University of Fort Hare

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Programme Unit: Nursing Sciences
East London Campus

SEMESTER EXAMINATION: JUNE 2023

Microbiology

TIME: 3 HOURS **CODE: MCB 211E** MARKS: 100

Student Surname (Capital) ----------

Student Names (Capital) ----------

Student Number ----------

THIS QUESTION PAPER CONSISTS OF 14 PAGES INCLUDING THIS PAGE

INTERNAL EXAMINERS
DR B NKALA
DR P CHITNIS

Instructions to students:

This question paper consists of four sections (A, B, C, D) and all questions are compulsory.
Answer Section A and Section C on the question paper and Section B and Section D on the answer book. Submit question paper along with answer book.

MCB 211E SEMESTER EXAMINATION 2023

Section A (30)

1. The optimum temperature for the growth of most pathogenic bacteria is:

a. 50 degree C
b. 100 degree C
c. 37 degree C
d. 25 degree C

2. During log phase of bacterial growth curve:

a. There is no appreciable increase in the number of bacterial count
b. Bacterial count increases tremendously
c. Bacterial count remains stationary
d. Bacterial count decreases

3. Secondary infection:

a. Occurs when new microorganism sets up an infection in a host whose resistance is lowered by a pre-existing infectious disease.
b. Occurs when the same microorganism in the host causes subsequent infection
c. Occurs due to suppression of normal microflora of the body
d. Represents those infections that are clinically not apparent

4. Bacterial spores:

a. Is the vegetative state of non-pathogenic bacteria
b. Is the pathogenic state of bacteria
c. Help bacteria to survive for longer periods under unfavourable environment
d. Are not destroyed by autoclaving

5. Acid fast staining technique is used for the identification of:
a. Staphylococci
b. Mycobacterium tuberculosis
c. Streptococci
d. Pneumococci

6. The microorganisms used to test the efficacy of autoclave sterilization are:
a. Pathogenic spore bearing microorganisms
b. Pathogenic non spore bearing microorganisms
c. Non-pathogenic spore bearing microorganisms
d. Non-pathogenic non spore bearing microorganisms

7. Humoral immunity:
a. Involves release of cytokines
b. Is mediated by antibodies
c. Is involved in delayed hypersensitivity reactions
d. Is mediated by neutrophils

8. When bacteria are stained with Gram stain and seen under the microscope, Gram positive bacteria appear:
a. Blue
b. Violet
c. Red
d. Pink

9. Which of the following disinfectants is used for disinfection of endoscopes?
a. Iodine
b. Gluteraldehyde (2%)
c. Triclosan
d. Chlorine

10. Aerobic bacteria require:
    a. Oxygen for their growth
    b. Carbon dioxide for their growth
    c. Nitrogen for their growth
    d. Hydrogen ions for their growth

11. Pathogens are microorganisms that:
    a. Live in complete harmony with the host without causing any damage to it
    b. Are capable of producing disease in the host
    c. Cannot cause disease in the host
    d. Exist only in the form of spores

12. Superinfection:
    a. Represents hospital cross infections
    b. Occurs due to suppression of normal microbial flora
    c. Represents infections which are clinically not apparent
    d. Occurs when new organism sets up an infection in the host

13. Endemic diseases:
    a. Spread slowly in a small group of persons
    b. Are constantly present in a particular area
    c. Spread through many areas of the world
    d. Occur exclusively during summer

14. Which of the following is not true for Corona virus infection?
    a. It can infect animals and become a new human Corona virus
    b. Middle East respiratory syndrome was caused by Corona virus
    c. It's spike proteins help to bind to the target cell membrane receptor
    d. It does not cause reinfection

15. Which of the following is not true for Zika virus?
    a. Spreads by Ades aegypti mosquito bite during the day
    b. Can be transmitted by semen
    c. It does not get transmitted by transplacental route
    d. It can cause Gullian -Barre syndrome

16. Which of the following is not true for Ebola virus?
    a. Its incubation period is about 8 – 10 days
    b. It can cause marked fluid loss from diarrhoea
    c. It spreads via direct contact with blood, secretions of an infected person
    d. It does not have tendency to remain endemic

17. Which of the following is the invasive lesion caused by Haemophilus influenzae?
    a. Urinary tract infection
    b. Sore throat
    c. Meningitis
    d. Diarrhoea

18. Which of the following serological test is done to diagnose 'Tick borne South African typhus'?
    a. VDRL test
    b. PCR test
    c. Weil – Felix reaction
    d. Elisa test

