PART – I (General Agriculture)

Multiple choice questions (No. 1 to 30). Choose the correct answer (a, b, c or d) and enter your choice in the circle (by shading with a pencil) on the OMR answer sheet as per the instructions given on the answer sheet.

1. Which of the following crops have been approved for commercial cultivation in India?
   a) Bt cotton and Bt brinjal
   b) Bt cotton and Golden Rice
   c) Bt maize and Bt cotton
   d) Bt cotton only

2. This year (2010-11) the expected food grain production in India is
   a) 212 million tonnes
   b) 220 million tonnes
   c) 235 million tonnes
   d) 250 million tonnes

3. The genome of which of the following crops is still not completely sequenced?
   a) Rice
   b) Soybean
   c) Sorghum
   d) Wheat

4. According to the Approach Paper to the 12th Five Year Plan, the basic objective of the 12th Plan is
   a) Inclusive growth
   b) Sustainable growth
   c) Faster, more inclusive and sustainable growth
   d) Inclusive and sustainable growth

5. To address the problems of sustainable and holistic development of rainfed areas, including appropriate farming and livelihood system approaches, the Government of India has set up the
   a) National Rainfed Area Authority
   b) National Watershed Development Project for Rainfed Areas
   c) National Mission on Rainfed Areas
   d) Command Area Development and Water Management Authority

6. Which of the following sub-schemes are not covered under the Rashtriya Krishi Vikas Yojana?
   a) Extending the Green Revolution to eastern India
   b) Development of 60,000 pulses and oilseeds villages in identified watersheds
   c) National Mission on Saffron
   d) National Mission on Bamboo

7. The minimum support price for the common variety of paddy announced by the Government of India for the year 2010-11 was
   a) ₹ 1030
   b) ₹ 1000
   c) ₹ 980
   d) ₹ 950

8. According to the Human Development Report 2010 of the United Nations, India's rank in terms of the human development index is
   a) 119
   b) 134
   c) 169
   d) 182
9. Which of the following does not apply to SRI method of paddy cultivation?
   a) Reduced water application
   b) Reduced plant density
   c) Increased application of chemical fertilizers
   d) Reduced age of seedlings

10. Which organic acid, often used as a preservative, occurs naturally in cranberries, prunes, cinnamon and cloves?
    a) Citric acid
    b) Benzoic acid
    c) Tartaric acid
    d) Lactic acid

11. Cotton belongs to the family
    a) Cruciferae
    b) Anacardiaceae
    c) Malvaceae
    d) Solanaceae

12. Photoperiodism is
    a) Bending of shoot towards source of light
    b) Effect of light/dark durations on physiological processes
    c) Movement of chloroplast in cell in response to light
    d) Effect of light on chlorophyll synthesis

13. Ergot disease is caused by which pathogen on which host?
    a) *Claviceps purpurea* on rye
    b) *Puccinia recondita* on wheat
    c) *Drechiera sorokiniana* on wheat
    d) *Albugo candida* on mustard

14. Rocks are the chief sources of parent materials over which soils are developed. Granite, an important rock, is classified as
    a) Igneous rock
    b) Metamorphic rock
    c) Sedimentary rock
    d) Hybrid rock

15. Which one of the following is a Kharif crop?
    a) Pearl millet
    b) Lentil
    c) Mustard
    d) Wheat

16. The coefficient of variation (C.V.) is calculated by the formula
    a) $\text{(Mean - S.D.)} \times 100$
    b) $(\text{S.D.}/\text{Mean}) \times 100$
    c) $\text{S.D.}/\text{Mean}$
    d) Mean/SD

17. Which of the following is commonly referred to as muriate of potash?
    a) Potassium nitrate
    b) Potassium chloride
    c) Potassium sulphate
    d) Potassium silicate

18. Inbred lines that have same genetic constitution but differ only at one locus are called
    a) Multi lines
    b) Monohybrid
    c) Isogenic lines
    d) Pure lines

19. For applying 100 kg of nitrogen, how much urea would one use?
    a) 45 kg
    b) 111 kg
    c) 222 kg
    d) 333 kg

20. The devastating impact of plant disease on human suffering and survival was first realized by epidemic of
    a) Brown spot of rice in Bengal
    b) Late blight of potato in USA
    c) Late blight of potato in Europe
    d) Rust of wheat in India

21. The species of rice (*Oryza*) other than *O. sativa* that is cultivated is
    a) *O. rufipogon*
    b) *O. longistaminata*
    c) *O. glaberrima*
    d) *O. nivara*

