

Part 1 Examination in Medical Microbiology and Virology

Sample MCQs

Multiple Choice Questions

Question 1

The cell wall of gram-positive bacteria may contribute to the development of septic shock.

Identify the component which is most associated with the induction of septic shock.

- A Capsular protein
- B Endotoxin
- C Peptidoglycan
- D Phospholipid
- E Teichoic acid

Question 2

Genetic variation in viruses contributes to their ability to evade the immuneresponse.

Select the principal means by which antigenic shift occurs in influenza A virus.

- A Low fidelity of DNA dependent DNA polymerase
- B Low fidelity of RNA dependent RNA polymerase
- C Low fidelity of reverse transcriptase
- D Reassortment of fragments of the RNA genome
- E Recombination between RNA genomes

Question 3

A 34 year old man with diabetic ketoacidosis develops headache, nasal congestion, periorbital swelling and a bloodstained nasal discharge. Over a period of a week he become drowsy and unresponsive. ENT examination shows black, necrotic lesions on the nasal septum, which is perforated. A lumbar puncture is performed but the CSF findings are entirely normal. Culture of the nasal discharge shows a heavy growth of *Streptococcus pneumoniae* and *Staphylococcus aureus*.

Select the most likely diagnosis.

- A Dental abscess
- B Nasal diphtheria
- C Orbital cellulitis
- D Rhinocerebral mucormycosis
- E Severe maxillary sinusitis

Question 4

The aminoglycosides are a very active group of antibacterial agents, particularly against Gram-negative bacilli.

Identify their mode of action from the list.

- A Disruption of cytoplasmic membrane function
- B Inhibition of bacterial cell wall synthesis
- C Inhibition of bacterial DNA gyrase
- D Inhibition of protein synthesis
- E Interference with bacterial folic acid metabolism

Question 5

A 22-year old female medical student recently returned from Tanzania presents with a history of haematuria. On investigation schistosomal serology is shown to be positive.

Select the treatment of choice.

- A Albendazole
- B Ivermectin
- C Mebendazole
- D Praziquantel
- E Suramin

Question 6

Many antiviral drugs act by inhibition of a viral DNA polymerase enzyme.

Select the virus for which this class of drugs would be effective.

- A Cytomegalovirus
- B Influenza
- C Measles
- D Mumps
- E Rabies

Question 7

You are informed of an outbreak of diarrhoea and vomiting amongst the 100 guests at a wedding reception. About two thirds of the guests became ill between 2 and 3 days after the reception. You obtain a list of guests and the menu for the buffet meal.

Select the most appropriate epidemiological investigation.

- A A case-control study
- B A correlational study
- C A cross-sectional study
- D A randomized controlled trial
- E A retrospective cohort study

Question 8

A 26 year old pregnant lady (17/40 gestation) consulted her general practitioner (GP) because her 2 year old son has a vesicular rash on his hands and in his mouth. The mother is concerned about her unborn child. The GP is experienced and confident of his diagnosis of hand foot and mouth disease, but telephones you regarding further management.

Choose the most appropriate advice.

- A Phone the local CCDC to find out if there is a current epidemic**
- B Reassure the mother that there is no risk to the pregnancy**
- C Refer the lady for fetal ultrasound scan
- D Send a vesicle fluid from the child for EM studies
- E Send blood for serological examination

Question 9

A mother takes her 6 year old son to her general practitioner (GP) extremely anxious because the child has that morning stabbed himself with a needle he found in a park frequented by drug users. Apart from a minor scratch to the right hand the child is otherwise well and has no past medical history of note.

Select the most appropriate action for the GP at this consultation.

- A Issue HIV post exposure prophylaxis to the child
- B Reassure the mother and suggest an accelerated course of Hepatitis B vaccine
- C Send the needle to the lab for testing
- D Suggest accelerated course of Hepatitis B vaccine and Hepatitis C immunization
- E Test the child for Hepatitis C, HIV, Hepatitis B surface antigen

Question 10

A 5 year old boy is seen in the paediatric respiratory clinic for regular review of his cystic fibrosis. He has a productive cough and a specimen is forwarded to the laboratory.

Select the culture medium which would be most appropriate to isolate *Haemophilus influenzae* from this patient.

- A Blood agar
- B Chocolate bacitracin agar
- C MacConkey agar
- D Methicillin mannitol salt agar
- E XLD agar

Question 11

You are asked to review the case of a 23 year old male student recently admitted with invasive meningococcal disease. He has made a good recovery but gives a history of a previous episode of meningococcal septicaemia when he was 15 years old. There is no history of other recurrent infections.

