

Roll No.

Question Booklet Number

O. M. R. Serial No.

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M. Sc. (Microbiology) (Fourth Semester)

EXAMINATION, July, 2022

MEDICAL MICROBIOLOGY

Paper Code

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Questions Booklet
Series

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Time : 1:30 Hours]

[Maximum Marks : 100

Instructions to the Examinee :

1. Do not open the booklet unless you are asked to do so.
2. The booklet contains 60 questions. Examinee is required to answer any 50 questions in the OMR Answer-Sheet provided and not in the question booklet. If more than 50 questions are attempted by student, then the first attempted 50 questions will be considered for evaluation. All questions carry equal marks.
3. Examine the Booklet and the OMR Answer-Sheet very carefully before you proceed. Faulty question booklet due to missing or duplicate pages/questions or having any other discrepancy should be got immediately replaced.

परीक्षार्थियों के लिए निर्देश :

1. प्रश्न-पुस्तिका को तब तक न खोलें जब तक आपसे कहा न जाए।
2. प्रश्न-पुस्तिका में 60 प्रश्न हैं। परीक्षार्थी को किन्हीं 50 प्रश्नों को केवल दी गई OMR आन्सर-शीट पर ही हल करना है, प्रश्न-पुस्तिका पर नहीं। यदि छात्र द्वारा 50 से अधिक प्रश्नों को हल किया जाता है तो प्रारम्भिक हल किये हुए 50 उत्तरों को ही मूल्यांकन हेतु सम्मिलित किया जाएगा। सभी प्रश्नों के अंक समान हैं।
3. प्रश्नों के उत्तर अंकित करने से पूर्व प्रश्न-पुस्तिका तथा OMR आन्सर-शीट को सावधानीपूर्वक देख लें। दोषपूर्ण प्रश्न-पुस्तिका जिसमें कुछ भाग छपने से छूट गए हों या प्रश्न एक से अधिक बार छप गए हों या उसमें किसी अन्य प्रकार की कमी हो, तो उसे तुरन्त बदल लें।

(Remaining instructions on the last page)

(शेष निर्देश अन्तिम पृष्ठ पर)

1. Identify the influenza virus serotype that causes most of the epidemics :
 - (A) Type A
 - (B) Type B
 - (C) Type C
 - (D) None of the above
2. All of the following statements are correct about the Neuraminidase (NA) and Hemagglutinin (HA) of influenza virus, except :
 - (A) Helps the virus to bind to host cell surface
 - (B) Both of the antigens are embedded in the outer surface of the viral envelope
 - (C) Neuraminidase is present as a spike and is composed of dimers
 - (D) Frequent antigenic changes occur in NA and HA
3. Which of the following is a reservoir for the antigenic shift variants of the influenza virus ?
 - (A) Pigs
 - (B) Rodents
 - (C) Mosquitoes
 - (D) Human
4. Identify the source of H5N1 infection in humans :
 - (A) Birds
 - (B) Pigs
 - (C) Ferrets
 - (D) None of the above
5. Genetic reassortment of Influenza virus is called :
 - (A) Antigenic drift
 - (B) Antigenic shift
 - (C) Both (A) and (B)
 - (D) None of the above
6. Which of the following viruses is not transmitted through the parenteral route ?
 - (A) Hepatitis A
 - (B) Hepatitis B
 - (C) Hepatitis C
 - (D) Hepatitis D
7. All of the following statements regarding HBV infection are true, except.
 - (A) Acute liver infection is subclinical in about 70 percent
 - (B) Chronic hepatitis B can lead to cirrhosis and liver cancer
 - (C) Infants born to infected mothers can have this virus
 - (D) Medications are not available for the treatment of the chronic hepatitis B infection

