The Open University of Sri Lanka
Advanced Certificate in Laboratory Technology
Course Unit: Laboratory Techniques in Biology
Course Code: PSC 2321
Open Book Test – I – 2006/2007
Duration: 01 hour

Registration No: .....

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16.06. 2007 Time: 2.00 pm – 3.00 pm

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ANSWER ALL QUESTIONS IN BOTH PARTS (A) AND PART (B).

PART (A) consists of **twenty (20)** multiple choice questions. Answer all the questions. The answers should be indicated in the annexed sheet by placing a cross (X) in the relevant cage.

PART (B) consists of **two (02)** structured essay type questions for which answers should be written in the space given in the question paper itself.

Please hand over Part A question paper along with Part B.

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Answer sheet for Part. A

Q. Nos	a	b	c	d
1				
2				
3				
4				
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19				
20				

PART A

1) Which of the following is incorrect about culture media for microbes?

   a) Enriched medium can be produced by adding blood serum or eggs to the basal medium
   b) Nutrient Agar is commonly used for the cultivation of heterotrophic bacteria
   c) MacConkey Agar prevents the growth of *Escherichia coli*
   d) Sabouraud's Agar medium is useful for detection of fungi

2) Heating of a plant material with Acetocarmine solution,

   a) tends to prevent the formation of nuclear membrane
   b) tends to prevent spindle formation
   c) tends to denature plant cells
   d) tend to soften the plant tissue

3) Which of the following statements concerning "bacterial endospore staining" is TRUE?

   a) Spores are readily stained by simple staining with Malachite green
   b) Once stained, spores are easily decolorized with distilled water
   c) A spore staining is useful to study the size, position and shape of the spore
   d) In the prepared specimen, vegetative cells will appear in green colour

4) The purpose of using vasculum in the collection of plant specimen is

   a) to obtain twigs from trees
   b) to store the plant specimens temporarily and to maintain their freshness
   c) to collect underground plant parts
   d) to collect flowers and fruits.

5) Which is the general fixative for stems, roots, leaves and all soft plant parts?

   a) Formol Alcohol
   b) Formol Acetic Alcohol
   c) King's Formula
   d) Farmer's Fluid.

6) Which of the following ingredient is not a constituent of Nutrient Agar?

a) Peptone
b) Agar
c) Glucose
d) Beef extract

7) Which of the following does not kill endospores of bacteria?

a) autoclaving
b) incineration
c) hot air oven sterilization
d) pasteurization

8) Assume that you are viewing a Gram Stained field of red cocci and purple bacilli through the microscope. You can safely conclude that you have,

a) made a mistake in staining
b) two different species
c) old bacterial cells
d) a young bacterial culture

9) Which statement is incorrect regarding inoculation of bacteria onto an agar plate?

a) Streaking is a method of inoculation
b) Inoculation needle should sterilized before streaking
c) Pure cultures cannot be obtained by streaking
d) Streaking effectively dilutes the concentration of bacteria in a stepwise pattern

10) One nanometer (nm) is equal to

a) 10^{-3} meter
b) 10^{-6} millimeter
c) 10^{-4} meter
d) 10^{-5} millimeter

11) The main advantage of using the Rotary microtome in section cutting because it is

a) less expensive
b) fast
c) easy to handle
d) capable of making thinner sections.

12) What is the general electrostatic term of an acid dye?

a) Anionic
b) Cationic
c) Amphoteric
d) Alkaline

13) During microtome section cutting to which part of a microtome is the wax block attached for sectioning?

a) to the chuck
b) to the edge of the knife
c) to chuck holder
d) to the base of the knife

14) Identify the correct sequence of the various stages of preparing a wax block for sectioning.

a) dehydration, fixation, clearing, wax infiltration
b) fixation, dehydration, clearing, wax infiltration
c) clearing dehydration, fixation, wax infiltration
d) wax infiltration, dehydration, clearing, fixation

15) Which substance is used to fix the sections to the glass slides during histological slide preparation?

a) xylene
b) wax
c) egg albumen
d) supper glue

16) A solution of 5 – 10 % formalin is commonly used in the laboratory and zoological museum to

a) to kill the animals
b) to preserve the animals for longer period
c) to remove the fat from the animals
d) to keep the natural color of the animals

17) What is the ideal congealing (solidifying) point of the wax that is used for infiltration of animal tissues?

a) 30°C – 35°C
b) 40°C – 45°C
c) 55°C – 60°C
d) 60°C – 65°C

18) Polarized light

a) consists of waves which are oriented in one plane only.
b) consists of short waves, high energy electromagnetic waves.
c) consists of waves which are oriented in two plane only.
d) consists of waves which are oriented in multiple planes.

19) Under what lighting condition that fluorescent image generally observed?

a) UV light
b) Nearly UV light
c) Infra red light
d) Dark ground illumination

20) The sub-stage disc diaphragm of simple microscope is mainly used to control

a) light intensity
b) glare
c) the size of the numerical aperture
d) all of the above

PART B

1) When studying microbiology, it is essential to grow microorganisms under laboratory conditions.

a. i. List five (5) basic instruments/equipment that should be present in a basic microbiological laboratory. Indicate the purpose/objective of having each instrument/equipment listed above.

	Instruments/equipments	Purpose/objective
1.		
2.		
3.		
4.		
5.		

ii. How do you sterilize a glass spreader for the microbiological work in the laboratory?

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iii. Why it is important to wrap glassware with aluminum foil papers when sterilizing under moist heat?

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b. Bacterial Identification is an essential step in microbiology, especially for the optimization of microbially mediated processes used by the man for his needs.

i. What is the vital prerequisite of the bacterial/fungal identification procedure?

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ii. What are the four major characteristics used in bacterial identification?

1. .....
2. .....
3. .....
4. .....

iii. Name two (2) commonly applied biochemical tests used in bacterial identification.

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c. Contamination is a serious problem in accurate diagnosis of microbial specimen.

i. What do you mean by aseptic techniques?

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ii. Give five (5) precautions that you would take in a microbiological laboratory to avoid contamination.

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d. Draw a petri dish showing the inoculation pattern to obtain a pure culture by the streak plate technique.

Label the diagram to indicate the point of inoculum, order of streaking lines and well isolated colonies.

e. Preserving of microorganisms is carried out by microbiologists for variety of reasons. Preservation is done in either moist state or dried state.

i. What do you mean by preservation?

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i. Give two (2) commonly used method of preservation.

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iii. Using a flow diagram, briefly state the procedure to be followed when a stock culture is used for a laboratory testing.

02.

a). What are the three basic microtome knife shapes?

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b). If you want to check whether the microtome knife blade edge is in perfect condition prior to section cutting, how would you do it?

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c). What is an animal tissue fixative?

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d). If you have been asked to prepare a stained permanent slide of a bunch of salivary gland of cockroach, what is the stain that you would use to stain the specimen?

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e). What is meant by tissue mordant?

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f). Name two (2) commonly used mordant in histological techniques.

1. .....

2.....

g). Generally in the laboratory, haematoxylin is used to stain the nucleus of cell. What is the main reason for using this chemical?

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h). What is the chemical composition of absolute alcohol? What is the purpose of using it in tissue preparation?

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i). Name the standard stain that is used to stain the human blood smear.

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j).

(i) Define the following.

i(a). Numerical Aperture of a microscope (NA):

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i(b). Resolution power:

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(ii) Explain the following.

ii(a).Coagulating fixative:

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ii(b).Progressive staining:

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ii(c). Achromatic objective:

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ii(d). Phase contrast effect:

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