Roll No. .....

Question Booklet Number

O. M. R. Serial No. | | | | | | | |

M. Sc. (Microbiology) (Fourth Semester) EXAMINATION, 2025-26

(Old Syllabus Effective from 2022)

(Only Back Paper Students)

PHARMACEUTICAL MICROBIOLOGY

Paper Code							
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Questions Booklet Series
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Time : 1:30 Hours] [*Maximum Marks : 75*

Instructions to the Examinee :

1. Do not open the booklet unless you are asked to do so.

2. The booklet contains 100 questions. Examinee is required to answer 75 questions in the OMR Answer-Sheet provided and not in the question booklet. 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 100 प्रश्न हैं। परीक्षार्थी को 75 प्रश्नों को केवल दी गई OMR आन्सर-शीट पर ही हल करना है, प्रश्न-पुस्तिका पर नहीं। 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)**

(Only for Rough Work)

1. Which drugs stop cancer growth by mimicking building blocks of DNA and RNA ?

(A) Alkylating agents

(B) Antimetabolites

(C) Plant alkaloids

(D) Antitumor antibiotics

2. Which drug acts by attaching an alkyl group to DNA to stop replication ?

(A) Methotrexate

(B) Doxorubicin

(C) Cyclophosphamide

(D) Vincristine

3. Drugs that block enzymes responsible for DNA winding/unwinding are called :

(A) Topoisomerase inhibitors

(B) Alkylating agents

(C) Antimetabolites

(D) Plant alkaloids

4. Which plant-derived drug disrupts cell division by targeting microtubules ?

(A) Etoposide

(B) Paclitaxel

(C) Bleomycin

(D) Cisplatin

5. Which class of drugs binds directly to DNA to prevent its replication ?

(A) Antitumor antibiotics

(B) Antimetabolites

(C) Plant alkaloids

(D) Topoisomerase inhibitors

6. Who discovered Salvarsan, the first chemical treatment for syphilis ?

(A) Robert Koch

(B) Alexander Fleming

(C) Louis Pasteur

(D) Paul Ehrlich

7. Which war led to the discovery of nitrogen mustard as a cancer treatment ?

(A) The Cold War

(B) World War II

(C) World War I

(D) The Vietnam War

8. Childhood leukemia treatment in the 1950s was revolutionized by combining :

(A) Vincristine and Paclitaxel

(B) Methotrexate and 6-mercaptopurine

(C) Doxorubicin and Cyclophosphamide

(D) Methotrexate and 5-fluorouracil

9. Which antibiotic type showed early promise in treating specific cancers ?

(A) Cephalosporins

(B) Penicillins

(C) Streptomycin

(D) Tetracyclines

10. What enables personalized medicine by identifying genetic drivers of cancer ?

(A) Antibiotics

(B) Genomic technologies

(C) Chemotherapy cocktails

(D) Immunotherapy

11. "Selective toxicity" in antimicrobials refers to the ability to :

(A) Kill specific microbes without damaging the host

(B) Kill all known microorganisms

(C) Prevent the development of drug resistance

(D) Penetrate through thick bacterial biofilms

12. The link between drug concentration and its effect on microbes is called :

(A) Pharmacodynamics

(B) Pharmacokinetics

(C) Resistance

(D) Selective toxicity

13. What is the term for two drugs working better together than the sum of their parts ?

(A) Selective toxicity

(B) Pharmacokinetics

(C) Synergy

(D) Resistance

14. How are skin-specific antimicrobial agents usually applied ?

(A) Intravenously

(B) Orally

(C) Topically

(D) Via inhalation

15. A very common side effect of taking antimicrobial drugs is :

(A) Vision loss

(B) Memory loss

(C) Gastrointestinal (stomach) upset

(D) Muscle weakness

16. Drugs entirely created in a lab via chemical processes are :

(A) Biologically derived

(B) Natural agents

(C) Synthetic agents

(D) Semisynthetic agents

17. What do we call natural compounds that are chemically modified in a lab ?

(A) Semisynthetic agents

(B) Synthetic agents

(C) Natural agents

(D) Biologically derived

18. Which of these is a prime example of a semisynthetic drug ?

(A) Paclitaxel

(B) Cyclophosphamide

(C) Etoposide

(D) Methotrexate

19. Doxorubicin is categorized as what type of agent ?

(A) Synthetic

(B) Semisynthetic

(C) Natural (from bacteria)