19. Syphilis is caused by:
    a. Rickettsiae
    b. Chlamydiae
    c. Treponema pallidum
    d. Pseudomonas

20. Which of the following infection is responsible for the formation of membrane on the pharynx?
    a. Tetanus
    b. Whooping cough
    c. Diphtheria
    d. Pneumonia

21. The early latency period of syphilis is:
    a. 10 years
    b. Life time
    c. 2 years
    d. 6 months

22. A 20 year old man involved in high risk sexual practices in the previous week, presents with acute urethritis with mucopurulent discharge from urethra. Which of the following infection is responsible for above mentioned symptoms?
    a. Syplilis
    b. Gonorrhoea
    c. HIV – AIDS
    d. Lymphogranuloma Venereum

23. The 'eschar' that develops in tick borne African typhus is:
    a. Maculopapular rash
    b. Subcutaneous nodules
    c. Dry crusty ulcer at the site of tick bite
    d. Hyperpigmented patch on the skin

24. The immunity develops in the body following viral infections lasts for:
    a. 5 years
    b. Life long
    c. 10 – 15 years
    d. 2 years

25. Which of the following drug is used for chemoprophylaxis of meningococcemia?
    a. Penicillin
    b. Rifampicin
    c. Sulphonamides
    d. Tetracycline

26. Which of the following hepatitis viral infection is transmitted by faecal – oral route of transmission?
    a. Hepatitis A
    b. Hepatitis B
    c. Hepatitis C
    d. Hepatitis D

27. Which of the following infection has tendency to cause Obstructive intestinal complications?
    a. Thread worm infection
    b. Guinea worm infection
    c. Tape worm infection
    d. Round worm infection

28. Which of the following infection causes painless terminal haematuria?
    a. Filariasis
    b. Strongyloidosis
    c. Trichinosis
    d. Schistosomiasis

29. Which of the following infection causes Anaemia & nutritional deficiency?
    a. Infection by threadworm
    b. Infection by hookworm
    c. Infection by guineaworm
    d. Infection by threadworm

30. Which of the following infections can cause encephalitis in HIV positive patients?
    a. Echinococcus granulosus
    b. Toxoplasmosis
    c. Giardiasis
    d. Trichinosis

Section B **(25)**

1. Define the following: (3)

    1.1 Active immunity
    1.2 Passive immunity
    1.3 Innate immunity

2. 'Sterilization'. Explain the methods used for sterilization. (7)

3. Explain 'Cardinal signs of inflammation' with their clinical significance (5)

4. Write notes on the following:

    4.1 Koch's postulate (5)

    4.2 ABO Haemolytic disease (5)

Section C **(20)**

Choose the most correct option:

1. Which of the following virus causes 'fever blisters'?
    a. Varicella zoster
    b. Influenza virus
    c. Human papilloma virus
    d. Herpes simplex

2. Chlamydia trachomatis causes:
   a. Gonorrhoea
   b. Lymphogranuloma venereum
   c. Pneumonia
   d. Urinary tract infection

3. Which of the following vaccines are given at birth?
   a. BCG & Triple vaccine
   b. Polio & Hepatitis B
   c. Polio & BCG
   d. BCG & Pneumococcal vaccine

4. The Bordetella pertussis organism causes:
   a. Whooping cough
   b. Diphtheria
   c. Tetanus
   d. Klebsiella pneumonia

5. Pathogenicity of staphylococci includes:
   a. Localised pyogenic lesions
   b. Meningitis
   c. Acute rheumatic fever
   d. Glomerulonephritis

6. Infectivity of chicken pox is maximum:
   a. During initial stages of the disease
   b. When the scabs are formed
   c. During carrier state
   d. During later stages of the disease

7. Interferons act by:
    a. Their direct action on viruses
    b. Causing rise in body temperature
    c. Their action on adjacent cells making them refractory to viral infection
    d. Activating complement

8. Shingles occurs:
    a. In persons who had measles many years ago
    b. Only in persons who are HIV positive
    c. Due to reactivation of Herpes simplex virus
    d. In persons who had chicken pox several years earlier

9. Staphylococci:
    a. Have Protein A which facilitates its adhesion to the host cells and tissues
    b. Produce Delta haemolysin which is associated with Methicillin resistant staphylococci
    c. Have M protein antigens used for typing and for virulence
    d. Produce many lipases which help them infect the skin and subcutaneous tissues

10. Streptococci:
    a. Typing is done by random amplification of polymorphic DNA
    b. Exhibit pigment production on nutrient agar optimally at 22 degrees
    c. Produce green colonies with partial haemolysis around colonies
    d. Have M protein antigens used for typing and for virulence

