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## PRACTICE QUESTIONS

Canadian Alliance of Medical Laboratory Professionals Regulators (CAMLPR)

# MIC

Clinical Microbiology

EDITION

Demo

QUESTIONS

9

FORMAT

Limited Edition PDF

# Before you begin

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## What this is

9 practice questions for Canadian Alliance of Medical Laboratory Professionals Regulators (CAMLPR) MIC, each with its answer key and an explanation. Answer a question before you read its key — the explanation is worth more once you have committed.

## If something looks wrong

Send us three things and we will check it:

- the exam code, MIC
- the question number
- the email address on your order

Write to **support@mometrix.net**. We reply within one business day.

**QUESTION 1**

SINGLE CHOICE

A 24-hour blood culture from a febrile neonate shows a gram-positive coccus that grows in chains, is catalase-negative, and is CAMP test positive. Which organism is the most likely identification?

- ☐ A Streptococcus pyogenes
- ☒ B Streptococcus agalactiae (Group B Streptococcus)
- ☐ C Enterococcus faecalis
- ☐ D Streptococcus pneumoniae

**ANSWER B**

**WHY** Streptococcus agalactiae (Group B Streptococcus) is gram-positive, catalase-negative, arranged in chains, and characteristically CAMP test positive. Streptococcus pyogenes is CAMP negative and bacitracin sensitive; Enterococcus faecalis grows in 6.5% NaCl and is PYR positive; S. pneumoniae is bile soluble and optochin sensitive.

**QUESTION 2**

SINGLE CHOICE

A stool specimen from a patient with persistent watery diarrhea is prepared with a modified Kinyoun acid-fast stain. Pink-red, slightly curved bacilli measuring 2–5  $\mu\text{m}$  are seen. The most likely organism is:

- ☐ A Escherichia coli
- ☐ B Campylobacter jejuni
- ☒ C Cryptosporidium parvum oocysts
- ☐ D Shigella sonnei

**ANSWER C**

**WHY** Modified acid-fast staining of stool is used to detect Cryptosporidium, Cyclospora, and Isospora (Cystoisospora) oocysts, which appear pink-red against a blue-green background. E. coli, Campylobacter, and Shigella do not stain with modified acid-fast techniques.

**QUESTION 3**

SINGLE CHOICE

Which culture and incubation conditions are most appropriate for the primary isolation of *Mycobacterium tuberculosis* from a clinical specimen?

- ☐ A Blood agar incubated at 35 °C in 5% CO<sub>2</sub> for 24–48 hours
- ☐ B Chocolate agar incubated at 35 °C in ambient air for 24–48 hours
- ☒ C Löwenstein-Jensen medium incubated at 35 °C in 5–10% CO<sub>2</sub> for up to 8 weeks
- ☐ D Thiosulfate-citrate-bile salts-sucrose (TCBS) agar incubated at 35 °C for 18–24 hours

**ANSWER C**

**WHY** *Mycobacterium tuberculosis* is a slow-growing mycobacterium that requires specialized mycobacterial media such as Löwenstein-Jensen, Middlebrook 7H10, or 7H11, with incubation at 35 °C in 5–10% CO<sub>2</sub> for up to 8 weeks. Blood and chocolate agars are used for routine bacteria, and TCBS is selective for *Vibrio* species.

**QUESTION 4**

SINGLE CHOICE

A cerebrospinal fluid (CSF) specimen is received in the laboratory for bacterial culture. Which statement best describes the correct handling of this specimen?

- ☐ A CSF should be refrigerated at 4 °C if culture will be delayed beyond 2 hours
- ☒ B CSF should be plated directly to media immediately upon receipt and incubated without delay
- ☐ C CSF is an unacceptable specimen for anaerobic culture and should only be inoculated to aerobic media
- ☐ D CSF should be centrifuged and only the supernatant used for culture to avoid host cell interference

**ANSWER B**

**WHY** CSF is a critical specimen that must be processed urgently. It should never be refrigerated (cold damages fragile organisms such as *Neisseria meningitidis* and *Haemophilus influenzae*) and should be inoculated directly to appropriate media (blood, chocolate, and an anaerobic medium for shunt/needle aspirates) without delay. Anaerobic culture of CSF from a lumbar puncture is not routinely productive, but the specimen should still be plated promptly.