(D) Biologically derived

20. Vinca alkaloids from the periwinkle plant are considered :

(A) Natural agents

(B) Synthetic agents

(C) Semisynthetic agents

(D) Biologically derived

21. Which agents target bacterial structures to stop their growth ?

(A) Antifungals

(B) Antivirals

(C) Antibiotics

(D) Antiprotozoals

22. Most antifungal drugs work by :

(A) Blocking viral entry

(B) Inhibiting ergosterol synthesis in fungal cells

(C) Disrupting bacterial cell walls

(D) Stopping RNA synthesis

23. Which drug is the standard treatment for herpes virus infections ?

(A) Acyclovir

(B) Fluconazole

(C) Oseltamivir

(D) Metronidazole

24. Antiprotozoal drugs generally work by :

(A) Blocking viral proteins

(B) Inhibiting bacterial protein synthesis

(C) Disrupting protozoan metabolism or DNA

(D) Breaking fungal cell membranes

25. Infections like Giardia are typically treated with :

(A) Antiprotozoal agents

(B) Antifungal agents

(C) Antiviral agents

(D) Antibiotics

26. Antimicrobial peptides (AMPs) mainly work by :

(A) Blocking protein synthesis

(B) Inhibiting viral replication

(C) Disrupting microbial cell membranes

(D) Targeting ergosterol

27. "Phage therapy" uses what to fight bacterial infections ?

(A) Engineered enzymes

(B) Bacteriophages (viruses)