Select the most likely immunodeficiency state.

- A Adenosine deaminase deficiency
- B C7 deficiency
- C Job's syndrome (hyperimmunoglobulinaemia E, defective chemotaxis)
- D Myeloperoxidase deficiency
- E Selective IgM deficiency

Question 12

A 65 year old man has been commenced on standard quadruple therapy, including rifampicin, for suspected tuberculosis. He has an extensive past medical history and is taking an number of other medications.

Select the drug which is most likely to have a clinically significant interaction with rifampicin.

- A Benzylpenicillin
- B Nonsteroidal antiinflammatory
- C Proton pump inhibitor
- D Thiazide diuretic
- E Warfarin

Question 13

Blood donors in the United Kingdom are screened for evidence of infection with the organisms below. For most, the screening test is based on antibody detection and thus vulnerably to missing infections in the "window period" prior to seroconversion. The screening test universally used for one organism detects protein antigen and is thus less vulnerable to this problem.

Select the organism for which this test is available.

- A Hepatitis B virus
- B Hepatitis C virus
- C Human immunodeficiency virus (HIV)
- D Human T-lymphotropic virus type 1 (HTLV1)
- E Treponema pallidum

Question 14

A male baby is born at 39 weeks gestation with a petechial rash, low birthweight, hepatosplenomegaly and bilateral cataracts. This is thought to be due to an infection acquired while the baby was still *in utero*.

Select the condition which is most likely to cause this clinical presentation.

- A Cytomegalovirus
- B Group B streptococcus
- C Rubella virus
- D Toxoplasma gondii
- E Treponema pallidum

Question 15

The complement fixation test (CFT) has largely been replaced by improved assays for evidence of infection.

Select the organism for which CFT remains a useful laboratory diagnostic test of infection.

- A Coxiella burnetii
- B Cytomegalovirus
- C Herpes simplex virus
- D Neisseria gonorrhoeae
- E Parainfluenza type 3

Question 16

A 20-year-old woman presented with a 2-day history of fever, headache and confusion.

On examination, her temperature was 39.0°C and her Glasgow coma score was 11. She had no neck stiffness or rash.

Investigations:

CT scan of brain	normal
cerebrospinal fluid:	
total protein	0.85 g/L (0.15–0.45)
glucose	3.8 mmol/L (3.3–4.4)
white cell count	126/μL (<5)
lymphocyte count	120/μL (<3)
neutrophil count	6/μL (0)

What is the most likely causative organism?

- A cytomegalovirus
- B enterovirus
- C herpes simplex virus type 1
- D human herpes virus 8
- E varicella zoster virus

Question 17

A 12-year-old boy underwent appendicectomy for acute appendicitis.

At the time of surgery there was evidence of localised peritonitis, and a pus swab was sent for culture.

Which is the most likely pathogen?

- A Streptococcus agalactiae
- B Streptococcus anginosus
- C Streptococcus equi
- D Streptococcus gallolyticus
- E Streptococcus infantarius

Question 18

A 23-year-old woman was referred with a 1-week history of fever, malaise, night sweats and painful joints. Two weeks previously she had had a sore throat.

On examination, her temperature was 38.2°C, pulse 110 beats per minute, blood pressure 105/65 mmHg. She had a pan-systolic murmur, her chest was clear on auscultation. Her right wrist and left knee were hot, swollen and painful.

Investigations:

serum C-reactive protein	221 mg/L (<10)
anti-streptolysin O titre	1600
echocardiogram	evidence of pericardial effusion with mitral regurgitation

Rheumatic fever is considered as a diagnosis

Which of the modified Duckett–Jones criteria are fulfilled to confirm the diagnosis?

- A 1 major + 1 minor
- B 1 major + 2 minor
- C 2 major + 2 minor
- D 2 major + 3 minor
- E 3 major + 3 minor

Question 19

A 72-year-old man developed fever and increased oxygen requirement while being ventilated 6 days after emergency surgery for a ruptured abdominal aortic aneurysm. Two days previously, he had been started on intravenous vancomycin for infection at the site of a peripheral intravenous cannula. He had a history of anaphylaxis following penicillin.

On examination, his temperature was 38.2°C, his pulse was 98 beats per minute and regular, and his blood pressure was 124/78 mmHg. There was decreased air entry and coarse crackles were audible at the right lung base.

Investigations:

chest X-ray

new infiltrate in right
lower lung field

What is the most appropriate addition to his antibiotic treatment?