22. The enzyme responsible for the fixation of CO₂ in mesophyll cells of C-4 plants is
    a) Malic enzyme
    b) Phosphoenol pyruvate carboxylase
    c) Phosphoenol pyruvate carboxykinase
    d) RubP carboxylase

23. Which one of the following is a "Vertisol"?
    a) Black cotton soil
    b) Red sandy loam soil
    c) Sandy loam sodic soil
    d) Submontane (Tara) soil

24. What is the most visible physical characteristic of cells in metaphase?
    a) Elongated chromosomes
    b) Nucleus visible but chromosomes not
    c) Fragile double stranded loose chromosomes
    d) Condensed paired chromosomes on the cell plate
25. All weather phenomena like rain, fog and mist occur in
   a) Troposphere
   b) Mesosphere
   c) Ionosphere
   d) Ozonosphere

26. Which of the following elements is common to all proteins and nucleic acids?
   a) Sulphur
   b) Magnesium
   c) Nitrogen
   d) Phosphorous

27. Silt has intermediate characteristics between
   a) Sand and loam
   b) Clay and loam
   c) Loam and gravel
   d) Sand and clay

28. Certified seed is produced from
   a) Nucleus seed
   b) Breeder seed
   c) Foundation seed
   d) Truthful seed

29. Seedless banana is an
   a) Autotriploid
   b) Automultitriploid
   c) Allotriploid
   d) Allomultitriploid

30. Which one of the following is used to test the goodness-of-fit of a distribution?
   a) Normal test
   b) t-test
   c) Chi-square test
   d) F-test

**PART – II (Subject Paper)**

Multiple choice questions (No. 31 to 130). Choose the correct answer (a, b, c or d) and enter your choice in the circle (by shading with a pencil) on the OMR answer sheet as per the instructions given on the answer sheet.

31. Insect groups hitherto not known from India
   a) Sialioidea
   b) Zoraptera and Sialoidea
   c) Gryllobatodea + Zoraptera + Mantophasmatodea
   d) Raphidioidea and Embioptera

32. 'Pteralia' and 'Patagia' are present, respectively in
   a) Lower margin of wing and Hymenoptera
   b) Middle of wing surface and Neuroptera
   c) Base of wing and Lepidoptera
   d) Anal region of wing and Lepidoptera

33. Avermectins are
   a) Octopamine receptor agonists
   b) Chloride channel activators
   c) Nicotine acetylcholine receptor agonist
   d) Sodium channel modulator

34. Lufenuron is
   a) Electron transport inhibitor
   b) JH mimic
   c) Chitin synthesis inhibitor
   d) Water balance disruptor

35. *Aenasius bambawalei* is an endoparasitoid belonging to
   a) Trichogrammatidae and parasitising *Maconellicoccus hirsutus*
   b) Encyrtidae and parasitising *Phenacoccus solenopsis*
   c) Eulophidae and parasitising *Phenococcus solenopsis*
   d) Eupelmidae and parasitising *Ceratovacuna bambawalei*

36. Insect development in which successive instars have quite different forms is known as
   a) Hemimetamorphosis
   b) Holometamorphosis
   c) Heteromorphosis
   d) Amorphosis

37. Spinosyn is derived from
   a) *Saccharopolyspora spinosa*
   b) *Polyspora spinosa*
   c) *Streptomyces avermitilis*
   d) *Streptomyces spinosa*

38. Emamectin benzoate is derived from
   a) *Streptomyces avermitilis*
   b) *Streptomyces scabies*
   c) *Saccharopolyspora spinosa*
   d) *Streptomyces emamectin*

39. In cyclorrhaphous diptera, the fusion of corpora cardiaca, corpora allata and prothoracic glands is referred to as
   a) Crabe's organ
   b) Simpher's organ
   c) Weismann's organ
   d) Gyroscopic organ

40. In solid cone nozzle, the solid cone is formed due to
   a) Bigger size of the cap
   b) Bigger size of the orifice plate
   c) Central hole in swirl plate
   d) Small size of the strainer
41. What will be the amount of cartap 50 SP required to prepare 10 litres of 0.1% spray material?
   a) 2.9 g
   b) 10 g
   c) 20 g
   d) 30 g

42. Insecticide fogs produced by thermal energy nozzles using a stream of hot gas to vapourise liquid pesticide form
   a) Fogs of droplet size > 15 μm dia
   b) Aerosol droplets of size < 15 μm dia
   c) High volume sprays
   d) Mist droplet of size 20-500 μm dia

