



Register Number:
Date:

**ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU 27.
M.Sc MICROBIOLOGY - III SEMESTER
SEMESTER EXAMINATION- OCTOBER 2019
MB -9218 MEDICAL MICROBIOLOGY**

Time: 2 ½ hours

Max Marks: 70

This paper contains **2** printed pages and **4** parts

I. Answer any Five of the following

5 x 3 =15

1. What is NABL? List two benefits of it.
2. Name the organism and species causing bacillary dysentery.
3. How is Penicillosis diagnosed?
4. What is semple vaccine and why is it administered?
5. a) List three methods to prevent transmission of Ebola.
b) Name one structure each involved in adhesion in bacterial, viral and protozoan infections.
6. Mention the factors that influence the diameter of the zone of inhibition during antimicrobial testing.
7. Write a note on ESBL.

II. Answer any Five of the following

5 x 5 =25

8. Write a note on biomedical waste management.
9. Describe the vaccines administered for meningitis caused by *Haemophilus* and *Neisseria*.
10. How is Leptospirosis diagnosed in a Laboratory?
11. Explain the infections of *Tinea pedis* and *Tinea capitis*.
12. Describe the mode of action of Nystatin and Metronidazole.
13. Add a note on the antigenic properties of the organism that causes AIDS.
14. How can you differentiate an infection with *Taenia saginata* and *Taenia solium*?

III. Answer any Two of the following

2x10=20

15. Give an account of chemical and biological safety in a Microbiology laboratory.
16. Name the etiological agent that causes sore throat. Explain its virulence mechanism.
17. What are the predisposing factors of Moniliasis? How is it transmitted? Mention its types and add a note on its prevention and treatment.

IV. Answer the following

1 x10=10

18. A 27 year old male sought medical care when he developed joint pain, fever and a red-rash on different parts of his body along with chills, nausea and non-bloody, non-bilious vomiting. The patient was admitted and tourniquet test performed was positive. On admission patient denied any other associated symptoms like visual changes, dizziness, chest pain or shortness of breath. No sick contacts in family and did not travel.
 - a) What kind of infection is this? Is it possible to get this infection twice? **2**
 - b) Can this infection become dangerous? **3**
 - c) What can the community and the person do to prevent this? **3**
 - d) What is the treatment? Is it curable? **2**

SCHEME OF EVALUATION-2019
M.Sc MICROBIOLOGY - III SEMESTER
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I. Answer any Five of the following

5 x 3 =15

1. NABL:- National Accreditation Board of Laboratories provides formal recognition of competent laboratories.-1

ANY TWO :1 mark each

1. Potential increase in business due to enhanced customer confidence and satisfaction.
2. Savings in terms of time, and money due to reduction or elimination of the need for retesting of products.
3. Better control of laboratory operations. QA and technical competency.
4. Increase in confidence in testing /calibration personnel performing
5. 5. Customers can identify and search labs accredited
6. Users of accredited labs will enjoy greater access for their products, in both domestic and international markets, when tested by accredited bodies.

2. Shigelladysentriae, sonnei, boydii and flexneri-3

- 3. Penicillosis is caused by *Penicillium marneffei* is thermally dimorphic is a relevant clue when trying to identify it.. Cultures should be done, skin, blood and sputum samples. Plating samples out onto two Sabouraud agar plates, then incubating one at 30 °C and the other at 37 °C, should result in two different morphologies. A mold-form will grow at 30 °C, and a yeast-form at 37 °C.**

Mycelial colonies will be visible on the 30 °C plate after two days. Growth is initially fluffy and white and eventually turns green and granular after sporulation has occurred. A soluble red pigment is produced, which diffuses into the agar, causing the reverse side of the plate to appear red or pink. The periphery of the mold may appear orange-coloured, and radial sulcate folds will develop.

Under the microscope, the mold phase will look like a typical Penicillium, with hyaline, septate and branched hyphae; the conidiophores are located both laterally and terminally. Each conidiophore gives rise to three to five phialides, where chains of lemon-shaped conidia are formed.-3

4. Semple vaccine is a neural vaccine administered to treat Rabies.

Caused by Rhabdovirus.-1

Vaccine developed by Semple at Central Research Institute It is 5% suspension of sheep brain infected with fixed virus and inactivated with phenol at 37°C leaving no residual live virus.-2

5. a) List three methods :-Each 0.5 mark

- ensuring all healthcare workers wear protective clothing

- implementing infection-control measures, such as complete equipment sterilization and routine use of disinfectant
- isolation of Ebola patients from contact with unprotected persons
- Thorough sterilization and proper disposal of needles in hospitals are essential in preventing further infection and halting the spread of an outbreak.
- Ebola tends to spread quickly through families and among friends as they are exposed to infectious secretions when caring for an ill individual. The virus can also spread quickly within healthcare settings for the same reason, highlighting the importance of wearing appropriate protective equipment, such as masks, gowns, and gloves.

B) adhesion in bacterial Pilli , Viral - Haemagglutin, Glycoprotein, and protozoan suckers, hooks infection each **0.5 mark**.

