Q.1 A 13 year old boy with short gut syndrome presents with malaise and fever. He lives in Islamabad area and has past medical history of significant multiple central line infections, while being treated at a tertiary care hospital. His central line was put in for intravenous lipid supplementation. His complete blood count revealed a normal white blood cell count with a neutrophilic predominance. Blood culture revealed growth of 2-5 μm budding organisms.

a) What is the most likely pathogen?
b) How would you identify the organism?
c) What other infections are commonly caused by this pathogen. Name two.
d) Would fluconazole be effective in this case?

Q.2 Cervical cancer is the second most frequent cancer in women. Such cancer develops slowly and multiple factors are involved in progression to malignancy.

a) Persistent infection of which virus is a necessary component of this process?
b) What is the mode of transmission of this virus?
c) Which genotypes are associated with cervical cancer?
d) What do you know about its prevention?
e) What other cancers, besides cervical cancer can be caused by this virus?
Q.3  A 47 year old male presented with high grade fever and headache. Blood film shows the following.

![Blood film image]

a) What is the diagnosis?
b) What is your estimate about the percent of parasitemia?
c) What are two treatment regimens available?
d) Name three complications expected in this patient.
Q.4 What is the role of following laboratory test in identification of pathogens. Your answer should not exceed 120 words/one page.

a) Sorbitol fermentation
b) Tumbling motility
c) O129 Sensitivity
d) Aesculin hydrolysis
e) Hippurate hydrolysis

Q.5 A 56 year old man presented with a swelling on his left jaw which has been growing slowly for some weeks. He has had a history of multiple dental procedures, including two extractions, in the past. On examination, he has poor oral hygiene but a well healed extraction site. On ultrasound, the mass appeared to contain a collection and the surgeon has just performed incision and drainage. However, he was surprised not to find fluid pus but to find a granular substance which he described as like grains of yellow sand.

a) What is the likely causative agent?
b) What is the most appropriate therapy?
c) What are the pre-disposing factors? Write at least 4.
d) Enlist laboratory tests, you will perform for the diagnoses of this case.

Q.6 Which of the following antibiotics are considered to have good anti-anaerobe activity? Explain their anti-anaerobic spectrum activity.

- Vancomycin
- Meropenem
- Clindamycin
- Gentamicin
- Ciprofloxacin
- Fusidic acid
- Metronidazole
- Cotrimoxazole
Q.7 a) What do you understand by plasma sterilization. 
b) What is the role of Ozone in sterilization?

Q.8 A health care worker from Lahore was admitted with complaints of abrupt onset of fever, headache, myalgia, and malaise. He later developed respiratory tract illness with non-productive cough, sore throat, and nasal discharge. Medical specialist suspected influenza virus infection. He called you to find out possible tests and also names of specimens to be submitted in the laboratory. He also asked about transportation strategy. What would you suggest?

Q.9 Quick identification of the bacterial pathogens has always been a challenge. Recently a new instrument MALDI TOF has been marketed that can identify these pathogens within an hour.

a) What does MALDI TOF stand for?
b) What is its principle?
c) What are its advantages and disadvantages?

Q.10 A 32 year old girl from Ghana works in Islamabad. She lived in a rural area of her country, and the area had recent flooding. She reported to a tertiary care hospital. Medical officer observed a large ulcer on her leg. She told that it began as a small painless papule approximately one year ago that evolved over time to a large, painless lesion with uneven edges and edema of the surrounding skin. A biopsy of the lesion was obtained, which revealed abundant acid fast bacilli.

a) What is the most likely etiology of this lesion? Justify it.
b) What are growth characteristics of this organism?
c) Comment on its antibiotic sensitivity.
d) How can you confirm its identification?
Q.11 A 19 year old male had a recent visit to Singapore where he had multiple sexual contacts. On return, his cousin (a student of final year MBBS) told him that he may have acquired chlamydial infections.

a) Which serotypes of chlamydia cause sexually transmitted infection?

b) Name four important diagnostic tests with justification. Your answer should NOT exceed 100 words.

c) Name two other species of Chlamydia along with the diseases they cause.

Q.12 a) What is Lysogeny?

b) Give at least three examples of organisms which are pathogenic only after being Lysogenized?

Q.13 a) Define bioterrorism.

b) Categorize organisms on the basis of their risks, also give examples.

c) What you would suggest for prevention of bioterrorism?

d) What are the characteristics of bioterrorism agent?

Q.14 The quantiferon gold test relies on three purified antigens that are almost entirely specific for Mycobacterium. These peptide antigens are ESAT-6, CFP-10 and TB7.7.

a) Which Mycobacterium species possess these antigens?

b) Which Mycobacterium species DO NOT possess these antigens?

c) What is the principle of Quantiferon TB gold?

d) How do you compare it with PPD?

e) Name the other test similar to Quantiferon TB?
Q.15 A 42 year old man presents with runny, stuffy nose and post-nasal drip for the last one month. He also has headache and pressure behind the cheeks. Head imaging is performed which revealed opacification of the sinuses. A sinus tissue biopsy is obtained. A KOH preparation of the tissue revealed abundant fungal elements with frequent septations. Wet preparation from culture showed brown conidia with 3 – 5 septations.

a) Name two important fungi that cause this infection.
b) What is the expected rate of growth and colony morphology of fungus?
c) Which group do they belong to?
d) What is the management of this case?

Q.16 A 58 year-old woman develops an undiagnosed neurological illness and declared brain dead. The family consented to multiorgan extraction.

a) Which screening tests will you perform to assess suitability of organs for donation?
b) Which documented infections usually preclude organs donations?
c) What limitations do the current screening methods have in Pakistan and how could you improve these?
Q. 17 A worm passed by a 39 year old man was received in the laboratory. Oratory Eggs below were squeezed out of the worm. The eggs measured 67 µm by 45 µm. He is suffering from abdominal discomfort, diarrhea and weight loss.

![Egg Image]

a) Name the pathogen. Give two identification features.
b) What are the main concerns / problems in humans due to this infection?
c) How had this patient acquired the infection?
d) Write measures which can prevent this infection.

Q. 18 a) What is the importance of environmental swabbing?
b) What is the association of microbial contamination of environment with health care associated infection?
c) What is / are the indication of environmental swabbing cultures? Write in three lines.
Q.19 Ten school children developed watery diarrhea within 48 hours after water drinking from the same source. The stools were watery and revealed highly motile organisms on direct microscopy.

a) What is the most likely pathogen?
b) What is the mode of action of toxin causing the disease.
c) How will you isolate and identify in the laboratory?
d) Name four other pathogens causing this watery diarrhoea.

Q.20 On a summer day in August, a 18 year old man was taken to the emergency department of a local hospital because of a 2 day history of fever, weakness, severe pain in his left groin, and diarrhea. On examination there were small rashes on his leg. A firm tender left groin mass (6 cm) with mild erythema, and small hemorrhages on the ‘skin of his right leg. Culture of aspirate from groin mass yielded growth of Gram negative, bipolar, ovoid" Safety-Pin-Shaped" bacteria.

a) What is the likely diagnosis in this case?
b) What are various forms of the disease caused by the agent?
c) What control measures can be under taken to prevent spread of the disease?

The End