

Roll No.

Question Booklet Number

O. M. R. Serial No.

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

ZOOLOGY

(Microbiology) (Elective)

Paper Code						
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Questions Booklet
Series

B

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. The time required for a bacterial population to double is the :
 - (A) Incubation period
 - (B) Generation time
 - (C) Lag time
 - (D) Growth constant

2. Exotoxins are generally composed of :
 - (A) Lipids
 - (B) Proteins
 - (C) Carbohydrates
 - (D) RNA

3. Which structure allows bacteria to attach to surfaces ?
 - (A) Flagella
 - (B) Pili/Fimbriae
 - (C) Mitochondria
 - (D) Nucleus

4. Antibiotics are ineffective against viruses because :
 - (A) Viruses are too small
 - (B) Viruses lack the metabolic targets (like cell walls) antibiotics hit
 - (C) Viruses have DNA
 - (D) Viruses live in water

5. During which phase are bacteria most sensitive to Penicillin ?
 - (A) Lag
 - (B) Log +
 - (C) Stationary
 - (D) Death

6. How does climate change typically affect pollen discharge ?
 - (A) It shortens the pollen season.
 - (B) It has no effect on pollen.
 - (C) It can lead to earlier and more prolonged pollen seasons due to warmer temperatures.
 - (D) It decreases the CO₂ available for plants.

7. Which element's cycle is primarily sedimentary ?
 - (A) Nitrogen
 - (B) Carbon
 - (C) Phosphorus
 - (D) Oxygen

8. The process of converting N₂ to Ammonia is called :
 - (A) Nitrification
 - (B) Denitrification
 - (C) Nitrogen Fixation
 - (D) Ammonification

9. Which bacterium is known for symbiotic nitrogen fixation in legumes ?
- (A) Azotobacter
 - (B) Rhizobium
 - (C) Nitrosomonas
 - (D) Pseudomonas
10. Which of the following is a common "aeroallergen" known to trigger Type I hypersensitivity ?
- (A) Carbon dioxide
 - (B) Ragweed pollen
 - (C) Water vapor
 - (D) Argon
11. Which zone of the ocean is characterized by the absence of light and very high pressure ?
- (A) Euphotic zone
 - (B) Aphotic zone
 - (C) Littoral zone
 - (D) Epilimnion
12. Microbes found in the Arctic and Antarctic that grow best at temperatures below 15°C are known as :
- (A) Thermophiles
 - (B) Mesophiles
 - (C) Psychrophilic
 - (D) Acidophiles
13. "Hypersensitivity" to inhaled spores or pollen is essentially :
- (A) A nutritional deficiency
 - (B) An overreaction of the immune system
 - (C) A bacterial infection of the lungs
 - (D) A viral replication cycle
14. Which pathogen is the primary cause of lobar pneumonia and is characterized by a thick polysaccharide capsule ?
- (A) *Streptococcus pneumoniae*
 - (B) *Escherichia coli*
 - (C) *Mycobacterium tuberculosis*
 - (D) *Streptococcus pyogenes*
15. The process of microorganisms being suspended into the air from a liquid or solid source is known as :
- (A) Launching
 - (B) Seeding
 - (C) Transport
 - (D) Deposition
16. Which bacterium is the most common cause of uncomplicated Urinary Tract Infections (UTIs) ?
- (A) *Vibrio cholerae*
 - (B) *Escherichia coli*
 - (C) *Salmonella typhi*
 - (D) *Bacillus anthracis*