8. Hepatitis E virus (HEV) infection is more commonly found in developing countries and is transmitted mostly through contaminated water, all of the following are the signs and symptoms of HEV, except :
 - (A) Blood in the stool
 - (B) Nausea and vomiting
 - (C) Yellowing of the skin
 - (D) Low-grade fever
9. Name the hepatitis virus that can develop infection into the host cell only when the hepatitis B virus is present ?
 - (A) Hep. A virus
 - (B) Hep. C virus
 - (C) Hep. D virus
 - (D) Hep. E virus
10. Each of the following pathogens can cause respiratory infections in humans, except :
 - (A) Respiratory syncytial virus
 - (B) Parainfluenza virus
 - (C) Measles virus
 - (D) Rabies virus
11. Which of the following viral infections is most commonly associated with the varicella virus ?
 - (A) Yellow fever
 - (B) Gangrene
 - (C) Tuberculosis
 - (D) Chickenpox
12. Vaccines are available for the prevention of infection caused by all of the following viruses, except :
 - (A) Measles virus
 - (B) Mumps virus
 - (C) Human parainfluenza virus
 - (D) Varicella-zoster virus
13. Which of the following is not the mosquito-borne viral disease ?
 - (A) Dengue
 - (B) Lassa fever
 - (C) Yellow fever
 - (D) Japanese B encephalitis
14. Name the vector via which encephalitis and yellow fever are transmitted to humans ?
 - (A) Ticks
 - (B) Sandflies
 - (C) Mosquitoes
 - (D) Rodent
15. Japanese B encephalitis has been mainly found in Asia that can be transmitted through the bite of a mosquito. Which of the following is the reservoir of the virus ?
 - (A) Herons
 - (B) Horses
 - (C) Cows
 - (D) Rabbits

16. Which of the following microorganisms is the major inhabitant of the human skin ?
- (A) *Escherichia coli*
 - (B) *Staphylococcus epidermidis*
 - (C) *Staphylococcus aureus*
 - (D) *Streptococcus pyogenes*
17. is the normal flora of the upper respiratory tract of the human body.
- (A) *Lactobacillus* spp
 - (B) *Staphylococcus* spp
 - (C) *Vibrio* spp
 - (D) None of the above
18. All of the following bacteria are the predominant normal flora of human feces, except :
- (A) *Pseudomonas* sps
 - (B) *Bacteroides* sps
 - (C) *Enterococcus* sps
 - (D) *Bacillus* sps
19. Name the pathogen transmitted to humans by the bite of fleas that can cause a serious and deadly infection :
- (A) *Salmonella typhi*
 - (B) *Yersinia pestis*
 - (C) *Shigella dysenteriae*
 - (D) *Escherichia coli*
20. Some bacteria and fungi need an iron receptors molecule for their growth which is an important virulence factor of bacterial pathogenesis, what is it called ?
- (A) Siderophores
 - (B) Ionophores
 - (C) Siderocytes
 - (D) None of the above
21. Which of the following bacteria does not have catalase ?
- (A) Enterobacter
 - (B) Pseudomonas
 - (C) Corynebacterium
 - (D) Streptococci
22. Which pathogen is a major cause of dental disease ?
- (A) *Staphylococcus epidermidis*
 - (B) *Streptococcus mutans*
 - (C) *Staphylococcus aureus*
 - (D) *Streptococcus agalactiae*

23. The most significant bacteria found in acne is acnes.
- (A) *Staphylococcus*
 - (B) *Streptococcus*
 - (C) *Propionibacterium*
 - (D) *Bacillus*
24. Which of the following bacteria is predominantly present as normal flora in urine ?
- (A) *Escherichia coli*
 - (B) *Staphylococcus epidermidis*
 - (C) *Staphylococcus aureus*
 - (D) *Streptococcus pyogenes*
25. The virulence factors of a bacteria are the important constituents of the bacteria that help in invading the host and initiating the infection. Select the important virulence factors which help in the process of bacterial pathogenesis :
- (A) Siderophores and Capsules
 - (B) Exotoxins and endotoxins
 - (C) Pili/fimbriae
 - (D) All of the above
26. Name the possible pathogen that can invade the skin and cause tissue damage in humans :
- (A) *E. coli*
 - (B) *Bacillus cereus*
 - (C) *Clostridium perfringens*
 - (D) *Proteus mirabilis*
27. Mycobacteria are acid-fast positive bacteria because they consist of :
- (A) lipopolysaccharide in the bacterial cell wall
 - (B) mycolic acid in the bacterial cell wall
 - (C) lipids
 - (D) Both (B) and (C)
28. The initial therapy of tuberculosis treatment regimen includes which of the following antibiotics/drugs ?
- (A) Streptomycin and rifampin
 - (B) Isoniazid, streptomycin, and ethambutol
 - (C) Rifampin, isoniazid, and ciprofloxacin
 - (D) Isoniazid, rifampin, pyrazinamide, and ethambutol

