



Department of Pathology  
Azra Naheed Medical College  
Grand Test-1, 04 December 2018  
MBBS 3<sup>rd</sup> Year (SEQ)  
(General Microbiology)

Bacteria

2018-2019

Total Marks: 25

Time Allowed: <sup>60</sup> min

Hafiz Muhammad Farhan

Name: \_\_\_\_\_

Roll No: 63

Date: \_\_\_\_\_

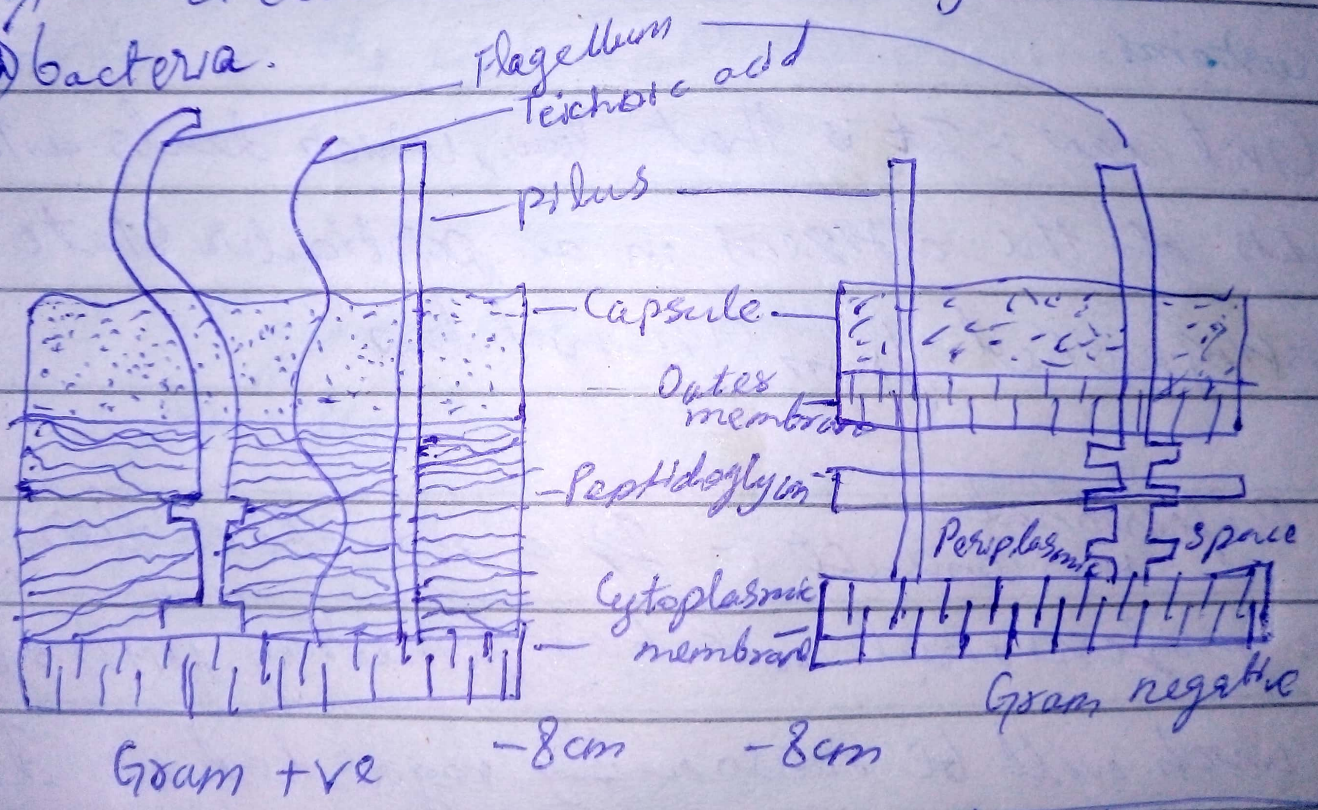
**Instructions:**

1. All subjective questions are to be attempted on the paper and returned to the invigilator within specified time after you have received the question paper.
2. Neat hand writing and use of margins will increase the outlook and presentation of your paper.

