

Roll No.

Question Booklet Number

O. M. R. Serial No.

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Question Booklet Number

M. Sc. (Second Semester)
(NEP) EXAMINATION, 2025-26
ZOOLOGY
(Lac-Culture) (Elective)

Paper Code							
B	0	5	0	8	0	6	T

Questions Booklet Series
A

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 Indian state contributes approximately 60% of the total national lac produce ?
 - (A) Chhattisgarh
 - (B) Jharkhand
 - (C) West Bengal
 - (D) Madhya Pradesh
2. The first scientific paper on the natural history of the lac insect was published in 1782 by :
 - (A) James Kerr
 - (B) Father Tachard
 - (C) Karl Lindinger
 - (D) Adolfo Targioni-Tozzetti
3. The primary aliphatic acid present in lac resin, constituting about 35% of its composition, is :
 - (A) Jalaric acid
 - (B) Shellolic acid
 - (C) Aleuritic acid
 - (D) Butolic acid
4. Which predator moth is known as the “Larger White Lac Moth” and is a major threat to cultivation ?
 - (A) *Pseudohypatopa pulverea*
 - (B) *Eublemma amabilis*
 - (C) *Chrysoperla zastrowi*
 - (D) *Tribolium castaneum*
5. The sedentary adult female lac insect possesses specialized structures to prevent resin from sealing spiracles is called :
 - (A) Filter chambers
 - (B) Brachial plates
 - (C) Malpighian tubes
 - (D) Anal tubercles
6. The Jethwi lac crop belongs to the Kusmi strain and is typically harvested in :
 - (A) January or February
 - (B) June or July
 - (C) October or November
 - (D) May or June
7. To which family does the superior host plant *Schleichera oleosa* belong ?
 - (A) Fabaceae
 - (B) Sapindaceae
 - (C) Rhamnaceae
 - (D) Moraceae
8. The refined granular form of lac obtained after washing sticklac in alkaline solution is :
 - (A) Shellac
 - (B) Seedlac
 - (C) Kiri lac
 - (D) Button lac

9. Lac insects belong to which order of the class Insecta ?
- (A) Coleoptera
(B) Hemiptera
(C) Lepidoptera
(D) Hymenoptera
10. The major predator *Pseudohypatopa pulverea* belongs to the family :
- (A) Noctuidae
(B) Blastobasidae
(C) Encyrtidae
(D) Gelechiidae
11. Which Sanskrit word, meaning “one hundred thousand,” is the root of the term “lac” ?
- (A) Laksha
(B) Lakhsya
(C) Lakshagriha
(D) Laccifer
12. The “Filter Chamber” in the gut of the female lac insect is an adaptation for :
- (A) Grinding solid host bark
(B) Handling high osmotic pressure of phloem sap
(C) Storing eggs before swarming
(D) Producing red lac dye
13. Adult male lac insects are characterized by :
- (A) A pyriform, sedentary body
(B) The absence of functional mouthparts
(C) Continuous secretion of resin throughout life
(D) A lifespan of several months
14. “Ari lac” is a term used for :
- (A) Lac harvested after nymphs have swarmed
(B) Immature lac harvested before larval emergence
(C) Refined shellac flakes
(D) Lac harvested from dead host trees.
15. The chemical formula for Aleuritic acid is :
- (A) $C_{16}H_{32}O_4$
(B) $C_{16}H_{30}O_6$
(C) $C_{18}H_{34}O_3$
(D) $C_{16}H_{28}O_4$
16. Which of the following is an “Emerging Host” plant used for intensive bush- lac cultivation ?
- (A) *Butea monosperma*
(B) *Ziziphus mauritiana*
(C) *Flemingia semialata*
(D) *Acacia catechu*