11. Which of the following is not true for Pneumococci?
    a. Pneumococcal autolysins contribute to virulence by releasing bacterial components in infected tissues
    b. Pneumococci grow only in sheep blood agar and chocolate agar
    c. Pneumococci readily undergo autolysis in cultures due to the activity of intracellular enzyme
    d. Pneumococci need selective culture media like Ludlam's agar or Robertson's cooked meat medium

12. Tetanus bacilli:
    a. Cause fermentation of inulin which is of diagnostic importance
    b. Produce b-globulin in acute phase but disappears in convalescence
    c. Robertson cooked meat broth produce black colonies on prolonged incubation
    d. Undergo autolysis in cultures due to the activity of Autolysin, enhanced by bile salts

13. Gonococci have virulence factor:
    a. IgA protease that helps in binding to the mucous membrane
    b. Pili which promote attachment to the host cells and inhibit phagocytosis
    c. Capsular polysaccharide that resists phagocytosis
    d. H binding protein that binds to Factor H which is a C3b inhibitor that impairs complement activation

14. Which of the following is not true for Corynebacterium diphtheriae?
    a. They possess metachromatic granules which stain blue with Loffler's methylene blue stain
    b. Ribotyping is the most useful method available to type its strains
    c. It has Protein 1 which shows antigenic diversity and helps in typing them
    d. They can be identified in smears by direct immunofluorescence test

15. Bordetella pertussis:
    a. Does not ferment lactose, mannitol or sucrose
    b. Growth is seen on Tellurite blood agar giving colonies grey or black colour
    c. Toxin exhibits diverse biological lymphocytosis producing factor
    d. Have metachromatic granules in the typical cuneiform arrangement

16. Haemophilus influenzae:
    a. Releases Adenylate cyclase toxin which catalyzes production of cAMP by cells
    b. Has Polyribosyl phosphate antigen of capsule which induces IgG, IgM & IgA antibodies
    c. Growth is seen on Charcoal blood agar as greyish white colonies
    d. Has filamentous haemagglutinin which adheres to the epithelium and erythrocytes

17. Which of the following is not true for Mycobacterium tuberculosis bacilli?
    a. Have cell wall lipids called as mycolic acids which induce delayed type hypersensitivity reaction
    b. Have proteins which induce delayed type hypersensitivity reaction
    c. Have cytoplasmic antigens that induce immediate-type hypersensitivity reaction
    d. Has cell wall associated glycolipid that can inhibit macrophage activation

18. E coli:
    a. Produces two kinds of endotoxins, haemolysins and enterotoxins
    b. Have heat labile O antigen which gets detached when heated to boiling temperature
    c. Strains carrying K antigens are more commonly responsible for Pyelonephritis
    d. Grows well on selective media like Deoxychocolate citrate agar and Salmonella Shigella agar (SS agar)

19. Rickettsiae:
    a. They resemble gram positive bacteria and take up Gram stain well
    b. Has surface protein antigen dominant in Spotted fever Rickettsia
    c. Can grow in cell free media as they are obligate intracellular bacteria
    d. They are readily cultivated in the yolk sac of developing chick embryos

20. Which of the following is not true for Chlamydia?
    a. Unlike bacteria, they do not have peptidoglycan cell walls
    b. They possess Genus-specific antigen which can be identified by complement fixation test
    c. Serotype-specific antigens are located on the major outer membrane proteins
    d. Species-specific protein antigen helps in intraspecies typing as it is found in some members of the species

Section D **(25)**

1. A 10 year old Nick was brought to the clinic by his mother as he was bitten by his neighbour's dog. Mother of this child is worried – whether her child is going to develop rabies. (6)
   1.1 Explain the treatment which will be given to Nick

2. A 30 year old Mr King visited clinic for the complaints of throat pain, body-ache, headache and malaise. On examination – both tonsils are inflamed (5)

   2.1 Which organism is responsible for causing this infection?

   2.2 Explain the pathogenicity of this organism causing in addition to pharyngitis & tonsillitis

3. A 22 year old Mrs Smith delivered a baby girl this morning. Her baby has been given scheduled vaccines at birth. (6)

   3.1How will you explain the importance of each vaccine in the South African immunisation schedule (EPI) to motivate Mrs Y to follow immunisation Schedule for her baby?

4. List the common parasitic infections which cause profuse watery diarrhoea in HIV positive patients & explain the measures which can be taken to prevent them? (4)

5. Explain the clinical features of falciparum (Cerebral) malaria. (2)

6. What is the prophylactic regimen which can be taken before visiting an endemic area for malaria in order to prevent getting infected by malaria? (2)