

The West Bengal University of Health Sciences
B.Sc. in Medical Microbiology 4th Semester November, 2023
Examination

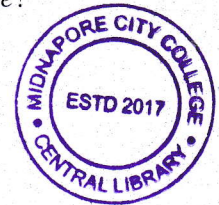
Subject : Systematic Bacteriology

Time : 2 hrs.

Full Marks : 50

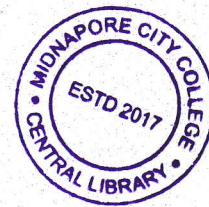
Attempt all questions

1. Tick the correct answer : 10 x 1
- a) Which of the following Staphylococcal haemolysins does not possess leucocidal activity?
 i) α haemolysin. ii) β haemolysin. iii) γ haemolysin. iv) δ haemolysin.
 - b) Which of the following is a major virulence factor of *Streptococcus pneumoniae*?
 i) Polysaccharide capsule. ii) M protein.
 iii) Streptolysin O. iv) Streptolysin S.
 - c) Which of the following organisms produces neurotoxin as a virulence factor?
 i) *Bacillus anthracis*. ii) *Clostridium tetani*.
 iii) *Streptococcus pneumoniae*. iv) *Staphylococcus aureus*.
 - d) Erythrasma is caused by which of the following microorganism?
 i) *Corynebacterium diphtheria*. ii) *Corynebacterium ulcerans*.
 iii) *Corynebacterium minutissimum*. iv) *Listeria monocytogenes*.
 - e) Which among the following species causes tuberculosis in humans?
 i) *Mycobacterium leprae*. ii) *Mycobacterium kansasii*.
 iii) *Mycobacterium bovis*. iv) *Mycobacterium ulcerans*.
 - f) Which of the following is true of *Haemophilus influenzae*?
 i) Invasive infections are most commonly associated with encapsulated strains.
 ii) Most invasive infections occur in infants during the neonatal period.
 iii) Most human infections are acquired from domestic pets.
 iv) Older adults are rarely at risk for infection with this organism because they typically have a high level of immunity.
 - g) Which one of the following is characteristic of *N. meningitidis* but not *N. gonorrhoeae*?
 i) Ferments glucose. ii) Contains a polysaccharide capsule.
 iii) Oxidase-positive. iv) Most isolates show resistance to penicillin.
 - h) Mycoplasmas can be cultivated in vitro on nonliving media as _____ :
 i) Facultative aerobes. ii) Obligate aerobes.
 iii) Facultative anaerobes. iv) Microaerophiles.
 - i) Enterobacteriaceae expresses a variety of virulent antigens, all of the following are the antigens of enteric bacteria, except?
 i) O antigens (in lipopolysaccharide). ii) K antigens (capsular antigens).
 iii) H antigens (flagellar proteins). iv) D antigens.
 - j) Enteric bacteria are mainly classified based on their ability to ferment various sugars including lactose. Which of the following bacteria is a non-lactose fermenter?
 i) *Klebsiella* spp. ii) *Salmonella* spp. iii) *Enterobacter* spp. iv) *Citrobacter* spp.



2. Answer **any four** of the following questions : 4 x 2
- a) What is the function of hyaluronidase?
 - b) What is the shape of *Clostridium tetani*?
 - c) Name the toxin produced by *Bacillus cereus*.
 - d) State the specific characteristics of acid fast bacterial cell wall.
 - e) Name all of the bacteria responsible for enteric fever.
 - f) Write down the growth condition of *Neisseria* sp.
3. Answer **any four** of the following questions : 4 x 4
- a) Briefly describe the toxin produced by *Clostridium tetani*.
 - b) Discuss the pathophysiology of *Neisseria gonorrhoeae*.
 - c) Discuss the mechanism of LT toxin produced by *Escherichia coli*.

P. T. O.



- d) Write the laboratory diagnosis of *Klebsiella* sp.
e) Discuss on Widal test.
f) Write different antigens produced by *Clostridium perfringens*.
4. Answer **any two** of the following questions :
- a) Over the course of 1 week, a 6-year-old boy develops 0.5- to 1.0-cm pustules on his face. During the next 2 days, some of the pustules break, forming shallow erosions covered by a honey-colored crust. New lesions then form around the crust. The boy's 40-year old uncle develops similar lesions after visiting for 1 week during the child's illness. The Gram stain from a skin pustule showed gram positive cocci in clusters. The organism grew on sheep blood agar (SBA) and was catalase positive. What is the most likely microorganism? Write the different antigens produced by that microorganism. How do you diagnose the microorganism in laboratory? 1+3+4
- b) A 2-year-old male with no past medical history presented to the emergency department with fever and 2 days of bloody diarrhea. Stool cultures were sent to the laboratory. A Gram stain of the specimen gram negative in nature. On the 5% sheep blood agar plate, the predominant organism had colonies that appeared flattened and spreading. On MacConkey agar the colonies were noted to be non-lactose fermenting. What is the causative bacterium? Write the pathophysiology of that infection? How do you diagnose the microorganism in laboratory? 1+4+3
- c) A 67-year-old Hispanic male presented to a hospital emergency department with a three week history of night sweats, weight loss, nausea, shortness of breath, and a productive cough. A chest x-ray (CXR) was done and revealed extensive bilateral cavitory disease. What is your diagnosis? What is the causative microorganism? Write the pathophysiology of that infection. 1+1+6