17. The red color of lac dye is primarily due to a mixture of anthraquinone derivatives called :
- (A) Aleuritic acids
 - (B) Laccaic acids
 - (C) Jalaric acids
 - (D) Butolic acids
18. What is the approximate percentage of resin in the total composition of lac ?
- (A) 5-6%
 - (B) 1 - 4%
 - (C) 70 - 80%
 - (D) 90 - 95%
19. The “Baisakhi” crop is the major summer crop for which strain of lac insect ?
- (A) Kusmi
 - (B) Rangeeni
 - (C) Takshila
 - (D) Jethwi
20. Which parasitoid is a beneficial insect in the lac ecosystem because it feeds on predator larvae ?
- (A) *Tachardiaephagus tachardiae*
 - (B) *Aprostocteus purpureus*
 - (C) *Bracon greeni*
 - (D) *Eupelmus tachardiae*
21. The systematic position of the lac insect family Kerriidae was erected by :
- (A) Karl Lindinger in 1937
 - (B) James Kerr in 1782
 - (C) Father Tachard in 1709
 - (D) Adolfo Targioni-Tozzetti in 1884
22. The appearance of “orange-colored spots” on the lac cell indicates :
- (A) The insect is dying
 - (B) Swarming of nymphs is imminent
 - (C) High concentration of wax
 - (D) Fungal infection
23. The byproduct “Kiri lac” is obtained from :
- (A) Washing of sticklac
 - (B) Residue left in the canvas bag after hot filtration
 - (C) Scraping of host bark
 - (D) Boiling of used filter bags.
24. The mobile first-instar nymph of the lac insect is commonly known as :
- (A) Grub
 - (B) Caterpillar
 - (C) Crawler
 - (D) Maggot

25. Which country produces the world's highest quality lac, specifically the Kusmi variety ?
- (A) Thailand
(B) China
(C) India
(D) Myanmar
26. Lac resin can be broadly resolved into two fractions using diethyl ether; the insoluble solid mass is :
- (A) Soft resin (25%)
(B) Hard resin (75%)
(C) Lac wax (5%)
(D) Lac dye (1%)
27. The first stage in the scientific cultivation of lac after selecting host trees is :
- (A) Inoculation
(B) Pruning
(C) Harvesting
(D) Processing
28. Which of these laccaic acids is identical to xanthokermisic acid ?
- (A) Laccaic acid A
(B) Laccaic acid B
(C) Laccaic acid C
(D) Laccaic acid D
29. The Malpighian tubes of the female lac insect are unique because they :
- (A) Are absent in the adult stage
(B) Store lac dye and appear beaded
(C) Open into the foregut
(D) Produce silk for the ovisac
30. Which host plant is commonly known as the "Flame of the Forest" ?
- (A) Kusum
(B) Ber
(C) Palas
(D) Peepal
31. India contributes what percentage to the global lac production ?
- (A) 25%
(B) 50%
(C) 85%
(D) 10%
32. The process of emergence of nymphs from the female cell is called :
- (A) Molting
(B) Swarming
(C) Inoculation
(D) Oviposition
33. Which byproduct is collected by boiling the used canvas filtration bags ?
- (A) Molemma
(B) Passewa
(C) Kiri
(D) Chowri

34. Shellac is characterized as a “thermoplastic” because it :
- (A) Conducts heat rapidly
 - (B) Becomes soft when heated and hardens when cooled
 - (C) Is destroyed by low temperatures
 - (D) Produces heat during its formation
35. The “Aghani” lac crop is harvested during which months ?
- (A) May - June
 - (B) October-November
 - (C) January - February
 - (D) June - July
36. Which host tree is favored for both Kusmi and Rangeeni strains depending on the season ?
- (A) *Butea monosperma*
 - (B) *Schleichera oleosa*
 - (C) *Ziziphus mauritiana*
 - (D) *Acacia arabica*
37. The Indian Institute of Natural Resins and Gums (IINRG) was recently rechristened as :
- (A) Indian Lac Research Institute
 - (B) National Institute of Secondary Agriculture (NISA)
 - (C) Central Lac Board
 - (D) Tribal Development Institute
38. The adult female lac insect belongs to the superfamily :
- (A) Aphididae
 - (B) Coccoidea
 - (C) Tenthredinoidea
 - (D) Chalcidoidea
39. Laccic acid A contains which functional group that distinguishes it from B ?
- (A) Amide
 - (B) Hydroxyl
 - (C) Carboxyl
 - (D) Methyl
40. Pruning of host trees is essential to :
- (A) Kill pests on the bark
 - (B) Generate soft, juicy twigs for settlement
 - (C) Reduce the height of the tree for harvesting
 - (D) Increase the wax content of the resin
41. Which predator moth belongs to the family Noctuidae ?
- (A) *Pseudohypatopa pulverea*
 - (B) *Eublemma amabilis*
 - (C) *Chrysoperla zastrowi*
 - (D) *Microbracon greeni*

