Brahmanbaria Medical College

Department of Microbiology

1st Term Examination

Batch: BMC-08

Subject: Microbiology (SAQ)

Time: 2 hours and 30 minutes **Total marks: 80**

First question of each group is compulsory. Answer any two from the rest
(Use separate answer script for each group)

Group – A (Marks - 20)

Q. No. 1. What is selective toxicity? Write down the mechanisms of action of penicillin. What are the criteria of ideal antibiotic? 1+3+2

Q. No. 2. What are the differences between pili and flagella? Enumerate the functions of cell membrane. Classify bacteria according to temperature requirement. 3+2+2

Q. No. 3. Write down the stages of bacterial pathogenesis. Enumerate the virulence factors of bacteria. What are the beneficial effects of normal flora? 3+2+2

Q. No. 4. Write short notes on: 3.5+3.5
a) Lowenstein Jensen media b) Tyndalization

Group – B (Marks – 20)

Q. No. 5. Draw a diagram showing how antibody is produced after vaccination. What are the differences between innate and acquired immunity? Draw and label IgG. 2+2+2

Q. No. 6 Describe the mechanism of type-II hypersensitivity. Enumerate the examples of type-II hypersensitivity. What is hygiene hypothesis? 3+2+2

Q. No. 7. Define tolerance. What are the general mechanisms of tolerance? Enumerate some microorganisms associated with autoimmune diseases. 1+3+3

Q. No. 8. Describe CFT. What are the types of graft rejection? How can you prevent graft rejection? 3+2+2

Group – C (Marks – 20)

Q. No. 9. A 21 years old male presented with severe dysuria and purulent urethral discharge. 1+3+2

a) What may be the most probable causative organism?
b) How will you diagnose the case in the laboratory?
c) Name other organisms causing similar infection.

Q. No. 10. What are the differences between staphylococci and streptococci? How can you differentiate the species of streptococci? Enumerate the toxins and enzymes produced by *Streptococcus pyogenes*. 2+2+3

Q. No. 11. Write down the laboratory diagnosis of diphtheria. What is lysogenic conversion? Enumerate the causes of sore throat. 4+1+2

Q. No. 12 Name the histotoxic clostridia. What are the clinical features of tetanus? Describe the pathogenesis of tetanus. 2+2+3

Group – D (Marks – 20)

Q. No. 13. Stool of a person with bloody diarrhoea is sent to the microbiology lab, on microscopical examination of stool, plenty of pus cells, macrophage and RBCs are found. 1+1+4

a) What is your diagnosis?
b) What is the probable causative organism?
c) How will you diagnose the case in the laboratory?

Q. No. 14 Write down the laboratory diagnosis of primary syphilis. What are the advantages and disadvantages of VDRL and TPHA? What is Jarisch-Herxheimer reaction? 3+2+2

Q. No. 15 Classify vibrio. Name the bacteria that increase cAMP. What are biochemical differences between classical and El tor biotype? 3+2+2

Q. No. 16 What are the differences between tuberculoid and lepromatous leprosy? What is Ghon's complex? Write down the laboratory diagnosis of pulmonary tuberculosis. 3+1+3

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Use OMR (Optical Mark Recognition) sheet as answer script
Select "T" for true and "F" for false statements

1. **Bacterial spore can be killed by**
   a) Formaldehyde gas
   b) Pasteurization
   c) Gluteraldehyde
   d) Red heat
   e) Boiling
2. **Acid fast bacteria are**
   a) *Bacillus anthracis*
   b) *Treponema pallidum*
   c) *Mycoplasma pneumoniae*
   d) *Mycobacterium leprae*
   e) *Nocardia asteroides*
3. **Bacteria causing pathogenesis by ADP ribosylation are**
   a) *Pseudomonas aeruginosa*
   b) *Escherichia coli*
   c) *Mycobacterium tuberculosis*
   d) *Streptococcus pneumoniae*
   e) *Salmonella typhi*
4. **Select antibiotics that inhibit protein synthesis by acting on 30s ribosomal subunit**
   a) Aminoglycosides
   b) Clindamycin
   c) Doxycycline
   d) Erythromycin
   e) Chloramphenicol
5. ***Staphylococcus saprophyticus***
   a) Is novobiocin sensitive
   b) Is catalase positive
   c) Causes honeymoon cystitis
   d) Causes haemolysis on blood agar
   e) Is coagulase positive
6. **False positive tuberculin test is seen in**
   a) Miliary TB
   b) Infection by non-tubercular mycobacterium
   c) BCG vaccination
   d) HIV infection
   e) Measles
7. ***Campylobacter jejuni***
   a) Is a microaerophilic bacteria
   b) Causes watery diarrhoea
   c) Source is domestic animal
   d) Is associated with autoimmune diaseases
   e) Infection is limited to intestine
8. ***Mycoplasma pneumoniae***
   a) Is an obligatory intracellular bacteria
   b) Is transmitted by respiratory droplets
   c) Has cholesterol in its cell membrane
   d) Is responsible for typical pneumonia
   e) Is treated by penicillin
9. **Regarding *Chlamydia trachomatis***
   a) It causes genital tract infection
   b) It forms inclusion body
   c) It is transmitted by vectors
   d) Infective form is reticulate body
   e) It is cultured in routine laboratory media