29. Other than *Mycobacterium tuberculosis* which of the following bacteria causes tuberculosis infection in animals and can be transmitted to humans by consumption of milk and other animal products ?
- (A) *Mycobacterium bovis*
 - (B) *Mycobacterium leprae*
 - (C) *Mycobacterium ulcerans*
 - (D) *Mycobacterium abscessus*
30. Shigellosis is caused by *Shigella dysenteriae* in humans causing fever, abdominal cramps, diarrhea sometimes blood. The infection is attributed to the activity of Shiga toxin which increases the severity by tissue invasion in the large intestine.
- (A) Exotoxic
 - (B) Enterotoxic
 - (C) Cytotoxic
 - (D) Neurotoxic
31. Which type of salmonellae is primarily infectious for humans ?
- (A) *Salmonella typhi* A
 - (B) *Salmonella paratyphi* A, B, and C
 - (C) *Salmonella paratyphi* A and B
 - (D) *Salmonella paratyphi* A
32. *Salmonella typhi* and *S. paratyphi* are the two major pathogens that cause enteric fever. Which of the following are not the possible specimen taken for the routine diagnosis of the disease ?
- (A) Blood
 - (B) Sputum
 - (C) Feces
 - (D) Urine
33. The Widal test is used for the detection of *Salmonella typhi* and other subspecies. This test is based on which of the following 'principles' ?
- (A) The antigens are detected using the neutralization assay
 - (B) The antigen combines with its soluble antibody and forms a lattice with a visible precipitate
 - (C) The antigens bind to RBCs and form the agglutination
 - (D) None of the above

34. Which of the following culture media is not the selective media most commonly used for the isolation of salmonellae and shigellae ?

- (A) Deoxycholate citrate agar
- (B) Xylose-lysine decarboxylase agar
- (C) Salmonella–Shigella agar
- (D) Potato dextrose agar

35. Select all the correct statements regarding prevention and control of cholera that can help to reduce the spread of the disease in children.

- (A) Provide oral rehydration solution to the patients
- (B) Proper and regular handwashing practices
- (C) Organizing awareness program for hygiene practices
- (D) All of the above

36. In recent years several studies have shown that there is a strong relationship between gut flora and the health conditions of an individual. What are the common types of poor health conditions that have been strongly associated with the imbalance and changes in the gut flora ?

- (A) Overweight
- (B) Mental stress
- (C) Inflammation
- (D) All of the above

37. Name the predominant pathogen identified during the dysentery outbreaks in India :

- (A) *Shigella dysentery type 1*
- (B) *Shigella boydii*
- (C) *Shigella dysentery type 3*
- (D) *Shigella sonnei*

38. The biochemical properties of enteric bacteria are helpful in the differentiation of the specific pathogen. Which of the following biochemical test methods demonstrate the production of tryptophan into an indole compound ?
- (A) IMViC test
 - (B) MRVP test
 - (C) TSI test
 - (D) Citrate test
39. *S. typhimurium* causes enterocolitis and gastroenteritis in humans. What is the most common food for the source of transmission of the infection to humans ?
- (A) Fruits and vegetables
 - (B) Poultry and eggs
 - (C) Canned beans
 - (D) Yogurt
40. The symptoms of typhoid fever usually develop in one to three weeks after exposure to *S. typhi*. Which of the following is the least common symptom of the disease ?
- (A) Weight gain
 - (B) Headache
 - (C) High-grade fever
 - (D) Rashes
41. Cholera is predominant mainly in developing countries where there is a lack of clean drinking water supply. Name the type of diarrheal infection associated with *V. cholerae* ?
- (A) Acute watery bloody diarrhoea
 - (B) Acute watery rice water diarrhoea
 - (C) Mild watery rice water diarrhoea
 - (D) Acute watery diarrhoea with no blood
42. Which of the following is the most common form of plague which causes swelling of the lymph nodes ?
- (A) Septicemic plague
 - (B) Bubonic plague
 - (C) Pneumonic plague
 - (D) All of the above