**QUESTION 5** SINGLE CHOICE

An isolate of *Staphylococcus aureus* is tested by broth microdilution for vancomycin. The MIC reported is 2 µg/mL. Using CLSI breakpoints for *S. aureus*, this result is interpreted as:

- ☒ **A** Susceptible
- ☐ **B** Intermediate
- ☐ **C** Resistant
- ☐ **D** Non-determinant, requires repeat testing

**ANSWER A**

**WHY** According to CLSI, the vancomycin susceptibility breakpoint for *Staphylococcus aureus* is ≤2 µg/mL (Susceptible), 4–8 µg/mL (Intermediate), and ≥16 µg/mL (Resistant). An MIC of 2 µg/mL is therefore reported as Susceptible.

**QUESTION 6** SINGLE CHOICE

A hair and scalp scraping from a child with patchy alopecia is inoculated onto Sabouraud dextrose agar. After 2 weeks of incubation at 25 °C, a flat, downy, gray-white colony with no diffusible pigment is observed. Microscopic examination shows septate hyphae with smooth-walled, club-shaped macroconidia. The most likely identification is:

- ☐ **A** *Microsporum canis*
- ☐ **B** *Trichophyton tonsurans*
- ☒ **C** *Trichophyton rubrum*
- ☐ **D** *Epidermophyton floccosum*

**ANSWER C**

**WHY** *Trichophyton rubrum* typically produces a flat, white-to-cream or reddish, cottony-to-downy colony on Sabouraud dextrose agar, with reddish-brown diffusible pigment on the reverse being variable. Microscopically, it shows slender, septate hyphae with numerous tear-shaped (piriform) microconidia and rare, smooth-walled, pencil-shaped macroconidia. *Epidermophyton floccosum* does not produce microconidia; *Microsporum canis* typically has a yellow pigment and rough-walled macroconidia; *T. tonsurans* produces variable colony morphology with microconidia of varying size.

**QUESTION 7**

SINGLE CHOICE

A peripheral blood film from a febrile patient who recently returned from sub-Saharan Africa shows ring forms, trophozoites, and crescent-shaped gametocytes within red blood cells. The most likely organism is:

- ☐ A *Plasmodium vivax*
- ☒ B *Plasmodium falciparum*
- ☐ C *Babesia microti*
- ☐ D *Trypanosoma brucei*

**ANSWER B**

**WHY** *Plasmodium falciparum* is the only *Plasmodium* species that produces crescent-shaped (banana-shaped) gametocytes. It also commonly shows multiple ring forms within a single RBC and the absence of mature schizonts in peripheral blood. *P. vivax* shows enlarged RBCs and Schüffner's dots; *Babesia* does not produce gametocytes; trypanosomes are extracellular in blood.

**QUESTION 8**

SINGLE CHOICE

Which of the following best describes the correct quality control approach for Gram stain reagents in the clinical microbiology laboratory?

- ☐ A Use only a known gram-positive organism as a positive control with each batch of stains
- ☒ B Test each new batch of Gram stain reagents with both a known gram-positive and a known gram-negative organism, and document the results
- ☐ C Gram stain reagents do not require QC once performance is verified annually by the manufacturer
- ☐ D Quality control of Gram stain is performed only when a new lot of crystal violet is received, not for the decolorizer or safranin

**ANSWER B**

**WHY** Per CLSI and laboratory accreditation standards, each new lot of Gram stain reagents must be quality controlled using both a known gram-positive (e.g., *Staphylococcus aureus*) and a known gram-negative (e.g., *Escherichia coli*) organism. The decolorizer (alcohol/acetone) is the most critical reagent to QC because under-decolorization or over-decolorization will produce incorrect results.

**QUESTION 9**

MULTIPLE CHOICE

Which of the following specimens are classified as requiring Biosafety Level 3 (BSL-3) containment and practices during processing in the microbiology laboratory? (Choose two.)

- ☒ **A** Sputum for *Mycobacterium tuberculosis* culture
- ☐ **B** Cerebrospinal fluid for routine bacterial culture
- ☒ **C** Tissue homogenate for *Brucella melitensis* culture
- ☐ **D** Blood culture for *Staphylococcus aureus*
- ☐ **E** Stool for *Entamoeba histolytica* antigen testing

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**ANSWER** A • C

**WHY** *Mycobacterium tuberculosis* and *Brucella melitensis* are Risk Group 3 pathogens that require BSL-3 containment, including a Class I or II biological safety cabinet for any procedure that may generate aerosols, sealed centrifuge rotors, and respiratory protection. CSF, blood cultures for *S. aureus*, and stool for amoeba antigen testing are handled under standard BSL-2 practices.