(C) Synthetic antibodies

(D) Human genes

28. Using engineered enzymes to target specific disease pathways is called :

(A) Enzyme replacement therapy

(B) Enzyme inhibition therapy

(C) Enzyme induction therapy

(D) Enzyme conversion therapy

29. Which turmeric derivative is used for its anti-inflammatory properties ?

(A) Resveratrol

(B) Quercetin

(C) Artemisinin

(D) Curcumin

30. What is a key feature of therapeutic bacteriophages ?

(A) They target specific bacterial strains

(B) They kill fungi by targeting cell walls

(C) They disrupt human cell membranes

(D) They prevent all viral replication

31. How do bacteria develop resistance via "spontaneous" change ?

(A) Exchanging genes with neighbors

(B) Genetic mutation

(C) Absorbing antibiotic molecules

(D) Cell wall thickening

32. Resistance genes moving between bacteria via physical contact is :

(A) Horizontal gene transfer

(B) Vertical gene transfer

(C) Genetic recombination

(D) Gene amplification

33. A major cause of the global antibiotic resistance crisis is :

(A) Proper prescribing habits

(B) Use of combination therapy

(C) Overuse and misuse of antibiotics

(D) Strict patient compliance

34. The goal of an antibiotic stewardship program is to :

(A) Increase the use of broad-spectrum drugs

(B) Encourage the misuse of drugs

(C) Optimize antibiotic use to limit resistance

(D) Stop all antibiotic research

35. What strategy lowers the risk of resistance emerging during treatment ?

(A) Using single antibiotics only

(B) Combination therapy targeting multiple pathways

(C) Poor patient compliance

(D) Inappropriate prescribing

36. Which of these is a biological source of microbial contamination ?

(A) Soil

(B) Animals

(C) Dust

(D) Packaging

37. Which environmental factor is most critical for microbial survival ?

(A) Packaging

(B) Light exposure

(C) pH

(D) Machinery type

38. Which of these is an “intrinsic” factor for microbial growth ?

(A) Storage temperature

(B) Atmospheric conditions

(C) Water activity

(D) Packaging type

39. If active drug ingredients break down, what is the likely result ?

(A) Higher potency

(B) Reduced efficacy

(C) Better stability

(D) Less contamination

40. Which additive is used in formulations to ensure stability ?

(A) Flavorings

(B) Emulsifiers

(C) Water activity

(D) Light exposure

41. The main objective of sterilization in a pharmaceutical plant is to :

(A) Prevent growth only

(B) Improve product color

(C) Kill or remove all forms of microbial life

(D) Reduce contamination slightly

42. Using high-pressure steam at high temperatures is called :

(A) Chemical sterilization

(B) Heat sterilization

(C) Radiation sterilization

(D) Filtration

43. Which process must happen before using a new sterilization method ?

(A) Regulatory approval

(B) Product validation

(C) Process qualification

(D) Packaging qualification

44. What facility control helps prevent contamination during manufacturing ?

(A) Filtration

(B) Cleanrooms

(C) Heat sterilization

(D) Chemical disinfection

45. Sterilizing-grade filters are used specifically to :

(A) Improve product clarity

(B) Physically remove microorganisms

(C) Increase shelf life

(D) Decrease liquid viscosity

46. Autoclaving is another name for :

(A) Dry heat sterilization

(B) Steam sterilization

(C) Gaseous sterilization

(D) Radiation sterilization

47. Radiation sterilization primarily kills microbes by :

(A) Denaturing proteins

(B) Oxidizing components

(C) Alkylating DNA

(D) Breaking cell walls

48. Which method is best for heat-sensitive plastics ?

(A) Steam sterilization

(B) Dry heat sterilization

(C) Gaseous sterilization

(D) Boiling

49. What is the purpose of using sterilizing-grade filters in filtration sterilization ?

(A) Increasing shelf life

(B) Removing microorganisms

(C) Clarifying the liquid

(D) Changing viscosity

50. Which method uses ethylene oxide or hydrogen peroxide vapor ?

(A) Radiation sterilization

(B) Dry heat sterilization

(C) Gaseous sterilization

(D) Autoclaving

51. Why are preservatives added to product formulations ?

(A) To enhance color

(B) To stop microbial growth and contamination

(C) To make the product taste better

(D) To increase thickness

52. An ideal preservative should have :

(A) Broad-spectrum antimicrobial activity

(B) A very high price

(C) A strong color

(D) A sweet taste

53. Designing a preservative system carefully is meant to :

(A) Decrease stability

(B) Increase product shelf life

(C) Make the product more colorful

(D) Lower viscosity

54. When picking a preservative, which is NOT a positive factor ?

(A) Low toxicity

(B) High cost

(C) Stability

(D) Compatibility

55. A common strategy in developing a preservative system is :

(A) Avoiding them entirely

(B) Using only one agent

(C) Combining preservatives with different mechanisms

(D) Picking one with a strong scent

56. The primary job of an antimicrobial preservative is to :

(A) Stop spoilage by inhibiting microbial growth

(B) Change the product's color

(C) Improve the taste

(D) Increase viscosity

57. How do most preservatives work ?

(A) Boosting microbial metabolism

(B) Disrupting microbial cell membranes

(C) Activating microbial enzymes

(D) Helping microbes grow

58. The effectiveness of a preservative is highly dependent on its :

(A) Concentration

(B) Packaging

(C) Temperature

(D) Flavor

59. Which book sets the standards for pharmaceutical preservatives ?

(A) European Pharmacopoeia

(B) United States Pharmacopeia (USP)

(C) British Pharmacopoeia

(D) International Pharmacopoeia

60. Broad-spectrum preservatives are useful because they :

(A) Require specific high temperatures

(B) Only work at one pH

(C) Have a wide microbial target range

(D) Require very high concentrations

61. "Preservative stability" means the agent can :