43. The outbreak of the black death, a pandemic during the 1300s killed millions of people in Europe and Asia. Name the possible pathogen found to be responsible for the outbreak ?
- (A) *Francisella tularensis*
 (B) *Yersinia pestis*
 (C) *Yersinia pseudotuberculosis*
 (D) *Pasteurella haemolytica*
44. All of the following bacterial pathogens given below are the examples of major zoonotic diseases, except :
- (A) *Bacillus anthracis*
 (B) *Borrelia burgdorferi*
 (C) *Yersinia pestis*
 (D) *Leishmania tropica*
45. All of the following are the characteristics of cutaneous mycoses, except :
- (A) The infection of hair, skin, and nails
 (B) The common cause of ringworm in humans only
 (C) *Candida* spp is associated with the infection
 (D) The keratinized layer of the skin is prone to the infect
46. A 26-year-old man develops itchy, white flaky, and stingy patches in between the toe webs and soles of the feet, the infection is characterized by inflammation and skin fissures. Which of the following is the possible etiological agent ?
- (A) *Trichophyton rubrum*
 (B) *Microsporum canis*
 (C) *Trichophyton equinum*
 (D) *Trichophyton tonsurans*
47. Which of the following is the risk factor of an Athlete's foot ?
- (A) Wearing tight shoes
 (B) Sweating a lot
 (C) Keeping the feet wet for a long period of time
 (D) All of the above
48. Which of the following dermatophytes does not have the spore form characteristic called Microconidia ?
- (A) *Microsporum* spp
 (B) *Epidermaphyton* spp
 (C) *Trichophyton* spp
 (D) *Blastomyces* spp

49. All of the following are common dermatophytes responsible for the infection of nails, except :
- (A) *Epidermophyton floccosum*
 - (B) *Trichophyton rubrum*
 - (C) *Trichophyton mentagrophytes* complex
 - (D) *Microsporum canis*
50. HIV 2 (a less pathogenic than HIV 1) is mainly found in which part of the world ?
- (A) Asia
 - (B) West Africa
 - (C) Northern Europe
 - (B) North America
51. Which of the following is an important molecule present in the outer membrane of HIV that helps the virus to enter the host cell and cause infection ?
- (A) Polysaccharides
 - (B) Glycoproteins
 - (C) Proteins
 - (D) Lipopolysaccharides
52. Select all the incorrect options given below for the common route of transmission of HIV from one person to another ?
- (A) Unprotected sexual contact with an infected person
 - (B) From infected mother to the fetus
 - (C) From the mosquito bite
 - (D) Exposure to contaminated blood and blood products
53. Which of the following enzymes is required for the viral replication process and plays a critical role in the pathogenesis of HIV infection ?
- (A) RNA polymerase
 - (B) DNA polymerase
 - (C) RNA polymerase II
 - (D) Reverse transcriptase
54. Select all the opportunistic infections which are common in the HIV/AIDS :
- (A) Candidiasis
 - (B) Toxoplasmosis
 - (C) Meningitis
 - (D) All of the above

55. Name the possible source of the transmission of HIV in humans that is believed to have first occurred in Africa :
- (A) A duck
 - (B) A pig
 - (C) A cow
 - (D) A chimpanzee
56. A patient is diagnosed with AIDS, living with HIV for more than 6 years. Which of the following statements is true regarding the diagnosis of the disease ?
- (A) The CD4⁺ count is less than 200 cells/mm³
 - (B) It occurs at the early stage of the HIV infection
 - (C) The person with AIDS can live up to 10 years
 - (D) The virus is usually in a dormant state during this stage
57. Which of the following is an important HIV antigen in determining the early detection of HIV infection ?
- (A) p24
 - (B) gp120
 - (C) Pol gene
 - (D) Gp120
58. The envelope protein gp120 (Glycoprotein 120) is required for the attachment of the HIV virus to CD 4 receptors of target host cells. Identify the immune cells that consist of CD 4 receptors :
- (A) T helper cells
 - (B) Monocytes
 - (C) Macrophages
 - (D) Dendritic cells
59. Identify the false statement about the influenza viruses subtypes A, B, and C :
- (A) Influenza type A may be found in chickens, pigs, and horses
 - (B) Antigenic shifts or viral genome reassortment occurs in Influenza A virus
 - (C) All three types of viruses are found in humans and other animals
 - (D) Influenza virus infects mainly the upper respiratory tract
60. Which of the following viruses can give life-long immunity to the disease after prior infection or immunization ?
- (A) Rhinovirus
 - (B) Influenza A virus
 - (C) Influenza C virus
 - (D) Measles virus

