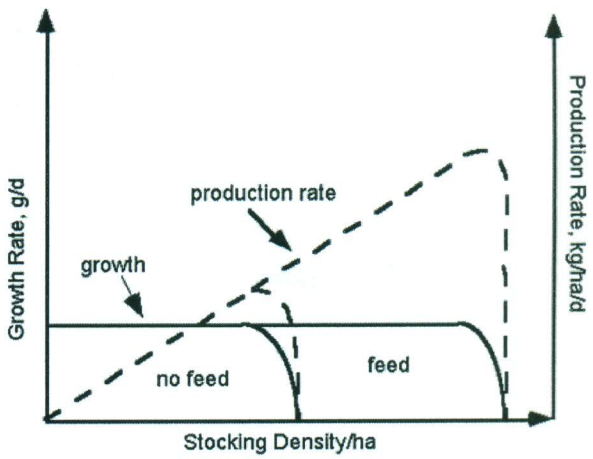
12. 20,000 channel catfish/ha were stocked into a 1 ha pond, a complete feed is fed, pond was aerated, and 460-g fish harvested after 180 days (see graph below). The market size is 500 g. What would you recommend for the following production cycle to allow the fish to reach the required market size based on the graph below?

    a) stock bigger fish b) stock less fish c) stock more fish d) harvest sooner

    e) grow them longer



13. Based on the graph below, why does the production rate continue to increase while the growth rate is constant (not changing).



14. Each year a farmer harvests his pond when the standing crop reaches 6,000 kg/ha. If he wants to reduce the time it takes him to reach his standing crop, what are two options (2 points each) he can use?

15. Which of the following will **NOT** increase yield?

a) higher carrying capacity b) more crops per year c) higher survival

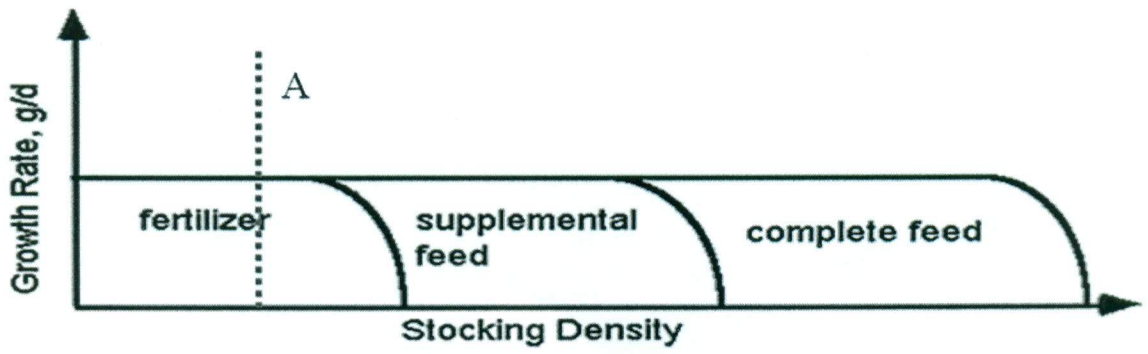
d) partial harvesting e) shorter growing season

16. Your client wants to set up a farm in Ghana and grow tilapia for the food market, which requires a whole fish of 195 g or greater. The growing season there is 150 days. He has the following information. Of the stocking rates listed, which one do you recommend?

Stocking Rate[1] (fish/ha)	Final Weight (g/fish)	Survival (%)	Final Standing Crop (kg/ha)	Food Conversion
10,000	249	97	2,415	2.0
20,000	200	93	3,720	2.7
30,000	166	96	4,781	2.4
[1]Tilapia were stocked at 17 g and fed a 23% protein, pelletized ration for 150 days.				

17. Based upon the graph below, at stocking density A, what is the best way to maximize growth and minimize costs?

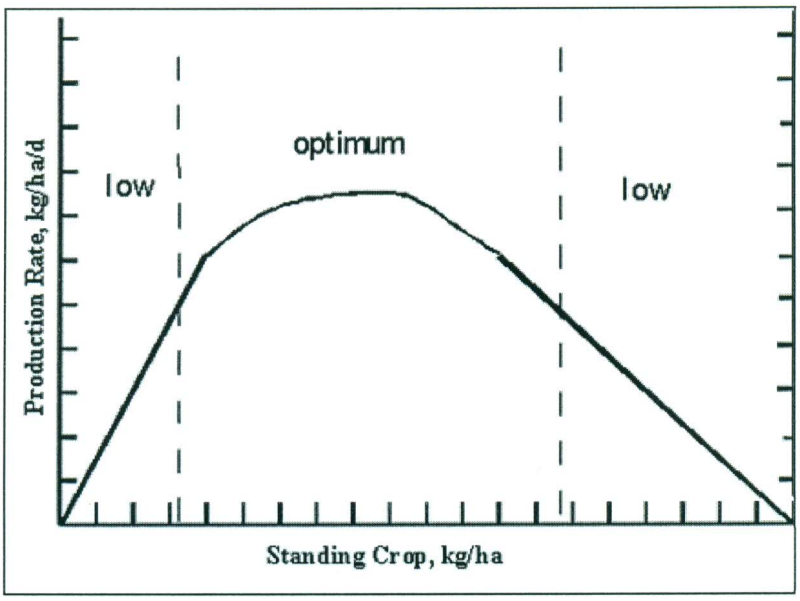
a) fertilize b) feed supplemental feed c) feed complete feed d) aerate e) exchange water