43. Mango stem borer complex belonging to the genus Batocera in India and adjacent S.E. Asian countries comprises of
   a) Only rufomaculata DeGeer
   b) rufomaculata, rubus, royliei and numentor
   c) Only rubus (Linnaeus)
   d) Only rufomaculata (DeGeer)

44. The hosts on which parasitoids oviposit readily, that they do not attack normally in the field are termed as
   a) Facultitious hosts
   b) Alternate hosts
   c) Laboratory hosts
   d) Mass culture hosts

45. Phylocnistoris citrella is a leaf miner pest of Citrus vulgaris
   a) Only Citrus sp., and it is a specific pest
   b) Citrus spp. + other Rutaceae
   c) All Rutaceae

46. Vapour heat treatment as a quarantine measure is to be done between temperature range of
   a) 40 and 47°C and hours of exposure is important
   b) 50 and 57°C and hours of exposure is immaterial
   c) 40 and 47°C and time and flow rate not important
   d) 30 and 57°C and density of load is immaterial

47. Computer generated IPM models as practiced in developed countries like USA have synthesized menu based IPM systems comprising of
   a) Input of weather data + developmental models of significant pests
   b) Pest risk analysis data
   c) IPM protocols of a single major pest
   d) Simulated host phenology + input of weather data + developmental models of significant pests

48. Pest Risk Analysis (PRA) is a sanitary and phytosanitary measure typically to be done by
   a) Recipient/exporting country on the information largely given by the producer/exporting country
   b) Producer/exporting country on the information given by recipient/exporting country
   c) Plant quarantine machinery of the producer/exporting country
   d) Only the Govt. of India for export of wheat

49. Total Population Management (TPM) is the term framed by the proponents of
   a) Genetic control – Knipling (1955)
   b) Genetic control – Knipling (1965)
   c) Wide area management of fruit flies
   d) Genetic engineering

50. Sprays with a higher number of droplets of <1100 μm dia are categorized as ‘very fine’ and are
   a) Recommended for crops due to high field efficacy
   b) Efficient as these entirely deposit on plants effectively without any drift hazard
   c) Not recommended for crops due to drift hazard
   d) Recommended as these do not cause any pollution

51. The oxadiazine insecticide now picking up for pest control is
   a) Indoxacarb
   b) Indoxycarb
   c) Indoxadiazine
   d) Spinosad

52. An Insecticide of new chemical class of spirotetracyl phenyl substituted tetronic acid and active against whiteflies and spider mites is
   a) Imidacloprid
   b) Spinosad
   c) Spirodiclofen
   d) Spiromesifen

53. Neonicotinoids act on the central nervous system of insects through binding at the
   a) Synaptic nicotinic acetylcholine receptor
   b) Post synaptic nicotinic acetyl choline receptor
   c) Synaptic anticholinesterases
   d) Synaptic acetylcholine

54. Monarch (model) and the viceroy (mimic) butterflies are classical examples of
   a) Batesian mimicry named after Batesian
   b) Mullerian mimicry named after Fritz Muller
   c) Mullerian mimicry named after V. Mullerian
   d) Batesian mimicry named after H.W. Bates
55. Example of a selective carbamate insecticide toxic to aphids and Diptera
a) Indoxacarb
b) Pirimicarb
c) Endosulfan
d) Indoxycarb

56. Two or more identical scientific names that could cause a conflict of interpretation in taxonomy are
a) Primary homonyms
b) Synonyms
c) Homonyms
d) Holonyms

57. Speciation without geographic isolation results in
a) Apomorphic species
b) Parapatic species
c) Successional species
d) Palaespecies

58. Identification, nomenclature and classification as simplest components without analysis of any relationships at any level constitute what is called as
a) Biosystematics
b) Systematics
c) Taxonomy
d) International Code of Zoological Nomenclature and its articles

59. Cactoblastis cactorum is an example of an insect used in biological control of weed Opuntia, which was brought from
a) Australia to Argentina
b) Argentina to Australia
c) Australia to India
d) California to Australia

60. Example of a protein used as a major source of nitrogen for formation of adult tissues in the pupal stage is
a) Resilin
b) Pupiparin
c) Hox protein
d) Calliphorin