(A) Maintain its chemical integrity and potency

(B) Enhance the product's color

(C) Increase the product's thickness

(D) Stop microbes only for one day

62. Inoculating a product with known microbes to test it is called :

(A) Compatibility testing

(B) Accelerated stability testing

(C) Challenge testing

(D) Effectiveness testing

63. What is the goal of the Preservative Challenge Test (PCT) ?

(A) To see if the product changes color

(B) To test efficacy against various microbes

(C) To check if ingredients mix well

(D) To measure shelf life

64. Checking if a preservative reacts poorly with other ingredients is :

(A) Challenge testing

(B) Stability testing

(C) Compatibility testing

(D) Efficacy testing

65. Accelerated stability testing is used to :

(A) Test efficacy in real-time

(B) Check stability under "speeded-up" aging conditions

(C) Find the minimum dose needed

(D) Monitor color changes

66. A system using microbes to find specific metabolic traits is a :

(A) Molecular screening system

(B) Biochemical screening system

(C) Microbial screening system

(D) Recombinant screening system

67. The main goal of a recombinant screening system is to :

(A) Identify protein interactions

(B) Select clones with specific DNA sequences

(C) Analyze molecules at a tiny scale

(D) Find biochemical activities

68. Which system identifies specific biochemical interactions ?

(A) Microbial screening

(B) Recombinant screening

(C) Biochemical screening system

(D) Molecular screening

69. A common strategy for building molecular-level screening is :

(A) Picking a specific microbe

(B) Using recombinant DNA technology

(C) Using high-throughput methods

(D) Designing an enzymatic assay

70. The primary objective of biochemical screening is to :

(A) Quantify protein amounts

(B) Identify specific DNA

(C) Detect specific biochemical activities/interactions

(D) Find microbial traits

71. What is the goal of conventional bioprospecting ?

(A) Analyzing computer datasets

(B) Finding drug candidates in nature

(C) Making machine learning algorithms

(D) Virtual screening

72. Systematically searching for bioactive compounds in nature is :

(A) Virtual screening

(B) Network pharmacology

(C) Conventional bioprospecting

(D) Machine learning

73. Data mining in drug design is used to :

(A) Conduct field surveys in forests

(B) Analyze large datasets to find new drug candidates

(C) Isolate natural compounds

(D) Sequence human DNA

74. Which approach maps complex links between drugs, targets, and diseases ?

(A) Virtual screening

(B) Machine learning

(C) Network pharmacology

(D) Bioprospecting

75. Screening chemical libraries via computer against a protein target is :

(A) Data mining

(B) Virtual screening

(C) Network pharmacology

(D) Bioprospecting

76. What is the main goal of preclinical trials ?

(A) Test efficacy in humans

(B) Find the best dose for humans

(C) Identify toxicities in a lab/animal setting

(D) Study long-term effects

77. Which parameter measures the "lethal dose" for 50% of animals ?

(A) NOAEL

(B) MTD

(C) LD50

(D) ED50

78. Clinicians report adverse events to authorities mainly to assess :

(A) Efficacy

(B) Safety

(C) Cost

(D) Pharmacokinetics

79. The primary goal of Phase I clinical trials is to :

(A) Determine the maximum tolerated dose (MTD) and safety

(B) Confirm the drug works

(C) Study long-term side effects

(D) Compare with other drugs

80. The ED50 is the dose that works for what percentage of people ?

(A) 25%

(B) 50%

(C) 75%

(D) 100%

81. Bioavailability describes :

(A) The speed of drug absorption

(B) The concentration at the brain

(C) The fraction of a dose that reaches systemic circulation

(D) How long a drug lasts

82. Ligand-based drug design includes :

(A) Molecular docking

(B) Pharmacophore modeling and QSAR

(C) X-ray crystallography

(D) De novo design

83. Why do we conduct preclinical trials ?

(A) To prove efficacy in humans

(B) To set a final market price

(C) To evaluate safety and toxicity in animals

(D) To analyze metabolism in humans

84. Which is NOT usually part of the official drug approval process ?

(A) Preclinical studies

(B) Clinical trials

(C) Post-marketing surveillance

(D) Direct-to-consumer marketing

85. A major use for biosensors in the pharma industry is :

(A) Data encryption

(B) Disease diagnostics

(C) Marketing automation

(D) Logistics

86. Where does most early-stage R&D funding come from ?

(A) Government bonds

(B) Corporate loans

(C) Venture capital

(D) Public stock markets

87. A major trend in the modern pharma market is :

(A) A move toward personalized medicine

(B) A decrease in research spending

(C) Fewer biologic drugs

(D) Removing digital health tools

88. What protection keeps others from copying a new drug formulation ?

(A) Trademark

(B) Copyright

(C) Patent

(D) Trade secret

89. What is the purpose of the BP and USP pharmacopoeias ?

(A) To market drugs globally

(B) To provide quality standards for medicines

(C) To fund research

(D) To hire scientists

90. Who approves drugs for sale in the USA ?

(A) EMA

(B) WHO

(C) FDA

(D) MHRA

91. Phase IV surveillance monitors :

(A) 20-50 people

(B) 300-3,000 people

(C) The whole market after approval

(D) 20-300 people

92. Clinical trials are NOT characterized as :

(A) Human subject studies

(B) Behavioral research studies

(C) Studies based only on animals

(D) Biomedical research studies

93. Order the FDA steps : Lab tests, then :

(A) IND - Human trials - NDA - Approval

(B) NDA - IND - Human trials - Approval

(C) Human trials - NDA - IND - Approval

(D) Approval - NDA - IND - Lab tests

94. The drug discovery process essentially :

(A) Guarantees no side effects

(B) Determines the safety and efficacy of candidates

(C) Only happens in animal labs

(D) Focuses solely on manufacturing

95. FDA stands for :

(A) Federal Drug Association

(B) Food and Drug Act

(C) Food and Drug Administration

(D) Federal Department of Drug Administration

96. Human safety assessment is the main focus of :

(A) Phase I

(B) Phase II

(C) Phase III

(D) Phase IV

97. Good Manufacturing Practices (GMP) ensure :

(A) Consistent product quality and safety

(B) Higher drug prices

(C) Better marketing

(D) Fast FDA approval

98. The ANDA process is used to approve :

(A) New biologics

(B) Orphan drugs

(C) Generic drugs bioequivalent to brand names

(D) Drug grants

99. What do Good Manufacturing Practices (GMP) regulations primarily ensure in the pharmaceutical industry ?

(A) Marketing strategies

(B) Product quality and safety

(C) Pricing

(D) Faster testing

100. What is the purpose of the Abbreviated New Drug Application (ANDA) process overseen by the FDA ?

(A) New brand name drugs

(B) Post-market safety

(C) Generic drugs

(D) Biologic grants

(Only for Rough Work)

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

Example :

Question :

Q. 1 (A) ● (C) (D)
Q. 2 (A) (B) ● (D)
Q. 3 (A) ● (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 सही उत्तर छाँटना है। उत्तर को OMR आन्सर-शीट में सम्बन्धित प्रश्न संख्या में निम्न प्रकार भरना है :

उदाहरण :

प्रश्न :

प्रश्न 1 (A) ● (C) (D)
प्रश्न 2 (A) (B) ● (D)
प्रश्न 3 (A) ● (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।