18. Based upon the graph below, how can I increase my production rate from low to optimum at low standing crop levels?

a) stock bigger fish b) stock less fish c) harvest fish d) harvest sooner

e) partial harvest



19. Which of the following is **NOT** related to the partial harvesting with re-stocking system used in growing channel catfish in the US?

a) water conservation b) low effluent discharge c) high fish yields

d) limited disease e) year-round harvesting

20. What is the yield for a tra catfish farm in Vietnam that stocks at 250,000/ha with 90% survival, grows to 1 kg in six months and can grow all year?

a. 450,000 kg/ha b. 500,000 kg/ha/year c. 450,00 kg/ha/year d. 225,000 kg/ha/year

21. What is the main difference between how nitrogen is removed in ponds and an indoor, recirculating systems?

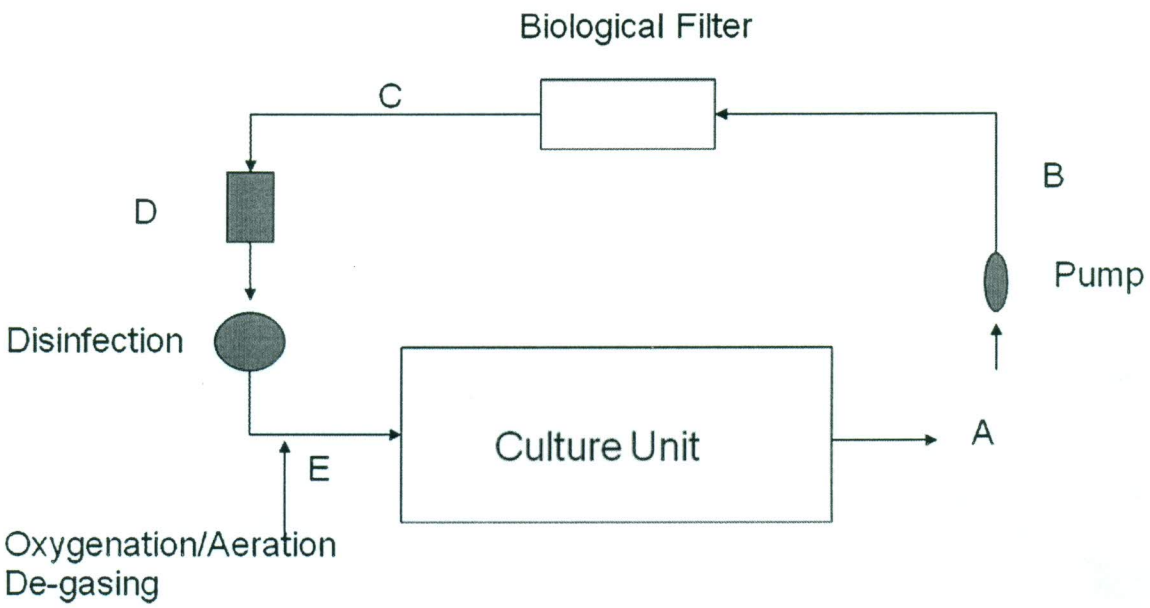
22. The main purpose of a biological filter is to:

a) remove ammonia b) aerate c) remove solids d) remove carbon dioxide

e) kill bacteria

23. Which of these is the best place to remove most of the settleable solids?

A B C D E



24. For the packed column shown below, which is **NOT** something it can do?

a. add oxygen b. remove dissolved solids c. remove carbon dioxide

d. act as a biofilter e) aerate

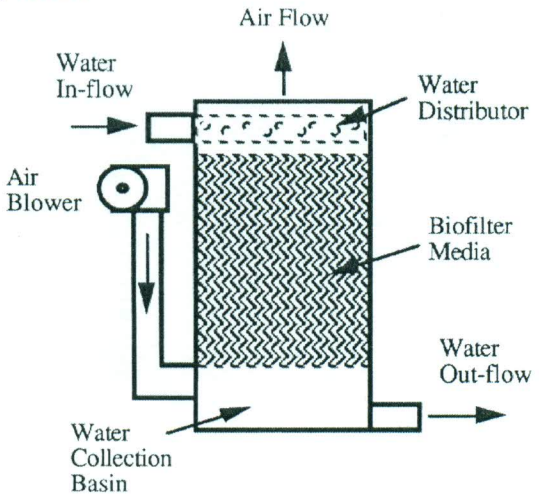


Figure 6. Packed tower nitrifying filter with forced gas exchange

25. Why is it important to remove solids from the recirculating system before you treat with ultraviolet light?

BONUS:

26. (3 pts) What was the best part of this class and why? **Being over doesn't count!!!!!**