

The West Bengal University of Health Sciences
B.Sc. in Medical Microbiology 4th Semester September - October, 2026
Examination

Subject : Systematic Bacteriology

Time : 2 hrs.

Full Marks : 50

Attempt all questions

1. Tick the correct answer :

10 x 1

- a) Which test differentiates *Staphylococcus aureus* from other Staphylococci?
 - i) Catalase test. ii) Oxidase test. iii) Coagulase test. iv) Indole test.
- b) The causative agent of diphtheria produces its toxin through :
 - i) Endotoxin. ii) Exotoxin (phage mediated). iii) Lipid A. iv) Enterotoxin.
- c) Satellite phenomenon with *Staphylococcus aureus* is used to identify :
 - i) *Pseudomonas*. ii) *Haemophilus influenzae*. iii) *Brucella*. iv) *Klebsiella*.
- d) Which bacterium produces double zone of hemolysis on blood agar?
 - i) *Clostridium perfringens*. ii) *Streptococcus pyogenes*.
 - iii) *Bacillus anthracis*. iv) *Vibrio cholerae*.
- e) Which species of *Mycobacterium* is photochromogenic?
 - i) *M. tuberculosis*. ii) *M. kansasii*. iii) *M. leprae*. iv) *M. avium-intracellulare*.
- f) Which Gram-negative bacillus is non-fermenter and produces green pigment in culture?
 - i) *Vibrio parahaemolyticus*. ii) *Klebsiella pneumoniae*.
 - iii) *Pseudomonas aeruginosa*. iv) *Shigella dysenteriae*.
- g) Weil-Felix reaction is useful in the diagnosis of :
 - i) *Mycoplasma pneumoniae*. ii) Rickettsial infections.
 - iii) Chlamydial infections. iv) Spirochaetal infections.
- h) Which bacteria is pleomorphic and lacks a cell wall?
 - i) *Treponema pallidum*. ii) *Mycoplasma pneumoniae*.
 - iii) *Rickettsia prowazekii*. iv) *Bacillus subtilis*.
- i) String test (viscous thread formation) is used for :
 - i) *Vibrio cholerae*. ii) *Salmonella typhi*.
 - iii) *Escherichia coli*. iv) *Brucella abortus*.
- j) Which bacteria shows bipolar "safety pin" appearance on staining?
 - i) *Yersinia pestis*. ii) *Bacillus anthracis*.
 - iii) *Clostridium tetani*. iv) *Neisseria gonorrhoeae*.



2. Answer **any four** of the following questions :

4 x 2

- a) What stand for IMViC?
- b) What is nosocomial infection?
- c) Name two zoonotic bacterial infections.
- d) What is the significance of the Elek's test?
- e) Name two culture media used for *Vibrio cholerae*.
- f) Why does *Streptococcus pneumoniae* cause rust-colored sputum in pneumonia?

3. Answer **any four** of the following questions :

4 x 4

- a) Why does *Neisseria gonorrhoeae* cause repeated infections in the same person?

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- b) *Mycobacterium leprae* is the causative agent of leprosy. 2
 i) Why is *M. leprae* unculturable in artificial media? 2
 ii) Name two alternative methods used for its growth or detection.
 c) Write the pathogenesis of *Klebsiella* sp.
 d) Discuss on Widal test.
 e) Write different antigens produced by *Clostridium perfringens*.
 f) State the specific characteristics of acid-fast bacterial cell wall.

4. Answer **any two** of the following questions : 2 x 8
- a) Over the course of 1 week, a 6-year-old boy develops 0.5–1.0 cm pustules on his face. During the next 2 days, some of the pustules rupture, 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. A Gram stain from a skin pustule shows Gram-positive cocci in clusters. The organism grows on sheep blood agar and is catalase positive. What is the most likely microorganism? Write the different antigens produced by that microorganism. How do you diagnose the microorganism in the laboratory? 1+3+4
- b) A 25-year-old female presented with frequent urination, burning sensation while urinating, and lower abdominal pain. Urine appears cloudy.
 i) What is your probable diagnosis?
 ii) Name the causative agent.
 iii) Describe the pathogenesis and virulence factors.
 iv) How will you confirm the diagnosis in the laboratory? 1+1+4+2
- c) Write down the mode of pathogenesis of *Vibrio cholerae*. What is the common laboratory diagnosing approaches practiced to identify this pathogen? 4+4