6. Diffusibility of the drug, disc concentration, nature and composition of the medium, thickness, presence of inhibitory substances, pH, time of incubation **0.5x6=3**

7. Extended spectrum Beta lactamase -**1ESBLs** are Gram-negative bacteria that produce an enzyme; beta-lactamase that has the ability to break down commonly used antibiotics, such as penicillins and cephalosporins and render them ineffective for treatment. ... The most common **ESBL**-producing bacteria are some strains of *Escherichia coli* and *Klebsiella pneumoniae*.-2

II. Answer any Five of the following

5 x 5 =25

8. Biomedical waste management:-Objective is to prevent harm resulting from waste. Minimize its volume, retrieve reusable materials, and ensure safe and economical disposal. The different steps are reduction, reuse, segregation, storage, transportation, and treatment. Reduction in volume can be achieved by proper planning and using reusable items wherever possible. Segregated waste to be put into different coloured containers as prescribed in the rules for necessary treatment. Treatment can be by chemical, deep burial, incineration, autoclave, microwave and disinfectants etc

9. *Haemophilus influenzae* causes meningitis – Hib PRP – There are 13 serotypes. Polyribosyl Ribitol Phosphate- Purified PRP is immunogenic in older children and adults. Poorly immunogenic in Children below 2 years. Can be coupled like tetanus and Diphtheria toxoids.-to increase immunogenicity. **2.5**

Neisseria meningitidis- This also is classified into 13 serogroups of which Groups A, B and C are most important. Monovalent and Polyvalent vaccines containing the capsular polysaccharide of groups A and C W-135 and Y. The vaccines induce good immunity in older children and adults, but not effective against children below 3yrs. The immunity is specific and no vaccine against group B. A is usually associated with epidemics, C mostly localized and B both epidemics and outbreaks. -2.5

10. blood examination, Urine ,serological diagnosis,animal diagnosis, water tested for Pathogen.
Blood urine under dark field microscope – delicate flexible helical rods, numerous coils, EMJH –colonies are aerobic and microaerophilic. Which can be stained and dark field illumination. In animals – when inoculated intraperitoneally in Guinea pigs .The animals develop fever and die within 8-12 days.Various serological tests such as ,ELISAetc-3
- 11.Explanation of Athletes foot – **2.5** Dermatophyte Interdigitating spaces on feet caused by *Trichophytonrubrum*, *T. mentagrophytes*,and *E Floccusum*. and Infection of hair and scalp by Endothrix and ecothrix fungus T mentagrophytes and Microsporum canis-**2.5**
12. Nystatin –antifungal antibiotic **0.5** -Like amphotericin B **nystatin** is an ionophore. It binds to ergosterol, a major component of the fungal cell membrane. When present in sufficient concentrations, it forms pores in the membrane that lead to K⁺ leakage, acidification, and death of the fungus-**2**.
- Metronidazole.-antiparasitic-**0.5**-It inhibits nucleic acid synthesis by disrupting the DNA of microbial cells. This function only occurs when **metronidazole** is partially reduced, and because this reduction usually happens only in anaerobic bacteria and protozoans, it has relatively little**effect** upon human cells or aerobic bacteria-**2**
13. AIDS –HIV virus :- 1. Envelope antigens –Spike gp120. Transmembrane pedicel Envelope gp41
2. Shell antigen:- Nucleocapsid protein p18
3. Core antigens – Principal core ag-p24 other core p15 and p55
4. Polymerase ag- p31,p51,p66.
14. *Taeniasaginata* and *Taeniasolium*.**5** ?

III. Answer any Two of the following 2x10=20

- 15.chemical:- MSDS and explain 5
biological safety –Bsc etc-5
16. *Streptococcus pyogenes* -1
Explain its virulence mechanism- MTR proteins, Toxins, Streptolysin O and S Pyrogenic ,erythrogenic, scarlatian toxin, Streptokinase or fibrinolysin-.
17. Predisposing factors – hormonal influences, diabetes, , weakened immunity, Acquired immunodeficiency, -2 marks Transmission -2
types subcutaneous, cutaneous, systemic-2 prevention -2treatment -2 .

IV. Answer the following

1 x10=10

18. a) Anyone who is bitten by an infected *Aedes* mosquito can get dengue fever.

Yes. It is possible to get dengue more than once. There are four different strains (serotypes) of the dengue virus. If a person has suffered from one virus, there can be a repeat occurrence if a different strain is subsequently involved. Subsequent infections with different serotypes increase the risk of severe complications.-2

b)The infection can become dangerous since it may damage the blood vessels. The damage may range from increased permeability of the blood vessels, causing leakage of blood fluid/plasma into various organs, to completely broken blood vessels that cause bleeding. The symptoms and signs of dengue haemorrhagic fever and dengue shock syndrome are related to damage to the blood vessels and low platelet count (platelets are a component of our blood).-3

c) Prevention of dengue relies heavily on preventing the mosquito (*Aedes aegypti*) that transmits dengue from breeding inside and in the vicinity of homes. Every household can undertake very simple measures to prevent breeding by draining out water from various containers, regularly changing water and cleaning flower vases and other items or, in the case of unused items, by discarding or destroying them. Since the mosquito cannot travel far, such "house cleaning" by all members of a community will ensure that no breeding places exist, and prevent dengue from occurring others as mosquito nets, repellents and guppy fish in stagnant water that eat mosquito larvae .-3

d)Like most viral diseases, there is no specific cure for dengue fever. Antibiotics do not help. Paracetamol is the drug of choice to bring down fever and joint pain. Other medicines such as aspirin and ibuprofen should be avoided since they can increase the risk of bleeding. Doctors should be very careful when prescribing medicines. Any medicine that decreases the platelet count should be avoided. -2