

Roll No. ....

Question Booklet Number

O. M. R. Serial No.

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## M. Sc. (Microbiology) (Fourth Semester)

### EXAMINATION, 2025-26

(Old Syllabus Effective from 2022)

(Only Back Paper Students)

## ENTREPRENEURIAL MICROBIOLOGY

Paper Code						
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Questions Booklet Series
D

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 of the following is used in biodegradable packaging ?
  - (A) Agro-waste cellulose
  - (B) PVC
  - (C) Nylon
  - (D) Polystyrene
2. Which of the following is a probiotic benefit ?
  - (A) Pathogen growth
  - (B) Toxin production
  - (C) Antibiotic resistance
  - (D) Infection control
3. Which of the following is a patentable biotechnological product ?
  - (A) Recombinant vaccine
  - (B) Natural sunlight
  - (C) Rainwater
  - (D) Soil
4. Which of the following is a challenge in entrepreneurship ?
  - (A) High salary
  - (B) Stable income
  - (C) Uncertainty
  - (D) Fixed working hours
5. Which of the following is a fungal protease producer ?
  - (A) *Streptomyces griseus*
  - (B) *Bacillus subtilis*
  - (C) *Escherichia coli*
  - (D) *Aspergillus niger*
6. Which of the following is a step in patent filing ?
  - (A) Drafting claims
  - (B) Ignoring novelty
  - (C) Avoiding documentation
  - (D) Skipping legal review.
7. Which of the following is a plant growth promoting rhizobacterium (PGPR) ?
  - (A) *Azospirillum*
  - (B) *Staphylococcus*
  - (C) *Mycobacterium*
  - (D) *Candida*
8. Which of the following is a reason for startup failure ?
  - (A) Strong leadership
  - (B) Poor market research
  - (C) Adequate funding
  - (D) Customer loyalty
9. Which of the following is a patentable process ?
  - (A) Earth's rotation
  - (B) Natural photosynthesis
  - (C) Gravity
  - (D) Microbial fermentation for enzyme production

10. Mushroom cultivation helps in :
- (A) Vitamin synthesis
  - (B) Antibiotic production
  - (C) Waste degradation
  - (D) Metal extraction
11. Which of the following is a regulatory body for food products in India ?
- (A) FPO
  - (B) NASA
  - (C) ISRO
  - (D) DRDO
12. Contamination in brewing is caused by :
- (A) Filtered water
  - (B) Unwanted microbes
  - (C) Controlled temperature
  - (D) Sterile equipment
13. Which of the following is a startup funding source ?
- (A) Bank clerks
  - (B) Tax inspectors
  - (C) Government auditors
  - (D) Angel investors
14. Which of the following is a workplace safety concern ?
- (A) Following SOPs
  - (B) Chemical exposure
  - (C) Wearing lab coats
  - (D) Using fume hoods
15. Which of the following is a benefit of microbial bioinoculants ?
- (A) Increased pesticide resistance
  - (B) Improved nutrient uptake
  - (C) Reduced crop yield
  - (D) Soil compaction
16. Industrial alcohol is produced using :
- (A) *Rhizopus nigricans*
  - (B) *Penicillium chrysogenum*
  - (C) *Saccharomyces cerevisiae*
  - (D) *Streptomyces griseus*
17. Which of the following is NOT a characteristic of an entrepreneur ?
- (A) Risk-taking
  - (B) Innovation
  - (C) Dependency
  - (D) Decision-making

18. Which of the following is a patentable composition ?
- (A) Water
  - (B) Microbial enzyme cocktail
  - (C) Air
  - (D) Sand
19. Brewing involves which of the following steps ?
- (A) Carbonation
  - (B) Pasteurization
  - (C) Sterilization
  - (D) Filtration
20. Which of the following is a fermentation trend ?
- (A) Lack of sensors
  - (B) Manual fermentation
  - (C) Open-air tanks
  - (D) Use of immobilized cells
21. Which of the following is a microbial source of ethanol ?
- (A) *Saccharomyces cerevisiae*
  - (B) *Clostridium acetobutylicum*
  - (C) *Lactobacillus acidophilus*
  - (D) *Streptococcus thermophilus*
22. The term “enterprise” refers to :
- (A) A business idea
  - (B) A government scheme
  - (C) A business organization
  - (D) A financial institution
23. Proteolytic enzymes are used for :
- (A) DNA replication
  - (B) Protein hydrolysis
  - (C) Lipid breakdown
  - (D) Carbohydrate synthesis
24. Which of the following is a microbial source of methane ?
- (A) *Pseudomonas*
  - (B) *Streptococcus*
  - (C) *Mycobacterium*
  - (D) *Methanobacterium*
25. Which of the following is a safety regulation ?
- (A) Use of biosafety cabinets
  - (B) Ignoring spills
  - (C) Eating in lab
  - (D) Unlabeled containers
26. Which of the following is a legal form of enterprise ?
- (A) Illegal cartel
  - (B) Sole proprietorship
  - (C) Underground network
  - (D) Informal group

