

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

SECOND YEAR EXAMINATION FOR THE AWARD OF DEGREE  
OF BACHELOR OF SCIENCE (NURSING)

NURS 223: MEDICAL MICROBIOLOGY

STREAMS: BSC (NURS)Y2S2

TIME: 3 HOURS

DAY/DATE: WEDNESDAY 06/12/2017

2.30 P.M. – 4.30 P.M.

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INSTRUCTIONS:

- Do not write anything on the question paper
- Mobile phones and any other reference material are NOT allowed in the examination room.
- The paper has THREE (3) sections. Answer ALL questions
- Answer for part A should be on the first page of the answer booklet.
- Number ALL your answers and indicate the order of appearance in the space provided in the cover page of the examination answer booklet.

SECTION A

1. Virus causing mumps is also responsible for
  - (a) Measles
  - (b) Hepatitis A
  - (c) Rabies
  - (d) Varicella
2. Exotoxins are
  - (a) Heat labile
  - (b) Heat stable
  - (c) Part of cell wall
  - (d) Polymerized complexes

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3. The following bacteria produce pigment, EXCEPT
  - (a) *Pseudomonas pyocyaneus*
  - (b) *Serratiamarcescens*
  - (c) *Streptococcus Pneumoniae*
  - (d) *Staphylococcus aureus*
  
4. Influenza virus is identified by using
  - (a) Haemagglutinin inhibition test
  - (b) Tissue culture method
  - (c) Embryonated eggs
  - (d) Plague formation
  
5. Techoic acid is
  - (a) Found in the wallsof gram positive bacteria
  - (b) Provide receptors for phages
  - (c) Make up outer wall of gram negative bacteria
  - (d) Influencethe permeability of the membrane
  
6. Which of the following statement (s) about Group B streptococci (*Streptococcus agalactiae*) is/are NOT correct?
  - (a) They are important causes of toxic syndrome
  - (b) They are frequent colonizers of the female genital tract
  - (c) They are important causes of urinary tract infection in the elderly
  - (d) They are  $\beta$ -hemolytic
  
7. *Treponemapallidum* can best identified using
  - (a) Fluorescence microscope
  - (b) Bright field microscope
  - (c) Dark field microscope
  - (d) Counter stain microscope

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8. A 20 year old patient comes to the outpatient clinic with skin abscess on the right arm. A swab from the intact skin overlying this abscess grows coagulase negative staphylococci. An aspirate obtained sterilely with a needle and syringe grows *Staphylococcus aureus*. About these 2 organisms in this patient you can say:
- (a) Both are normal flora and contaminated the specimens sent to the lab
  - (b) The staph aureus is pathogen and the coagulase negative staph is not
  - (c) The coagulase negative staphylococcus is a pathogen
  - (d) The coagulase negative staphylococcus is an opportunistic pathogen
9. Characteristics of a bacterial capsule include:
- (a) All bacteria have one
  - (b) It is composed of peptidoglycan
  - (c) It is an important mechanism for protecting a bacteria against ingestion by polymorph nuclear lymphocytes.
  - (d) It is what causes the gram stain reaction
10. While you are on your obstetrics rotation you deliver a healthy appearing bouncing baby boy to a 19 year old mother. Three days later the baby becomes lethargic, has a high temperature and vomits. A lumbar puncture shows that the infant has bacterial meningitis. A gram stain of spinal fluid shows short gram positive rods. This organism is:
- (a) *Listeria monocytogenes*
  - (b) Group B streptococcus
  - (c) *Neisseria meningitidis*
  - (d) *Clostridium tetani*
11. You are interested in the microbiology culture results on one of your patients and come to the microbiology laboratory to get an update. The microbiology lab supervisor tells you that your patient is growing gram positive bacilli from both blood cultures you drew and from a urine sample. He volunteers that he doesn't think you ought to worry since these results aren't likely to be important. His rationale is:
- (a) Gram positive bacilli are so rare that they aren't likely to cause disease
  - (b) Gram positive bacilli do not cause urinary tract disease
  - (c) Gram positive bacilli are common urinary tract disease
  - (d) Gram positive bacilli cause infections that patients usually resolve without antibiotic therapy.