10. **Phagocytic cells are**
    a) Neutrophil
    b) B lymphocyte
    c) Macrophage
    d) Natural killer cell
    e) Monocyte
11. **J chain is present in**
    a) IgA
    b) IgG
    c) IgM
    d) IgD
    e) IgE
12. **Type-II hypersensitivity includes**
    a) ABO transfusion reaction
    b) Contact dermatitis
    c) Serum sickness
    d) Autoimmune haemolytic anaemia
    e) Grave's disease
13. **Mycobacterium-**
    a) May be cultured in middle brook 7H10 & 7H11
    b) Has mycolic acids in its cell wall
    c) Generation time is 2 hours
    d) Cord factor has role in pathogenesis
    e) Diagnosed by Albert stain
14. **A medium is made enriched by adding**
    a) Blood
    b) Antibiotics
    c) Chemicals
    d) Serum
    e) Egg
15. **Arthus reaction**
    a) Concentration of antigens are more than antibodies in the immune complex
    b) Occurs after repeated exposure to the same antigen
    c) Usually localized
    d) Occurs in type 2 hypersensitivity
    e) Onset of action is slow
16. **Indications of blood culture includes**
    a) Brucellosis
    b) Diphtheria
    c) Enteric fever
    d) Bacterial endocarditis
    e) Rheumatic fever
17. **Which one is true?**
    a) Wire loop-hot air oven
    b) Culture media-autoclave
    c) Gloves-autoclave
    d) Swab stick-hot air oven
    e) Catheter-ethylene oxide
18. **Bacteriophage mediated toxins produced by**
    a) *Corynebacterium diphtheriae*
    b) *Shigella dysenteriae*
    c) *Vibrio cholerae*
    d) *Clostridium botulinum*
    e) *Clostridium tetani*
19. **Immunoglobulin G**
    a) Can cross placenta
    b) Activates classical pathway
    c) Can cause opsonisation
    d) Is produced mainly in the primary immune response
    e) Is the most abundant immunoglobulin in newborns
20. **Neonatal meningitis is caused by**
    a) *Neisseria meningitidis*
    b) *Listeria monocytogenes*
    c) *Haemophilus influenzae*
    d) *Streptococcus agalactiae*
    e) *Escherichia coli*

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(Use separate answer script for each group)

Group – A (Marks - 20)

Q. No. 1. A 35 years old man has history of chronic amoebiasis for last 5 years. Now he has developed pain in his right hypochondriac region. 1+1+4
a) What is your diagnosis?
b) What organism is responsible for this?
c) Write down the laboratory diagnosis.

Q. No. 2. Name four parasites causing anaemia. What do you mean by relapse and recrudescence? What are the differences between sporozoite induced malaria and trophozoite induced malaria? 2+2+3

Q. No. 3. Name three parasites causing fever. Write down the laboratory diagnosis of kala-azar. What are the causes of anaemia in case of kala-azar? 2+3+2

Q. No. 4. Name three free living amoeba with the diseases they produce. What are the modes of infection of *Toxoplasma gondii*? Write down the laboratory diagnosis of trichomoniasis. 2+2+3

Group – B (Marks – 20)

Q. No. 5. A 5 years old boy has history of itching around anus at night and his mother gave history of collecting small worms around his anal mucosa. 1+2+3
a) What may be the possible parasite causing such complaints?
b) What are the different modes of infection?
c) Mention the laboratory diagnosis of this case.

Q. No. 6 Name four parasites that enter body through skin penetration. What are the differences between *Ancylostoma duodenale* and *Necator americanas*? Write down the pathogenic effects of *Ascaris lumbricoides*. 2+2+3

Q. No. 7. Classify tissue nematodes according to their habitats. Write down the pathogenesis of elephantiasis. Describe the egg of *Trichuris trichiura*. 2+3+2

Q. No. 8. Enumerate three parasites having two intermediate hosts. Draw and label hydatid cyst. How can you diagnose hydatid cyst? 2+2+3

Group – C (Marks – 20)

Q. No. 9. A 25 years old man of Dhaka city gave the history of fever for 7 days with haemarrhagic skin rashes and conjunctival congestion. Blood test revealed severe thrombocytopenia, raised PCV. 1+1+4

a) What is the causative agent?
b) Enumerate its vector.
c) Describe the pathogenesis.

Q. No. 10. Name four DNA enveloped viruses. Write down the seromarkers of Hepatitis B with their interpretations. What is window period? 2+4+1

Q. No. 11. Describe the structure of a virus. Name three major genes of HIV with their functions. What are modes of infection of HIV? 3+2+2

Q. No. 12 Name three viruses that enter body through gastrointestinal tract. Write down the pathogenesis of poliomyelitis. What are the advantages and disadvantages of oral polio vaccine? 1+3+3

Group – D (Marks – 20)

Q. No. 13. A HIV positive person developed neck rigidity and severe headache. 1+1+4

a) What may be the possible fungal agent?
b) Is it capsulated?
c) How will you diagnose the case in the laboratory?