27. Which of the following is a patentable invention ?
- (A) Genetically engineered microbe
  - (B) Natural law
  - (C) Mathematical equation
  - (D) Historical fact
28. Which of the following is a microbial source of bioplastics ?
- (A) *Candida albicans*
  - (B) *Streptococcus pyogenes*
  - (C) *Mycobacterium tuberculosis*
  - (D) *Ralstonia eutropha*
29. Which of the following best defines an entrepreneur ?
- (A) A person who manages a business
  - (B) A person who owns multiple enterprises
  - (C) A person who initiates and organizes a business venture
  - (D) A person who works for a startup
30. Which of the following is used in bioleaching of uranium ?
- (A) *Acidithiobacillus ferrooxidans*
  - (B) *Escherichia coli*
  - (C) *Bacillus subtilis*
  - (D) *Streptococcus pyogenes*
31. Legume inoculants help in :
- (A) Alcohol fermentation
  - (B) Nitrogen fixation
  - (C) Protein digestion
  - (D) Vitamin B12 synthesis
32. Which of the following is a fermentation economic factor ?
- (A) Equipment cost
  - (B) Employee hobbies
  - (C) Office snacks
  - (D) Wall color
33. Which of the following is a commonly cultivated mushroom species ?
- (A) *Penicillium camemberti*
  - (B) *Candida utilis*
  - (C) *Agaricus campestris*
  - (D) *Rhizopus nigricans*
34. Which of the following is a legal term in patent documentation ?
- (A) Notes
  - (B) Comments
  - (C) Suggestions
  - (D) Claims

35. Which of the following is a benefit of bioplastics ?
- (A) Biodegradability
  - (B) Toxicity
  - (C) Non-renewability
  - (D) Pollution
36. Which of the following is a risk mitigation strategy ?
- (A) Ignoring threats
  - (B) Insurance
  - (C) Overconfidence
  - (D) Avoiding planning
37. The term “infringement” in patent law refers to :
- (A) Legal registration
  - (B) Unauthorized use of a patented invention
  - (C) Filing a patent
  - (D) Publishing a research paper
38. Which of the following is a microbial bioplastic polymer ?
- (A) Nylon
  - (B) PVC
  - (C) PET
  - (D) PHB
39. Which of the following is a business idea in microbial biotechnology ?
- (A) Probiotic formulation
  - (B) Road building
  - (C) Furniture making
  - (D) Event management
40. Bacterial insecticides are primarily derived from :
- (A) *Escherichia coli*
  - (B) *Bacillus thuringiensis*
  - (C) *Staphylococcus aureus*
  - (D) *Clostridium tetani*
41. Which of the following is a key activity in entrepreneurship ?
- (A) Innovation
  - (B) Procrastination
  - (C) Delegation
  - (D) Avoidance
42. Which of the following is a characteristic of a patent ?
- (A) Confidentiality
  - (B) Public disclosure
  - (C) Unlimited duration
  - (D) No legal protection

43. Which of the following is used in bioleaching of gold ?
- (A) *Bacillus cereus*
  - (B) *Escherichia coli*
  - (C) *Thiobacillus thiooxidans*
  - (D) *Clostridium difficile*
44. A patent grants the inventor :
- (A) Tax exemption
  - (B) Exclusive rights to the invention
  - (C) Free manufacturing license
  - (D) Unlimited funding
45. Which of the following is a microbial method for plastic degradation ?
- (A) Shredding
  - (B) Combustion
  - (C) Melting
  - (D) Biodegradation
46. Which of the following is a secondary product from agro-industrial waste ?
- (A) Food dyes
  - (B) Pesticides
  - (C) Herbicides
  - (D) Insecticides
47. Which of the following is a government policy for MSMEs ?
- (A) Income Tax
  - (B) GST
  - (C) Udyam Registration
  - (D) RBI Act
48. Which of the following is a microbial process for recycling waste ?
- (A) Composting
  - (B) Incineration
  - (C) Landfilling
  - (D) Dumping
49. Baker's yeast is commonly used in :
- (A) Vaccine development
  - (B) Antibiotic production
  - (C) Vitamin synthesis
  - (D) Bread making
50. What is the primary goal of entrepreneurship development ?
- (A) Profit maximization
  - (B) Skill enhancement
  - (C) Employment generation
  - (D) Tax reduction