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12. The organism that grows at a temperature of 45°C is said to be.....
13. At what period in the bacterial growth cycle is growth rate reciprocal of generation time?.....
14. The term facultative anaerobe refers to an organism that .....
15. In regard to temperature and oxygen requirements during growth, *Staphylococcus epidermidis* is best described as.....
16. Which of the staphylococcus is novobiocin resistant?
17. Of staphylococci and streptococcus, which get inhibited by crystal violet in blood agar?
18. Which bacteria is both catalase positive and oxidase negative?
  - (a) Streptococcus
  - (b) Staphylococcus
  - (c) Neisseria
  - (d) Bacillus
19. *Streptococcus pyogenes* can be differentiated from other haemolytic *Streptococci* on the basis of .....
20. Bacterial sore throat is commonly caused by
  - (a) *Staphylococcus aureus*
  - (b) *Streptococcus pyogenes*
  - (c) *Neisseria meningitidis*
  - (d) Viridans group of *streptococcus*
21. Foods most often associated with the emetic type of food poisoning by *Bacillus cereus* is
  - (a) Meat
  - (b) Rice
  - (c) Fermented milk
  - (d) Steamed beans
22. *Listeria monocytogenes* shows which of the following characteristics
  - (a) It can grow at refrigerator temperatures (4°C)
  - (b) It is an extracellular pathogen
  - (c) It is catalase-negative
  - (d) It is strictly a human pathogen

23. Which one of the following is characteristic of *N.meningitidis* but not *N. gonorrhoeae*?
- (a) Ferments glucose
  - (b) Contains a polysaccharide capsule
  - (c) Is oxidase positive
  - (d) Most isolates show resistance to penicillin
24. The motile bacteria is a
- (a) *S. typhi*
  - (b) *K. pneumoniae*
  - (c) *B. anthracis*
  - (d) *Shigella*
25. Lymphogranuloma venereum (LGV) is a sexually transmitted disease is caused by
- (a) *C.opthalmia*
  - (b) *C. trachomatis*
  - (c) *C. pneumonias*
  - (d) *C. psittasi*
26. Virus causing rabies is
- (a) Orthomyxo virus
  - (b) Paramyxo virus
  - (c) Rhabdo virus
  - (d) Toga viruses
27. Dengue virus is transmitted from man to man by the
- (a) Sand fry
  - (b) Ticks
  - (c) *Aedesaegyptimosquitoe*
  - (d) *Culexmosquitoe*
28. Yellow fever is caused by
- (a) Bunya virus
  - (b) Calci virus
  - (c) Arbo virus
  - (d) None of these

29. Fungi producing mycelium are called
- (a) Moulds
  - (b) Filamentous fungi
  - (c) Both a and b
  - (d) Yeasts
30. Tinea versicolor is caused by
- (a) *Candida albicans*
  - (b) *Malassezia furfur*
  - (c) *Aspergillus niger*
  - (d) None of these
31. Epidemic pleurodynia and myocarditis of new born infants are both caused by
- (a) Group B coxsackievirus
  - (b) Reovirus
  - (c) Polyomavirus
  - (d) Cytomegalovirus
32. Main causative organism of gas gangrene is
- (a) *Clostridium botulinum*
  - (b) *Clostridium tetani*
  - (c) *Clostridium difficile*
  - (d) *Clostridium perfringens*
33. Biological false reaction of VDRL is related to
- (a) Lepra bacilli
  - (b) *Corynebacterium diphtheriae*
  - (c) *Clostridium welchii*
  - (d) None of these
34. A diagnosis of diphtheria is confirmed by
- (a) Microscopic appearance of organisms stained with methylene blue
  - (b) Isolation of typical organisms from materials such as blood, showing invasiveness
  - (c) Detection of  $\beta$  phage plaques in cultures of suspicious isolates
  - (d) Demonstration of toxin production by a suspicious isolate