61. Uric acid is deposited permanently in the epidermal cells of the abdomen forming distinct
a) Black transverse bands in Dysdercus
b) White transverse bands in Dysdercus
c) Black transverse bands in Periplaneta
d) White transverse bands in Periplaneta

62. Important and strongly stimulating phagostimulants for phytophagous insects are
a) Sugars especially glucose
b) Amino acids
c) Sugars especially sucrose
d) α-proline

63. Of the following, an insect demonstrated to show a hygrokinetic response with increased activity in moist air compared with dry air is
a) Wireworms
b) Locust
c) Hydrophilid beetle
d) Ephemeropteran nymph

64. A complex form of phototaxis occurring in a moving insect and receiving a constant visual stimulus is called as
a) Kinesis
b) Menotaxis
c) Photokinesis
d) Mechanophototaxis

65. The innermost component of the integument attached by hemidesmosomes to the epidermal cells is
a) Epidermis
b) Endocuticle
c) Procuticle
d) Basal lamina

66. "An insect that requires and eats only one animal in its life span but may be ultimately responsible for killing many" is a
a) Parasitoid
b) Parasite
c) Kolobiont endoparasite
d) Kolobiont ectoparasite

67. Formation of hyperosmotic urine occurs in
a) All terrestrial insects
b) Saltwater mosquitoes
c) All aquatic insects
d) All insects living in ultra cold temperature

68. An insect in which neck is distinct, it is mainly derived from the
a) Last part of head
b) Head and thorax both
c) First part of thorax
d) Clear segment of thorax

69. The body temperature of insects normally follows closely the temperature of the surroundings and hence it is termed as
a) Hyperthermic
b) Warm blooded
c) Cold hardiness
d) Poliklothermic

70. Cold hardiness in insects is enabled due to
a) Poliklothermic nature
b) Polyhydroxyl substances like trehalose
c) Hydroxyl substances like alcohols
d) Cryoprotectants which evaporate at low temperature
71. In most insects, the concentration of trehalose in the haemolymph is
a) Dynamic but not related to the glycogen in the fat body
b) Constant and in dynamic equilibrium with glycogen in fat body
c) Always stable, never related to any activity
d) Constant but not related to the glycogen in fat body

72. Much of endocuticle formation, tanning and wax formation in insects is essentially part of
a) Pre-ecdysis
b) Moultung/ecdysis
c) Post ecdysis
d) Metamorphosis

73. The classic "Mosaic theory" of insect vision was propounded by
a) V.B. Wigglesworth (1965)
b) Von Frisch (1967)
c) Wehner and Bernard (1980)
d) Muller (1829)

74. Widely distributed form of proprioceptors of chordotonal nature in insect is
a) Scolopidia
b) Compaunform sensilia
c) Sensilla trichoidea
d) Trichogen/generative hair cell

75. DDT was synthesized by
a) Zeidler, 1874
b) Paul Muller, 1939
c) Schrader, 1941
d) Aucante, 1954

76. The chemical converted to cholesterol in higher animals and JH in insects is
a) Paraterpenol
b) Farnesyl pyrophosphate
c) Bacterial endochitinase
d) Histidine

77. Caudal breathing tube is the characteristic feature of
a) Notonectidae
b) Nepidae
c) Corixidae
d) Naucoridae

78. Name the chemical spray used in identification of amino acids:
 a) Phenol
b) Ninhydrin
c) Iodine
d) Butanol

79. Bunchy top in sugarcane is formed by
a) Chilo auricilius
b) Scirpophaga exerptalis
c) Melanoplus glomerata
d) Chilo infuscifellus

80. Droplet size in ultra low volume (ULV) spraying varies from
a) 0.5 – 15 microns
b) 30 – 150 microns
c) 250 – 350 microns
d) 500 – 800 microns

81. Androconia found in wings of certain insects are
a) Specialized scales
b) Bristles
c) Spots
d) Specialized glands

82. In regular distribution of an insect species, which of the following holds true?
a) Variance equal to mean density
b) Variance greater than mean
c) Variance less than mean
d) Variance and mean are above SD

83. Honey bee venom contains
a) Melittin
b) Klinns
c) Sclerotin
d) Arthropodin

84. Muscardine disease in silkworm is caused by
a) Nosema bombycis
b) Beauveria bassiana
c) Bacillus bombysepticus
d) Beauveria muscardina

85. Destructive Insect Pest Act (DIPA) was first passed in
a) 1914
b) 1920
c) 1937
d) 1968

86. Among the following, which is the best suited for bee culture?
a) Apis dorsata and Apis mellifera
b) Apis florea
c) Apis cerana indica
d) Milipona melifera