17. Ringworm infection (*Tinea*) is caused by a group of fungi known as :
- (A) Ascomycetes
 - (B) Dermatophytes
 - (C) Yeasts
 - (D) Mushrooms
18. Candidiasis (thrush) is an opportunistic infection caused by *Candida albicans*, which is a type of :
- (A) Filamentous mold
 - (B) Dimorphic fungus/Yeast
 - (C) Multicellular parasite
 - (D) Acid-fast bacteria
19. The Widal test is used for the diagnosis of which bacterial infection ?
- (A) Tuberculosis
 - (B) Cholera
 - (C) Strep Throat
 - (D) Typhoid (Enteric fever)
20. What is the C : N ratio ideal for starting composting ?
- (A) 10 : 1
 - (B) 30 : 1
 - (C) 100 : 1
 - (D) 5 : 1
21. Biofertilizers increase crop yield by approximately :
- (A) 5%
 - (B) 10-25%
 - (C) 90%
 - (D) 0%
22. Which bacteria convert Nitrite to Nitrate ?
- (A) *Nitrosomonas*
 - (B) *Nitrobacter*
 - (C) *Azospirillum*
 - (D) *Thiobacillus*
23. Which element cycle is affected most by burning fossil fuels ?
- (A) Phosphorus
 - (B) Nitrogen
 - (C) Carbon
 - (D) Sulphur
24. The pH of vermicompost is generally :
- (A) Highly acidic
 - (B) Highly alkaline
 - (C) Near Neutral
 - (D) 2.0

25. The process of using microbes to clean up polluted soil is :
- Bio-augmentation
 - Bioremediation
 - Fermentation
 - Nitrification
26. Which bacterium is characterized by its “comma-shaped” morphology and causes profuse watery diarrhea ?
- Vibrio cholerae*
 - Salmonella typhi*
 - Bacillus anthracis*
 - Helicobacter pylori*
27. Which of the following is an antifungal medication used to treat Candidiasis ?
- Streptomycin
 - Acyclovir
 - Oseltamivir
 - Fluconazole
28. VAM (Vesicular Arbuscular Mycorrhiza) is a/an :
- Bacteria
 - Fungus
 - Virus
 - Algae
29. The “Red worm” commonly used in vermicomposting is :
- Pheretima posthuma*
 - Eisenia fetida*
 - Lumbricus terrestris*
 - Hirudinaria*
30. Which of these is a free-living nitrogen fixer ?
- Rhizobium
 - Azotobacter
 - Anabaena azollae
 - Frankia
31. The primary gas responsible for the Greenhouse effect in the Carbon cycle is :
- O₂
 - N₂
 - CO₂
 - CH₄
32. Nitrification is the conversion of :
- N₂ to NH₃
 - Ammonia to Nitrates
 - Nitrates to N₂
 - Proteins to Amino Acids
33. Which biofertilizer is specifically used for Wet-land Rice ?
- Rhizobium
 - Azotobacter
 - Azolla
 - Mycorrhiza

34. The moisture content in a good carrier-based biofertilizer should be :
- (A) 5%
 - (B) 10-20%
 - (C) 30-40%
 - (D) 80%
35. Phosphorus is essential for the synthesis of :
- (A) Sugars
 - (B) DNA & ATP
 - (C) Chlorophyll
 - (D) Starch
36. Which of the following is considered a “bioaerosol” ?
- (A) Volcanic ash
 - (B) Pollen grains
 - (C) Desert sand
 - (D) Smoke particles
37. What is the primary factor that limits the survival of microbes in the air ?
- (A) Lack of nutrients and desiccation (drying out)
 - (B) High oxygen concentration
 - (C) Presence of Nitrogen
 - (D) Gravity
38. The “Oxygen effect” in aeromicrobiology refers to :
- (A) The formation of reactive oxygen species that damage microbial cells
 - (B) Oxygen helping microbes breathe better in flight
 - (C) The buoyancy provided by oxygen
 - (D) Microbes producing oxygen while in the air
39. “Sick Building Syndrome” is most closely associated with :
- (A) Marine microbiology
 - (B) Arctic microbiology
 - (C) Hydrothermal vents
 - (D) Intramural aeromicrobiology
40. Which virus targets and destroys CD⁴⁺ T-cells, leading to immunosuppression ?
- (A) Poliovirus
 - (B) HIV
 - (C) Hepatitis B
 - (D) Influenza
41. Rheumatic heart disease is a potential complication following an untreated infection by : .
- (A) *Streptococcus pyogenes*
 - (B) *Escherichia coli*
 - (C) *Vibrio cholerae*
 - (D) *Bacillus anthracis*