35. Which of the following fungi is most likely to be found within reticuloendothelial cells.
- (a) *Histoplasma capsulatum*
  - (b) *Sporothrix schenckii*
  - (c) *Cryptococcus neoformans*
  - (d) *Candida albicans*
36. Aspergillosis is recognized in tissue by the presence of
- (a) Metachromatic granules
  - (b) Pseudohyphae
  - (c) Septate hyphae
  - (d) Budding cells
37. Fungi often colonize lesions due to other causes. Which of the following is least likely to be present as colonizer.
- (a) *Candida*
  - (b) *Sporothrix*
  - (c) *Mucor*
  - (d) *Aspergillus*
38. A girl who pricked her finger while pruning some rose bushes develops a local pustule that progresses to an ulcer. Several nodules then develop along the local lymphatic drainage. The most likely agent is
- (a) *Aspergillus fumigatus*
  - (b) *Sporothrix schenckii*
  - (c) *Cryptococcus neoformans*
  - (d) *Candida albicans*
39. Immunocompromised persons are suffered from several fungal diseases. Which of the following is the least frequently associated
- (a) *Cryptococcus neoformans*
  - (b) *Aspergillus fumigatus*
  - (c) *Malassezia furfur*
  - (d) *Mucor* species

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40. Each of the following statements concerning *Cryptococcus neoformans* are correct EXCEPT
- (a) Its natural habitat is the soil, especially associated with pigeon feces
  - (b) Budding yeasts are found in the lesions
  - (c) The initial site of infection is usually the lung
  - (d) Pathogenesis is related primarily to the production of exotoxin A
41. Fungal cells that reproduce by budding are seen in the infected tissues of patients with
- (a) Candidiasis, cryptococcosis, and sporotrichosis
  - (b) Mycetoma, candidiasis and mucromycosis
  - (c) Tinea corporis, tinea unguium, and tinea versicolor
  - (d) Sporotrichosis, mycetoma and aspergillosis
42. Which of the following is not the characteristics of histoplasmosis
- (a) Person to person transmission
  - (b) Specific geographic distribution
  - (c) Yeasts in tissue
  - (d) Mycelial phase in the soil
43. Infection with dermatophyte is most often associated with
- (a) Intravenous drug abuse
  - (b) Inhalation of the organism from contaminated bird feces
  - (c) Adherence of the organism to perspiration moist skin
  - (d) Fecal-oral transmission
44. Each of the following statement concerning *Candida albicans* is correct EXCEPT
- (a) *C. albicans* is a budding yeast that forms pseudohyphae when it invades tissue
  - (b) *C. albicans* causes thrush
  - (c) *C. albicans* is transmitted primarily by respiratory aerosol
  - (d) Impaired cell mediated immunity is an important predisposing factor to disease



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45. The finding of large, multinucleated, clumps of cells in the bronchial secretions of a 2 year old girl with acute bronchopneumonia suggests that this infection is caused by
- (a) Epstein – Barr virus
  - (b) Mycoplasma hominis
  - (c) Rhinovirus
  - (d) Respiratory syncytial virus (RSV)
46. In a chronic carrier of hepatitis B virus (HBV), which positive test is most indicative of high infectivity?
- (a) Hepatitis B surface Antigen (HbsAg)
  - (b) Hepatitis B core Antigen (HbcAg)
  - (c) Hepatitis B e Antigen (HbeAg)
  - (d) Anti-HBsAg
47. Enteroviruses differ from rhinoviruses mainly in their:
- (a) Type of nucleic acid
  - (b) Size
  - (c) Capsid shape
  - (d) Ability to survive in acidic conditions
48. Viruses that can remain latent (usually in neurons) for many years are most likely:
- (a) Togaviruses
  - (b) Herpesviruses
  - (c) Enteroviruses
  - (d) Rhinoviruses
49. Which of the following is not an RNA virus?
- (a) Retrovirus
  - (b) Enterovirus
  - (c) Rhabdovirus
  - (d) Adenovirus
50. A structure component that is found in all viruses is:
- (a) The envelope
  - (b) DNA
  - (c) Capsid
  - (d) Tail fibers

**SECTION B (30 MARKS)**

1. Differentiate between *staphylococcus aureus* and *staphylococcus epidermis*. [5 marks]
2. Categorize medically important streptococci using Lancefield classification indicating key diagnostic features. [9 marks]
3. Describe the pathogenesis of cholera. [6 marks]
4. Describe the pathogenesis of *Cryptococcus neoformans*. [4 marks]
5. Describe the viral growth cycle of the human immunodeficiency virus (HIV). [6 marks]

**SECTION C (20 MARKS)**

A patient is suspected to be suffering from tuberculosis (TB)

- (a) State FIVE virulent factors of the causative organism. [5 marks]
- (b) Describe the pathogenesis of TB. [15 marks]

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