- A ceftazidime
- B ciprofloxacin
- C co-trimoxazole
- D fosfomycin
- E tigecycline

Question 20

A 24-year-old woman presented with a 2-day history of cough productive of green sputum.

On examination, there were signs of consolidation at the left lung base. Her CURB-65 score was 1. She was attempting to conceive and was reluctant to take any antibiotic that might be harmful in pregnancy.

Which antibiotic is most appropriate?

- A amoxicillin
- B azithromycin
- C doxycycline
- D levofloxacin
- E vancomycin

Question 21

A 35-year-old woman presented with a 3-day history of productive cough, breathlessness and rigors.

She was treated empirically with intravenous vancomycin. What is the site of action of vancomycin?

- A cell membrane integrity
- B DNA synthesis
- C peptidoglycan cross-linking
- D protein synthesis via the 50S ribosomal subunit
- E RNA synthesis

Question 22

Four patients on an elderly care ward were diagnosed with norovirus infection.

What immediate measure is most appropriate to prevent further spread within the institution?

- A close down the kitchen supplying meals to the ward
- B hydrogen peroxide vapour in affected areas
- C introduce alcohol hand rub to the ward
- D isolation of symptomatic patients
- E transfer asymptomatic patients to other wards

Question 23

A 30-year-old man was diagnosed with acute hepatitis A virus infection. This was notified to the Health Protection Unit (HPU).

He had attended a wedding reception 4 weeks previously. The HPU ascertained that that eight other guests out of a total of 50 had developed acute hepatitis.

What is the most appropriate approach to investigating the source of this outbreak?

- A case control study
- B cohort study
- C environmental investigation of the catering facility
- D randomised controlled trial
- E serological surveillance

Question 24

A 1-day old baby was visited by his 5-year-old sister who developed chickenpox the following day. The baby had been born at 30 weeks' gestation and weighed 990g. The mother had not had any obvious illness during the pregnancy.

The maternal antenatal blood taken at 13 weeks was retrieved for investigation

Investigations:

Varicella zoster virus IgG	positive
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What is the most appropriate intervention for the baby?

- A commence intravenous aciclovir
- B commence oral valganciclovir
- C give intramuscular human normal immune globulin
- D give intramuscular varicella zoster immune globulin
- E no action required

Question 25

A 6-year-old boy was brought by his mother to the emergency department after accidentally stabbing himself with a needle found discarded in the park. His mother had brought the needle with them.

On examination, the child was well, apart from a minor scratch to the right hand. What

is the most appropriate management?

- A give hepatitis B immunoglobulin
- B issue HIV post-exposure prophylaxis
- C request urgent blood-borne virus serology
- D start an accelerated course of hepatitis B vaccine
- E test the needle for blood-borne viruses

Question 26

What is the most appropriate confirmation test following an initial reactive hepatitis B surface antigen (HBsAg) screening result by enzyme immunoassay (EIA)?

- A neutralisation of the reactivity using hepatitis B surface antibody
- B repeat the EIA
- C test the sample for hepatitis B core total antibody
- D test the sample for HBV DNA
- E test the sample for hepatitis B e antigen and hepatitis B e antibody

Question 27

A 42-year-old woman was admitted to ICU with severe community acquired pneumonia. She was known to have advanced HIV disease and had recently returned from the mid-west of the USA.

Investigations

Non-directed bronchial lavage

Gram stain
Yeast 2+

Which of the following poses greatest risk to laboratory staff?

- A *Candida dubliniensis*
- B *Cryptococcus neoformans*
- C *Histoplasma capsulatum*
- D *Rhodotorula rubrum*
- E *Trichosporon beigellii*

Question 28

A 5 year old child presented with a 2 day history of diarrhoea. Two other children in the same class had developed similar symptoms in the same week. An outbreak control team was convened.

Investigations

Faeces culture *Shigella sonnei*

What is the most likely cause of the outbreak?

- A a visit to a petting farm
- B eating party cakes
- C eating undercooked chicken nuggets
- D poor hand hygiene
- E swimming in contaminated pool water

Question 29

A 7-year-old boy, with no history of past chickenpox infection, was being treated for nephrotic syndrome with high dose prednisolone. His 3-year-old sister had developed confirmed chickenpox in the last 24 hours.

Investigations:

varicella zoster virus IgG 8 mIU/ml

What is the most appropriate next step in the boy's management?

- A give intravenous aciclovir
- B give oral valaciclovir
- C give varicella vaccine
- D give varicella zoster immunoglobulin (VZIG)
- E no treatment is required