42. Which of the following is the drug of choice for treating Influenza (Swine Flu) ?
- (A) Penicillin
 - (B) Oseltamivir (Tamiflu)
 - (C) AZT
 - (D) Quinine
43. *Streptococcus pyogenes* is also known as :
- (A) Group A Streptococcus (GAS)
 - (B) Group B Streptococcus (GBS)
 - (C) Pneumococcus
 - (D) Enterococcus
44. Prophylaxis for Chicken Pox involves which vaccine ?
- (A) BCG Vaccine
 - (B) DPT Vaccine
 - (C) MMR Vaccine
 - (D) Varicella Vaccine
45. Microorganisms that thrive in high-salt environments, such as the Dead Sea or Great Salt Lake, are called :
- (A) Barophiles
 - (B) Halophiles
 - (C) Thermophiles
 - (D) Psychrophilic
46. Hydrothermal vents are unique because their primary production is based on :
- (A) Photosynthesis
 - (B) Chemosynthesis (using sulfur/methane)
 - (C) Decomposition of whales
 - (D) Atmospheric nitrogen fixation
47. What is the typical salinity of “brackish” water ?
- (A) Less than 0.5 ppt
 - (B) Between 0.5 and 30 ppt
 - (C) Exactly 35 ppt
 - (D) Over 50 ppt
48. Which method is most effective for controlling microbes in the air of a sterile laboratory ?
- (A) Increasing humidity
 - (B) HEPA filtration and UV radiation
 - (C) Opening windows for ventilation
 - (D) Spraying saltwater
49. The “Benthic” zone of an aquatic ecosystem refers to :
- (A) The surface film
 - (B) The open water column
 - (C) The bottom sediment/floor
 - (D) The area where light reaches
50. *Thermus aquaticus*, the source of Taq polymerase used in PCR, was originally isolated from :
- (A) The Arctic
 - (B) A Hot Spring (Yellowstone)
 - (C) A Marine estuary
 - (D) A hospital ventilation system

51. The Germ Theory of disease was primarily established by :
- (A) Fleming
 - (B) Pasteur and Koch
 - (C) Watson and Crick
 - (D) Darwin
52. Penicillin was discovered from which type of organism ?
- (A) Bacteria
 - (B) Virus
 - (C) Mold (Fungi)
 - (D) Protozoa
53. Denitrification is carried out by :
- (A) *Nitrobacter*
 - (B) *Pseudomonas denitrificans*
 - (C) *Rhizobium*
 - (D) *Azospirillum*
54. Vermicompost is rich in :
- (A) Actinomycetes
 - (B) Only Nitrogen
 - (C) Macronutrients and Micro-nutrients
 - (D) Harmful Salts
55. Which of the following viruses is the causative agent of Chikungunya ?
- (A) Flavivirus
 - (B) Alphavirus
 - (C) Retrovirus
 - (D) Orthomyxovirus
56. The pathogenesis of Dengue fever often involves “antibody-dependent enhancement,” which can lead to which severe form ?
- (A) Encephalitis
 - (B) Paralytic Polio
 - (C) Dengue Hemorrhagic Fever (DHF)
 - (D) Jaundice
57. Which diagnostic test is considered the “Gold Standard” for detecting HIV/AIDS by confirming the presence of specific antibodies after a positive ELISA ?
- (A) Widal Test
 - (B) Western Blot
 - (C) Mantoux Test
 - (D) Sputum Culture
58. A bacteria with a cluster-like arrangement is termed as :
- (A) Streptococci
 - (B) Staphylococci
 - (C) Bacilli
 - (D) Spirochetes