Attempt all Questions. Each Question carries 5 marks

1. a. Draw and label the cell wall of Gram positive and Gram negative bacteria? (2)  
b. What is the role of fermentation in the respiration of facultative bacteria? (1.5)  
c. Classify bacteria on the basis of their temperature requirements. (1.5)
2. (a) Define normal flora. Discuss the vaginal flora before puberty and after puberty. (3)  
(b) Define nosocomial infection. (1)  
(c) Name one of the most important measures to stop nosocomial infection (1)
3. a. Draw and label the bacterial growth curve. During which phase of growth curve is the affect of antibiotics maximum? (2+0.5)  
b. What are plasmids and their roles? (1.5)  
c. What is the difference between conjugation and transduction? (1)
4. By which method of sterilization we can sterilize the instruments and bed linen in the hospitals and operation theaters? What is its principle and procedure? (0.5+1.5)  
b. Define the following: (1.5)  
i. Sterilization & Disinfection (1.5)  
ii. Spore and its medical implication (2)
5. (a) Name four mechanisms of action of antimicrobial drugs. (2)  
(b) Briefly discuss the mechanism acting on the bacterial cell wall. (3)

2) Draw & label cell wall of gram +ve & -ve bacteria.





b) Role of process of fermentation in the respiration of facultative bacteria?

If  $O_2$  is present, the pyruvate produced by fermentation enters the Krebs's cycle & metabolize into two final products  $CO_2$  &  $H_2O$ . The Krebs's cycle generates much more ATP than

Glycolytic cycle therefore facultative bacteria grow faster in the presence of  $O_2$ .  
Facultative & anaerobic bacteria ferment but aerobes which can grow only in presence of  $O_2$  do not.

c) Classify bacteria on the basis of their temp. requirements with examples.

mesophilic      Psychrophilic      Pseudomonas Thermophilic  
20 - 45 °C      -15 - 10 °C      45 - 122 °C

High temp :- Campylobacter jejuni

Low temp :- Listeria monocytogenes



a) Normal flora are those micro-organisms that are permanent residents of the body.

Vaginal flora of adult women is

→ Lactobacillus species, ~~before puberty & after~~

→ Group B streptococci

→ 5% Staph aureus.

Other in genital vicinity,

Strep. Staph epidermidis → pre puberty

Staph aureus

↳ saprophyticus

Mycobacterium smegmatis.