51. The difference between entrepreneur and entrepreneurship is :
- (A) One is a person, the other is a process
  - (B) Both are synonyms
  - (C) One is a company, the other is a product
  - (D) One is a government policy
52. Vermicompost is generated using :
- (A) Bacteria
  - (B) Algae
  - (C) Fungi
  - (D) Earthworms
53. Mycorrhiza is a type of :
- (A) Bacterial inoculant
  - (B) Viral agent
  - (C) Fungal inoculant
  - (D) Protozoan culture
54. Which of the following is a microbial bioinoculant for nitrogen fixation ?
- (A) *Azotobacter*
  - (B) *Escherichia coli*
  - (C) *Streptococcus pyogenes*
  - (D) *Clostridium tetani*
55. Methane is primarily produced by :
- (A) Aerobic bacteria
  - (B) Methanogenic archaea
  - (C) Fungi
  - (D) Cyanobacteria
56. Which of the following is a brewing step ?
- (A) Filtration
  - (B) Sterilization
  - (C) Pasteurization
  - (D) Maturation
57. Secondary agriculture refers to :
- (A) Primary crop cultivation
  - (B) Value-added agricultural processes
  - (C) Livestock farming
  - (D) Irrigation systems
58. Which institution is primarily responsible for entrepreneurship training in India ?
- (A) CSIR
  - (B) NIESBUD
  - (C) ICAR
  - (D) DRDO

59. Which of the following is NOT a risk in entrepreneurship ?
- (A) Financial loss
  - (B) Market competition
  - (C) Guaranteed profit
  - (D) Product failure
60. Which of the following is a microbial source of dietary fiber ?
- (A) *Spirulina*
  - (B) *Chlorella*
  - (C) *Lactobacillus*
  - (D) *Rhizobium*
61. Which of the following is a microbial source of biodegradable packaging material ?
- (A) *Candida*
  - (B) *Streptococcus*
  - (C) *Mycobacterium*
  - (D) *Cellulomonas*
62. Which of the following is used in mushroom cultivation ?
- (A) *Candida albicans*
  - (B) *Volvariella volvacea*
  - (C) *Penicillium roqueforti*
  - (D) *Rhizopus stolonifer*
63. Dietary fiber is an example of :
- (A) Primary metabolite
  - (B) Secondary product
  - (C) Enzyme
  - (D) Vitamin
64. Fermentation economics deals with :
- (A) Cost-benefit analysis of fermentation processes
  - (B) Genetic modification of microbes
  - (C) Patent filing procedures
  - (D) Enzyme purification
65. Which of the following is a by-product of brewing ?
- (A) Methane
  - (B) Carbon dioxide
  - (C) Hydrogen
  - (D) Ammonia
66. Which of the following is a fungal fermentation product ?
- (A) Protease
  - (B) Lipase
  - (C) Amylase
  - (D) Cellulase

67. Prebiotics are defined as :
- (A) Live microorganisms
  - (B) Non-digestible food ingredients
  - (C) Antibiotic compounds
  - (D) Pathogenic bacteria
68. Quality control in fermentation ensures :
- (A) Consistency and safety of products
  - (B) Increased contamination
  - (C) Reduced yield
  - (D) Higher mutation rates
69. Phenolic acids are derived from :
- (A) Fossil fuels
  - (B) Animal waste
  - (C) Agricultural residues
  - (D) Synthetic chemicals
70. Vermicompost is generated using :
- (A) Bacteria
  - (B) Earthworms
  - (C) Fungi
  - (D) Algae
71. FDA stands for :
- (A) Food Distribution Association
  - (B) Federal Drug Authority
  - (C) Fermentation Development Agency
  - (D) Food and Drug Administration
72. Genetic engineering in agriculture helps in :
- (A) Pest resistance
  - (B) Soil erosion
  - (C) Water pollution
  - (D) Climate change
73. Which of the following is a fungal source of amylase ?
- (A) *Saccharomyces cerevisiae*
  - (B) *Aspergillus oryzae*
  - (C) *Bacillus subtilis*
  - (D) *Rhizobium leguminosarum*
74. Which government scheme supports startup incubation in India ?
- (A) Make in India
  - (B) Digital India
  - (C) Startup India
  - (D) Skill India