4. Four alternative answers are mentioned for each question as—A, B, C & D in the booklet. The candidate has to choose the most correct/appropriate answer and mark the same in the OMR Answer-Sheet as per the direction :

Example :

Question :

Q. 1 (A) ☒ (B) (C) (D)

Q. 2 (A) (B) ☒ (C) (D)

Q. 3 (A) ☒ (B) (C) (D)

Illegible answers with cutting and over-writing or half filled circle will be cancelled.

5. Each question carries equal marks. Marks will be awarded according to the number of correct answers you have.
6. All answers are to be given on OMR Answer sheet only. Answers given anywhere other than the place specified in the answer sheet will not be considered valid.
7. Before writing anything on the OMR Answer Sheet, all the instructions given in it should be read carefully.
8. After the completion of the examination candidates should leave the examination hall only after providing their OMR Answer Sheet to the invigilator. Candidate can carry their Question Booklet.
9. There will be no negative marking.
10. Rough work, if any, should be done on the blank pages provided for the purpose in the booklet.
11. To bring and use of log-book, calculator, pager and cellular phone in examination hall is prohibited.
12. In case of any difference found in English and Hindi version of the question, the English version of the question will be held authentic.

Impt. : On opening the question booklet, first check that all the pages of the question booklet are printed properly. If there is any discrepancy in the question Booklet, then after showing it to the invigilator, get another question Booklet of the same series.

4. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार सम्भावित उत्तर—A, B, C एवं D हैं। परीक्षार्थी को उन चारों विकल्पों में से एक सबसे सही अथवा सबसे उपयुक्त उत्तर छोटना है। उत्तर को OMR आन्सर-शीट में सम्बन्धित प्रश्न संख्या में निम्न प्रकार भरना है :

उदाहरण :

प्रश्न :

प्रश्न 1 (A) ☒ (B) (C) (D)

प्रश्न 2 (A) (B) ☒ (C) (D)

प्रश्न 3 (A) ☒ (B) (C) (D)

अपठनीय उत्तर या ऐसे उत्तर जिन्हें काटा या बदला गया है, या गोले में आधा भरकर दिया गया, उन्हें निरस्त कर दिया जाएगा।

5. प्रत्येक प्रश्न के अंक समान हैं। आपके जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
6. सभी उत्तर केवल ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर ही दिये जाने हैं। उत्तर-पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।
7. ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाये।
8. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी OMR Answer Sheet उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें। परीक्षार्थी अपने साथ प्रश्न-पुस्तिका ले जा सकते हैं।
9. निगेटिव मार्किंग नहीं है।
10. कोई भी रफ कार्य, प्रश्न-पुस्तिका के अन्त में, रफ-कार्य के लिए दिए खाली पेज पर ही किया जाना चाहिए।
11. परीक्षा-कक्ष में लॉग-बुक, कैलकुलेटर, पेजर तथा सेल्युलर फोन ले जाना तथा उसका उपयोग करना वर्जित है।
12. प्रश्न के हिन्दी एवं अंग्रेजी रूपान्तरण में भिन्नता होने की दशा में प्रश्न का अंग्रेजी रूपान्तरण ही मान्य होगा।

महत्वपूर्ण : प्रश्नपुस्तिका खोलने पर प्रथमतः जाँच कर देख लें कि प्रश्न-पुस्तिका के सभी पृष्ठ भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्षनिरीक्षक को दिखाकर उसी सिरीज की दूसरी प्रश्न-पुस्तिका प्राप्त कर लें।