## b) Nosocomial Infection :-

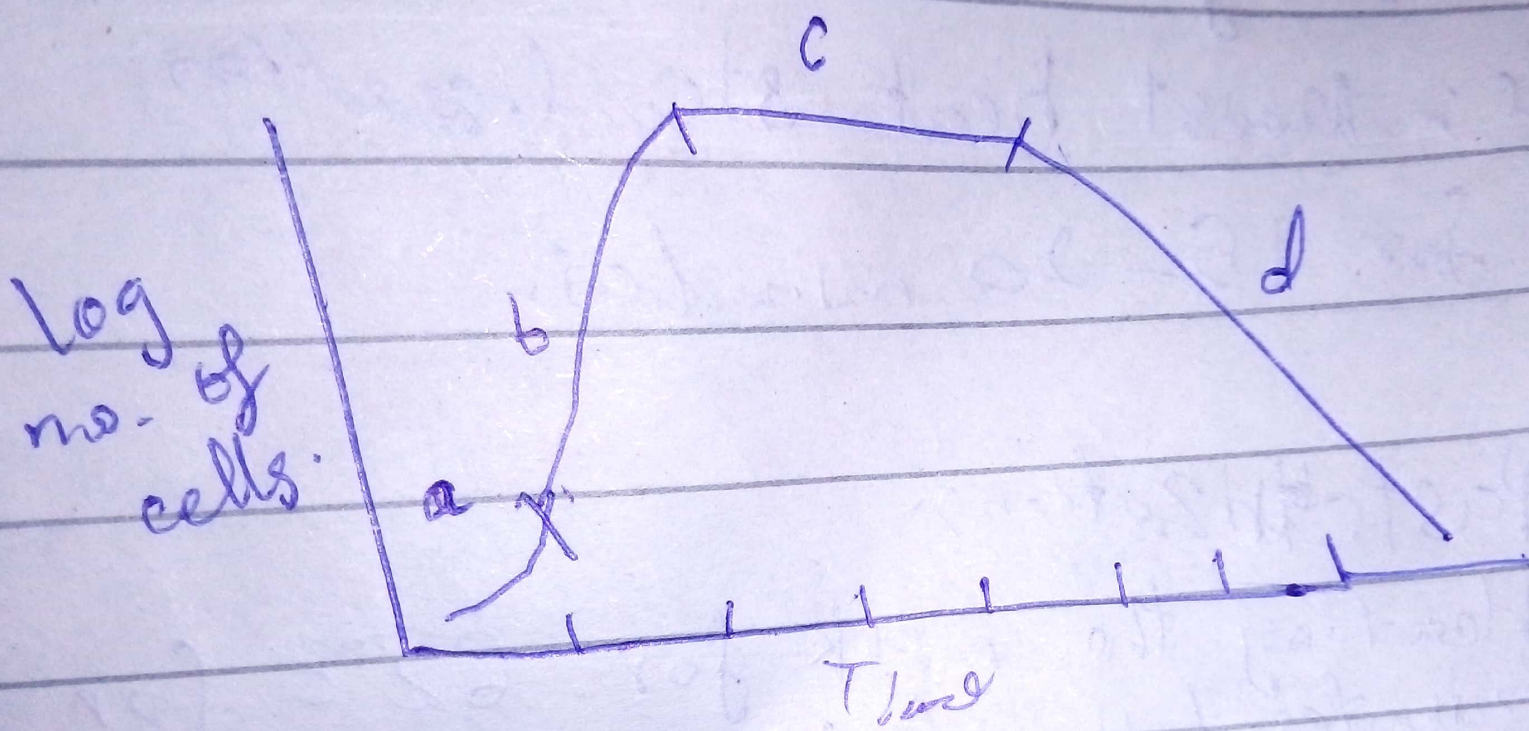
A hospital acquired infection (HAI) also known as nosocomial infection that is acquired in a hospital or other health care facility.

(c) most important step to prevent nosocomial infection

1) Handwashing

2) Gloves

3) Stethoscope: Cleaning with an alcohol swab at least daily





Max. in phase B because the cells are rapidly dividing in this phase & antibiotics act when the cell is dividing.

2:- Define plasmids. Functions ?

Plasmids are <sup>DNA</sup> extrachromosomal, double stranded cellular molecules that are capable of replicating independently of the bacterial chromosome.

Functions :- Antibiotic resistance,  
resistance to heavy metals,  
pili                      UV light, exotoxins,



## Conjugation

- DNA transfer from one bacterial cell to another.
- Prokaryotic
- DNA transferred: Chromosomal or plasmid

## Transduction

- DNA transfer to bacteria from virus.
- Prokaryotic
- DNA transferred: Any gene in generalized transduction, Only certain genes in specialized transduction.

2) By which method we can sterilize the instruments & bed linen?

Autoclaving

Principle - Moist heat sterilization

Procedure -  $121^{\circ}\text{C}$  for 15-20 minutes.



## (ii) Sterilization :-

Killing or removal of all micro-organisms including bacterial spores.

Disinfection :- It is the killing of many but not all micro-organisms.

## (iii) Spore & its medical implications.

Spores: Highly resistant structures formed in response to adverse conditions.

Medical importance of spores lies in extraordinary resistance to heat & chemicals.

5) a) Name 4 ~~MMA~~ MDA of antimicrobial drugs.

1) Cell wall synthesis inhibitors: - Penicillin, Cephalosporins

2) Protein synthesis: - Aminoglycosides

3) DNA gyrase inhibitors: - Quinolones

4) RNA polymerase inhibitors: - Vancomycin



b) Briefly discuss the mechanisms acting on bacterial cell wall.

(1) Binding of the antimicrobials to the enzymes <sup>that are</sup> receptors on bacterial cell membrane ~~to~~ PBP<sub>s</sub> (Penicillin binding proteins).

(2) Inhibition of Transpeptidation <sup>chain</sup> reaction that links the linear peptidoglycan ~~layer~~ of constituents of cell wall.

(3) Activation of autolytic enzymes that cause lesion in the bacterial cell wall.