59. Which term refers to the study of microorganisms in indoor environments like hospitals and office buildings ?
- (A) Extramural aeromicrobiology
 (B) Intramural aeromicrobiology
 (C) Limnology
 (D) Benthic microbiology
60. Atmospheric Sulphur is largely present as :
- (A) H₂S
 (B) SO₂
 (C) S₈
 (D) Both (A) and (B)
61. Which organism fixes nitrogen in association with the *Casuarina* plant ?
- (A) *Frankia*
 (B) *Rhizobium*
 (C) *Azospirillum*
 (D) *Clostridium*
62. “Hardening” in mass cultivation refers to :
- (A) Boiling the culture
 (B) Cooling the carrier
 (C) Allowing the microbes to acclimatize to the carrier
 (D) Drying compost
63. Who is known as the “Father of Microbiology” ?
- (A) Robert Hooke
 (B) Antonie van Leeuwenhoek
 (C) Louis Pasteur
 (D) Robert Koch
64. Swine Flu is caused by which specific strain of the Influenza virus ?
- (A) H1N1
 (B) H5N1
 (C) H3N2
 (D) HCV
65. *Bacillus anthracis* is known for producing which of the following that allows it to survive in harsh environments for decades ?
- (A) Endotoxins
 (B) Biofilms
 (C) Endospores
 (D) Flagella
66. Aspergillosis most commonly affects which organ system ?
- (A) Digestive system
 (B) Nervous system
 (C) Respiratory system
 (D) Integumentary system (skin)

67. The oral polio vaccine (OPV) contains :
- (A) Killed virus
 - (B) Live-attenuated virus
 - (C) Viral DNA
 - (D) Synthetic proteins
68. “Black Smokers” are a type of :
- (A) Pollen grain
 - (B) Hydrothermal vent
 - (C) Indoor air pollutant
 - (D) Arctic cloud formation
69. Which of the following is a primary characteristic of the marine environment compared to fresh water ?
- (A) Higher nutrient availability
 - (B) Lower pH
 - (C) High salinity and high hydrostatic pressure
 - (D) Higher temperature stability
70. The symbiotic bacteria found inside giant tubeworms (*Riftia pachyptila*) at hydrothermal vents provide the host with :
- (A) Oxygen
 - (B) Organic carbon (food)
 - (C) Protection from heat
 - (D) Light
71. YEMA medium is used for the growth of :
- (A) *Azotobacter*
 - (B) *Rhizobium*
 - (C) *Bacillus*
 - (D) Yeast
72. The role of “Carrier” in biofertilizer is to :
- (A) Kill pathogens
 - (B) Provide a surface for microbial survival
 - (C) Increase soil acidity
 - (D) Act as a pesticide
73. The “Cold Chain” is important for maintaining the potency of :
- (A) Antibiotics
 - (B) Vaccines
 - (C) Stains
 - (D) Agar plates
74. Alexander Fleming discovered Penicillin in :
- (A) 1850
 - (B) 1928
 - (C) 1952
 - (D) 1900

75. What happens to the diversity of microbes in the air as altitude increases ?
- (A) It increases significantly
 - (B) It stays exactly the same
 - (C) It generally decreases due to UV exposure and extreme cold
 - (D) It only consists of fungi
76. Viruses are considered “obligate intracellular parasites” because :
- (A) They are large
 - (B) They can only replicate inside a host cell
 - (C) They eat cells
 - (D) They have no DNA
77. Prophylaxis for Rabies involves both a vaccine and which of the following if a person is bitten ?
- (A) Oral Rehydration Salts (ORS)
 - (B) Human Rabies Immunoglobulin (HRIG)
 - (C) Oseltamivir
 - (D) Penicillin
78. Which hepatitis virus is primarily transmitted through the fecal-oral route rather than bloodborne exposure ?
- (A) Hepatitis
 - (B) Hepatitis C
 - (C) Hepatitis A
 - (D) Hepatitis D
79. In a thermally stratified freshwater lake, the upper, warmer layer is called the :
- (A) Hypolimnion
 - (B) Thermocline
 - (C) Epilimnion
 - (D) Benthic zone
80. Blue-Green Algae (BGA) are also known as :
- (A) Cyanobacteria
 - (B) Eumycetes
 - (C) Protozoa
 - (D) Bryophytes
81. The primary stain used in Gram staining is :
- (A) Safranin
 - (B) Iodine
 - (C) Crystal Violet
 - (D) Alcohol
82. Bacterial endotoxins are typically associated with :
- (A) Gram-positive bacteria
 - (B) Gram-negative bacteria
 - (C) Viruses
 - (D) Prions