42. The “Filter Chamber” of the gut consists of an association between :
- (A) Pharynx and Oesophagus
 (B) Ventriculus and Colon
 (C) Rectum and Anal tubercle.
 (D) Malpighian tubes and Gastric caecae
43. Which type of inoculation is discouraged because it leads to over-infestation and enemy buildup ?
- (A) Artificial inoculation
 (B) Natural inoculation
 (C) Mechanical inoculation
 (D) Solvent inoculation
44. Lac wax is chemically a mixture of :
- (A) Sesquiterpenic acids
 (B) Higher alcohols, acids, and esters
 (C) Saturated hydrocarbons only
 (D) Glucose and fructose
45. The “Katki” crop harvesting months are :
- (A) January-February
 (B) May-June
 (C) October-November
 (D) June - July
46. Which insect is the primary hyper-parasitoid in the lac ecosystem ?
- (A) *Aprostocetus purpureus*
 (B) *Bracon greeni*
 (C) *Tachardiaephagus tachardiae*
 (D) *Chrysoperla zastrowi*
47. The melting point of commercial shellac is approximately :
- (A) 45°C
 (B) 75°C
 (C) 150°C
 (D) 200°C
48. Sticklac consists of :
- (A) Pure resin only
 (B) Resin, wax, dye, and insect/tree debris
 (C) Bleached lac flakes
 (D) Only the host plant bark
49. Swarming nymphs are attracted to :
- (A) Thick branches with old bark
 (B) Tender, succulent shoots
 (C) The root system of the host
 (D) The flowers of the host
50. The “Lac state of India,” producing the highest volume of lac, is :
- (A) Bihar
 (B) Odisha
 (C) Jharkhand
 (D) Chhattisgarh

51. How many molts does a lac nymph typically undergo before reaching adulthood ?
- (A) One
(B) Two
(C) Three
(D) Five
52. Lac resin is soluble in :
- (A) Water
(B) Alcohol and weak alkalis
(C) Glycerol
(D) Hydrocarbons
53. The larval-pupal period of the predator *Eublemma amabilis* ranges from :
- (A) 3 - 5 days
(B) 22 - 38 days
(C) 50 - 60 days
(D) 1 year
54. Bleached lac is prepared by treating shellac with :
- (A) Sodium hypochlorite
(B) Hydrochloric acid
(C) Distilled water
(D) Calcium carbonate
55. Which scientific name was given to the lac insect by Adolfo Targioni-Tozzetti in 1884 ?
- (A) *Coccus lacca*
(B) *Kerria lacca*
(C) *Laccifer lacca*
(D) *Tachardia lacca*
56. “Phunki lac” is commercially valuable because :
- (A) It contains more dye
(B) It is harvested after swarming, preserving the next generation
(C) It is the highest quality resin
(D) It is obtained only from *Flemingia semialata*
57. The primary sesquiterpenoid acid in lac resin is :
- (A) Aleuritic acid
(B) Jalaric acid
(C) Palmitic acid
(D) Tartaric acid
58. Which host plant is used extensively in Thailand for lac production ?
- (A) *Butea monosperma*
(B) *Albizia saman* (Rain tree)
(C) *Ziziphus mauritiana*
(D) *Ficus religiosa*