75. Which of the following mushrooms is cultivated for recycling organic waste ?
- (A) *Agaricus bisporus*
  - (B) *Candida albicans*
  - (C) *Penicillium roqueforti*
  - (D) *Rhizopus stolonifer*
76. Which of the following is a microbial bioinoculant for potassium mobilization ?
- (A) *Azospirillum*
  - (B) *Rhizobium*
  - (C) *Frateuria aurantia*
  - (D) *Nitrobacter*
77. Which of the following is a fungal bioinoculant ?
- (A) *Nitrosomonas*
  - (B) *Rhizobium*
  - (C) *Azospirillum*
  - (D) *Trichoderma*
78. Which of the following is a flavor enhancer ?
- (A) Probiotic
  - (B) Antibiotic
  - (C) Toxin
  - (D) Preservative
79. Which of the following is a source of business opportunity ?
- (A) Natural disasters
  - (B) Political instability
  - (C) Market trends
  - (D) Inflation
80. Which of the following is a plant growth promoting product ?
- (A) Auxins
  - (B) Herbicides
  - (C) Insecticides
  - (D) Fungicides
81. Bioleaching is used to extract :
- (A) Proteins
  - (B) Metals
  - (C) Vitamins
  - (D) Sugars
82. Workplace safety includes :
- (A) Use of PPE
  - (B) Ignoring spills
  - (C) Overcrowding labs
  - (D) Avoiding SOPs
83. Which of the following is NOT part of the idea canvas ?
- (A) Customer segments
  - (B) Key activities
  - (C) Personal hobbies
  - (D) Revenue streams

84. Which of the following is a legal document for patent filing ?
- (A) Patent specification
  - (B) Lab notebook
  - (C) Research article
  - (D) Thesis
85. Which of the following is a fungal fermentation product used in cheese production ?
- (A) *Penicillium camemberti*
  - (B) *Candida albicans*
  - (C) *Rhizopus nigricans*
  - (D) *Volvariella volvacea*
86. Which of the following is NOT a requirement for patentability ?
- (A) Novelty
  - (B) inventiveness
  - (C) Utility
  - (D) Redundancy
87. Which of the following is a startup opportunity ?
- (A) Buying a franchise
  - (B) Launching a new product
  - (C) Joining a government job
  - (D) Renting office space
88. Which of the following is a microbial source of food color ?
- (A) *Monascus purpureus*
  - (B) *Escherichia coli*
  - (C) *Clostridium botulinum*
  - (D) *Streptococcus pyogenes*
89. Which of the following is a probiotic strain ?
- (A) *Mycobacterium tuberculosis*
  - (B) *Clostridium tetani*
  - (C) *Staphylococcus aureus*
  - (D) *Bifidobacterium bifidum*
90. Idea canvas is used to :
- (A) Paint business logos
  - (B) Visualize business concepts
  - (C) Design advertisements
  - (D) Create financial statements
91. Agro-industrial waste includes :
- (A) Metal scraps
  - (B) Plastic bottles
  - (C) Fruit peels
  - (D) Glass shards
92. Which of the following is a transgenic trait ?
- (A) Stem thickness
  - (B) Leaf size
  - (C) Drought resistance
  - (D) Root depth

93. Which of the following is a fungal source of flavor ?
- (A) *Volvariella volvacea*
  - (B) *Candida albicans*
  - (C) *Rhizopus nigricans*
  - (D) *Penicillium camemberti*
94. Which of the following is a safety measure in fermentation labs ?
- (A) Fire extinguisher availability
  - (B) Open flames near ethanol
  - (C) Eating in lab
  - (D) Unlabeled chemicals
95. Which of the following is a microbial bioinoculant for phosphorus solubilization ?
- (A) *Pseudomonas fluorescens*
  - (B) *Rhizobium*
  - (C) *Azotobacter*
  - (D) *Nitrobacter*
96. Composting involves :
- (A) Anaerobic digestion
  - (B) Aerobic microbial activity.
  - (C) Chemical oxidation
  - (D) UV sterilization
97. Which factor influences opportunity identification the most ?
- (A) Weather conditions
  - (B) Risk assessment
  - (C) Employee count
  - (D) Office location
98. Which of the following is a fermentation product used in baking ?
- (A) Yeast
  - (B) Mold
  - (C) Bacteria
  - (D) Enzyme
99. Which of the following is a component of fermentation economics ?
- (A) Raw material cost
  - (B) Employee birthdays
  - (C) Office decor
  - (D) Lab snacks
100. Which of the following is used in bioleaching of copper ?
- (A) *Clostridium botulinum*
  - (B) *Escherichia coli*
  - (C) *Thiobacillus ferrooxidans*
  - (D) *Bacillus subtilis*

***(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 छँटना 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।