Q. No. 14 Name the sexual and asexual spores of fungi. What are predisposing factors of *Malassezia furfur*? Write down the laboratory diagnosis of tinea capitis. 2+2+3

Q. No. 15 Classify fungi clinically. Write down the laboratory diagnosis of vaginal thrush. Describe germ tube test. 2+3+2

Q. No. 16 Describe the pathogenesis of histoplasmosis. Enumerate three differences between Aspergillus and Mucor. Name three antifungal drugs with their mechanisms. 3+2+2

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1. **Vector borne parasitic infections are**
   a) Malaria
   b) Kala-azar
   c) Toxoplasmosis
   d) Filariasis
   e) Amoebiasis
2. **Nematodes causing eye infections are**
   a) *Loa loa*
   b) *Onchocerca volvulus*
   c) *Brugia malayi*
   d) *Enterobius vermicularis*
   e) *Wuchereria bancrofti*
3. ***Trichomonas vaginalis***
   a) Is transmitted by sexual route
   b) Infection requires vaginal pH more than 4.5
   c) Infection causes vaginal discharge greenish in colour
   d) Cyst is the infective form
   e) Infection is common in childhood
4. **Which organisms are responsible for visceral leshmaniasis?**
   a) *Leishmania donovani*
   b) *Leishmania tropica*
   c) *Leishmania infantum*
   d) *Leishmania mexicana*
   e) *Leishmania braziliensis*
5. **Intracellular parasites are**
   a) *Toxoplasma gondii*
   b) *Leishmania donovani*
   c) *Naegleria fowleri*
   d) *Plasmodium falciparum*
   e) *Loa loa*
6. **Parasites do not need intermediate host are**
   a) *Ascaris lumbricoides*
   b) *Taenia saginata*
   c) *Toxoplasma gondii*
   d) *Trichomonas vaginalis*
   e) *Strongyloides stercoralis*
7. **Characteristics of *Giardia intestinalis* are**
   a) Habitat is caecum of human
   b) Trophozoite is the infective form
   c) Can cause steatorrhoea
   d) Can cause anaemia
   e) Can cause bloody diarhhoea
8. ***Regarding Ancylostoma duodenale***
   a) Rhabditiform larva larva is the infective form
   b) Egg has 4 blastomere
   c) Can cause autoinfection
   d) Ova is bile stained
   e) Can cause anaemia
9. **Infective form of**
   a) *Echinococcus granulosus* is filariform larva
   b) *Ascaris lumbricoides* is embryonated egg containing rhabditiform larva
   c) *Enterobius vermicularis* is rhabditiform larva
   d) *Wuchereria bancrofti* is 3rd stage larva of microfilaria bancrofti
   e) *Strongyloides stercoralis* is filariform larva

10. **Atypical viral agents are**
    a) Chikungunya virus
    b) Virion
    c) Prion
    d) Pseudovirion
    e) Human papilloma virus
11. **Viruses cross placenta are**
    a) Hepatitis B virus
    b) Human papilloma virus
    c) Cytomegalovirus
    d) Polio virus
    e) Rubella virus
12. **Members of Herpes virus family are**
    a) Adenovirus
    b) Cytomegalovirus
    c) Epstein Barr virus
    d) Human papilloma virus
    e) Parvovirus B 19
13. **Rabies vaccine**
    a) Contains live attenuated virus
    b) Gives lifelong immunity
    c) Is suggested after bite by rabid animal
    d) Is produced in human diploid cell by recombinant DNA technology
    e) Is given in multiple doses
14. **Clinical features of dengue are**
    a) Diarrohea
    b) Break bone fever
    c) Mucosal bleeding
    d) Retro orbital pain
    e) Decreased haematocrit
15. **Viruses having animal reservoir include**
    a) SARS-CoV-2 virus
    b) Polio virus
    c) Human immunodeficiency virus
    d) Rabies virus
    e) Measles virus
16. **Regarding Aspergillus species**
    a) They are dimorphic fungi
    b) May produce aflatoxin
    c) Can cause blood stream infection in immunodeficient person
    d) Microscopy reveals yeast and pseudohyphae
    e) It may cause fungal ball in lung
17. **Dermatophytes**
    a) Are mold fungi
    b) Cause cutaneous infection
    c) Are opportunistic in nature
    d) Can be seen under microscope by KOH preparation
    e) Cause systemic infection
18. **Non-dermatophytic molds are**
    a) *Cryptococcus neoformans*
    b) *Candida albicans*
    c) *Aspergillus fumigatus*
    d) Mucor species
    e) *Histoplasma capsulatum*
19. **Regarding eumycetoma**
    a) It is characterized by multiple discharging sinus
    b) Caused by Nocardia species
    c) Contaminated soil is the source
    d) Pus contains granule
    e) Budding yeast cell is diagnostic
20. **Cryptococcus species**
    a) Are opportunistic fungi
    b) Are exogenous pathogens
    c) Cause severe primary pulmonary infection
    d) Causes meningitis in AIDS patient
    e) Are mold in nature