59. The sedentary life of the female lac insect begins :
- (A) After its first molt
 (B) Immediately after settling as a crawler
 (C) After fertilization
 (D) Only in the pupal stage
60. Approximately how many tribal families in India earn a subsidiary income from lac ?
- (A) 10,000
 (B) 500,000
 (C) 3 - 4 million
 (D) 100 million
61. The “Anal tubercle” in the female lac insect is the site for :
- (A) Resin secretion
 (B) Respiration
 (C) The genital opening
 (D) Feeding
62. Laccic acid B is characterized by :
- (A) Presence of nitrogen
 (B) Absence of nitrogen (alcohol corresponding to A)
 (C) Amino acid side chain
 (D) Methyl group on the 1st position
63. The scientific name of the “Ber” tree is :
- (A) *Ziziphus mauritiana*
 (B) *Butea monosperma*
 (C) *Schleichera oleosa*
 (D) *Acacia catechu*
64. “Button lac” is physically distinguished as :
- (A) Fine dust-like material
 (B) Circular discs about 3 inches in diameter
 (C) Thin, brittle flakes
 (D) Large, raw twigs
65. The term “Lac Culture” refers to :
- (A) The study of synthetic resins
 (B) The rearing of lac insects for commercial production
 (C) The processing of plastic polymers
 (D) The cultivation of host trees only
66. Which functional group is partly free and partly combined in lac resin ?
- (A) Carboxyl
 (B) Hydroxyl
 (C) Aldehyde
 (D) Ester

67. *Tachardiaephagus tachardiae* is a primary :
- Predator
 - Parasitoid
 - Hyper-parasitoid
 - Host plant
68. The “Aghani” crop provides what quality of lac ?
- Standard Rangeeni
 - Superior/Best Kusmi
 - Inferior summer lac
 - Bleached lac
69. Lac insects feed on host trees by piercing the :
- Xylem vessels
 - Phloem sap
 - Leaf stomata
 - Root hairs
70. Which district in Jharkhand is a major center for lac production ?
- Ranchi
 - Jamshedpur
 - Dhanbad
 - Bokaro
71. “Molemma” is a lac byproduct characterized as :
- Large twigs
 - Finely divided dust like material.
 - Pure wax
 - Sticky dye liquid
72. Sexual maturation in lac insects is reached approximately after :
- 2 weeks
 - 8 weeks
 - 6 months
 - 1 year
73. The shellac formula is generally assigned as :
- $C_{16}H_{32}O_4$
 - A complex polyester of Aleuritic acid and Jalaric acid
 - A simple terpene alcohol
 - Pure carbohydrate polymer
74. “Brood lac” refers to :
- Twigs with mature female insects ready to swarm
 - Refined shellac sold in markets
 - Immature lac harvested in summer
 - Pesticide-treated host twigs

75. The color of lac dye turns reddish-violet in :
- (A) Acidic medium
 (B) Neutral medium
 (C) Alkaline medium
 (D) Vacuum
76. Which predator uses a habit of feeding on dead carcasses of lac insects, causing prolonged emergence ?
- (A) *Eublemma amabilis*
 (B) *Pseudohypatopa pulverea*
 (C) *Chrysoperla zastrowi*
 (D) *Microbracon greeni*
77. The “Filter Chamber” prevents the dilution of :
- (A) Red dye in the Malpighian tubes
 (B) Digestive enzymes in the midgut
 (C) Resin in the lac glands
 (D) Sperm in the receptaculum seminis
78. What is the approximate share of Kusmi lac in India’s total production ?
- (A) 10%
 (B) 90%
 (C) 50%
 (D) 100%
79. The scientific name of the “Palas” tree is :
- (A) *Butea monosperma*
 (B) *Schleichera oleosa*
 (C) *Ziziphus jujuba*
 (D) *Acacia catechu*
80. Lac is unique as a resin because it is the only one of :
- (A) Mineral origin
 (B) Synthetic origin
 (C) Animal origin
 (D) Marine origin
81. “Seedlac” is obtained from sticklac by :
- (A) Crushing and washing in water/alkali
 (B) Solvent extraction in hexane
 (C) Hot filtration through canvas
 (D) Bleaching with hypochlorite
82. The term “Crawlers” refers to :
- (A) Adult male insects
 (B) First-instar mobile nymphs
 (C) Predatory moths
 (D) Parasitoid wasps