83. “Antigenic drift” is a method pathogens use to :
- (A) Move faster
 - (B) Evade the immune system
 - (C) Kill the host
 - (D) Replicate DNA
84. *Helicobacter pylori* is a major causative agent for which of the following conditions ?
- (A) Peptic ulcers
 - (B) Pneumonia
 - (C) Anthrax
 - (D) Scarlet fever
85. The Mantoux (Tuberculin) skin test is used to screen for exposure to :
- (A) *Streptococcus pyogenes*
 - (B) *Mycobacterium tuberculosis*
 - (C) *Helicobacter pylori*
 - (D) *Salmonella typhi*
86. DOTS (Directly Observed Treatment, Short-course) is the standard treatment strategy for :
- (A) AIDS
 - (B) Typhoid
 - (C) Tuberculosis
 - (D) Polio
87. Which bacterial pathogen is famously associated with “Rice Water Stools” ?
- (A) *Salmonella typhi*
 - (B) *Vibrio cholerae*
 - (C) *Mycobacterium tuberculosis*
 - (D) *Streptococcus pneumoniae*
88. Extramural aeromicrobiology primarily focuses on :
- (A) Operating theaters
 - (B) Space stations
 - (C) Outdoor environments and agricultural fields
 - (D) Food processing units
89. Which device is commonly used to sample bioaerosols by impacting them onto a solid agar surface ?
- (A) Secchi disk
 - (B) Andersen Sampler
 - (C) Nansen bottle
 - (D) Petri dish lid
90. Which extreme environment is characterized by “permafrost” and highly seasonal microbial activity ?
- (A) Hot springs
 - (B) Marine trenches
 - (C) Arctic/Antarctic tundra
 - (D) Brackish estuaries

91. Which of the following is NOT a phase of the bacterial growth curve ?
- (A) Lag Phase
 - (B) Log Phase
 - (C) Mitotic Phase
 - (D) Stationary Phase
92. Gram-positive bacteria appear under a microscope.
- (A) Pink
 - (B) Blue
 - (C) Purple
 - (D) Colorless
93. Bacteria reproduce primarily through :
- (A) Mitosis
 - (B) Meiosis
 - (C) Binary Fission
 - (D) Budding
94. Which phase of growth shows the highest metabolic activity ?
- (A) Lag
 - (B) Log
 - (C) Stationary
 - (D) Death
95. The protein coat of a virus is called a/an :
- (A) Cell wall
 - (B) Capsule
 - (C) Capsid
 - (D) Envelope
96. Which enzyme helps bacteria break down connective tissue ?
- (A) Polymerase
 - (B) Hyaluronidase
 - (C) Lactase
 - (D) Catalase
97. Robert Koch formulated postulates to :
- (A) Identify viruses
 - (B) Link a specific microbe to a specific disease
 - (C) Discover DNA
 - (D) Create vaccines
98. What is the mordant used in Gram staining ?
- (A) Crystal Violet
 - (B) Safranin
 - (C) Gram's Iodine
 - (D) Ethanol
99. Which of these is a Gram-negative bacterium ?
- (A) *Staphylococcus*
 - (B) *Streptococcus*
 - (C) *E. coli*
 - (D) *Bacillus*
100. Viruses that infect bacteria are called :
- (A) Viroids
 - (B) Bacteriophages
 - (C) Prions
 - (D) Retroviruses

(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।