83. Which enzyme-mediated process is speculated to produce Aleuritic acid ?
- (A) Hydrolysis by lipase
 (B) Hydroxylation by cytochrome P450
 (C) Fermentation by yeast
 (D) Reduction by NADPH
84. The “Kusum” tree foliage appears in what color in February-March ?
- (A) Green
 (B) Red
 (C) Yellow
 (D) Brown
85. Which component of lac constitutes 5 - 6% of its composition ?
- (A) Resin
 (B) Dye
 (C) Wax
 (D) Gluten
86. *Kerria lacca* and *Kerria chinensis* are confirmed as distinct species by :
- (A) Only their host plant preference
 (B) Morphological and molecular (RAPD) markers
 (C) The color of the dye they produce
 (D) The shape of the host tree leaves
87. Pruning for the Kusum tree is typically done in :
- (A) January-February or June-July
 (B) October or November
 (C) April or May
 (D) December only
88. The most destructive predator, accounting for 23.38% relative abundance, is :
- (A) *Chrysoperla zastrowi*
 (B) *Pseudohypatopa pulverea*
 (C) *Eublemma amabilis*
 (D) *Tribolium* sp.
89. Lac dye is chemically an :
- (A) Aliphatic acid
 (B) Anthraquinone derivative
 (C) Terpenoid acid
 (D) Inorganic salt
90. The duration of swarming in lac insects is approximately :
- (A) 24 hours
 (B) 5 weeks
 (C) 6 months
 (D) 1 year

91. "Kusmi" lac fetches a higher price because :
- (A) It is darker and more viscous
 - (B) It is lighter in color and superior in quality
 - (C) It is harvested from Palas trees
 - (D) It is resistant to all predators
92. The major alicyclic component of lac resin is :
- (A) Aleuritic acid
 - (B) Shellolic acid
 - (C) Palmitic acid
 - (D) Butolic acid
93. India exports approximately what percentage of its raw lac ?
- (A) 10%
 - (B) 50%
 - (C) 85%
 - (D) 5%
94. Brachial plates are found in :
- (A) Only male lac insects
 - (B) Adult female lac insects
 - (C) First-instar nymphs
 - (D) All developmental stages
95. *Butea monosperma* belongs to the family :
- (A) Sapindaceae
 - (B) Fabaceae
 - (C) Rhamnaceae
 - (D) Malvaceae
96. The "Baisakhi" crop is harvested during :
- (A) October November
 - (B) January - February
 - (C) May-June
 - (D) July - August
97. "Garnet lac" is typically prepared from :
- (A) High-quality Kusmi brood
 - (B) Inferior seedlac or kiri residue
 - (C) Pure Aleuritic acid
 - (D) Freshly harvested Palas twigs
98. The specific gravity of orange shellac varies between :
- (A) 0.5-0.7
 - (B) 1.08 1.13
 - (C) 1.5-2.0
 - (D) 2.5-3.0
99. Which insect is known as the "Lace wing bug," a predator of crawlers ?
- (A) *Eublemma amabilis*
 - (B) *Chrysopa* sp.
 - (C) *Holcocera pulvereae*
 - (D) *Microbracon greeni*
100. Lac culture is considered an ideal "Secondary Agriculture" because it :
- (A) Requires massive land clearing
 - (B) Does not compete with food crops and uses marginal land
 - (C) Is entirely automated and requires no manual labor
 - (D) Uses only chemical host trees

(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।