87. Female aphids that produce eggs after mating
a) Fundatrix
b) Vivipara
c) Ovipara
d) Virginopara
88. The mean azadirachtin content of neem seed kernels by weight
a) 0.3%
   b) 0.6%
c) 0.03%
d) 0.08%

89. Suborder Caelifera is distinguished from Ensifera based on
a) Enlarged hind femur and short antenna
b) Enlarged hind femur and long antenna
c) Elongate antenna
d) Forceps like ovipositor

90. Cells of haemolymph that take up foreign chemicals of high molecular weight
a) Nephrocytes
   b) Oenocytcs
c) Phagocytes
d) Nidi cells

91. The first systemic organophosphate produced is
a) TEPP
   b) Methyl parathion
c) Schradan
d) Ethyl parathion

92. Polyhedra of the baculoviruses are of the size of
a) 1-15 μm
   b) 15-30 μm
c) 1-15 nm
d) 15-30 nm

93. Economic Injury Level as defined by an integrated pest management worker is the level at which
a) Damage can no longer be tolerated
b) Damage can be tolerated
c) Loss is less than cost of control
d) Control measures must be stopped

94. For an efficient integrated pest management, the economic threshold of a pest shall always be made to settle at a level
a) Equivalent to economic injury level
b) Lower than economic injury level
c) Higher than economic injury level
d) Fluctuating to be higher or lower than economic injury level

95. Any manipulation of environment intended to reduce pest numbers is referred to as
a) Habitat manipulation
   b) Ecological control
c) Ecosystem control
d) Biointensive control

96. Situation where a pest population after having been suppressed rebounds to numbers greater than that before suppression had occurred is called as
a) Secondary pest outbreak
b) Pest replacement
c) Pest resurgence
d) Pest epidemic

97. Currently the crystal toxins obtained from Bacillus thuringiensis are classified on the basis of
a) Serology
b) Transgenic capabilities
c) Amino acid sequence
d) Specificity

98. The use of gamma radiation for the eradication of insects is an example of
a) Mechanical control
b) Biological control
c) Cultural control
d) Physical control

99. The Journal "Insect Science and its Application" is published
a) As International Journal of Tropical Insect Science and published by Cambridge Journals
b) Continued in the same name by ICIPE, Nairobi
c) Continued in the same name and published by Cambridge Journals
d) As International Journal of Tropical Entomology and published by CABI, Wallingford

100. The "nucleocapsid" is always associated with the structure of insect pathogenic
a) Entomopox viruses
b) Non-occluded viruses
c) Baculoviruses
d) Irido viruses

101. The chemical compound produced by millipedes for their own defense is
a) Cardenolides
b) Iridoid glycosides
c) Hydrogen cyanide
d) Hydrogen chloride

102. An allelochemical involved in the biology of an organism (A), when it contacts another organism (B), evoking a behavioural/physiological response that is favourable to both (A and B) is a
a) Synamone
b) Kairomone
c) Pheromone
d) Allomone
103. The overall rate of JH synthesis by corpora allata in insects is regulated by peptides, of which the increase in synthesis is always by:
   a) Allatostatins
   b) Allatotropins
   c) Atropine
   d) FMR Famide

104. The mobilisation of lipids from the fat body is known to be effected by the:
   a) Allatostatins
   b) Vitellogenins
   c) Octopamine
   d) Adipokinemine

105. Chemicals produced by insects, which circulate in blood to regulate all the long term physiological, developmental and behavioural activities are:
   a) Moulting hormones
   b) Insect neuropeptides
   c) Insect hormones
   d) Pheromones

106. Occurrence of different phenotypes within a species, where the development of phenotype is governed exclusively by environmental conditions is referred to as:
   a) Polymorphism
   b) Polyphenism
   c) Polyaundry
   d) Polyethism

107. Diflubenzuron, teflubenzuron and chlorfluazuron are examples of:
   a) Pyrrole insecticides
   b) Neonicotinoids
   c) Avermectins
   d) Phenyl urea insecticides

108. A novel chitin synthesis inhibitor affecting specifically the plant hoppers, whiteflies and scale insects is:
   a) Diflubenzuron
   b) Dimilin
   c) Buprofezin
   d) Benzoyl phenyl urea

109. Epigynial shield and setae are important in the identification of:
   a) Families of Acarina
   b) Only Amerosidae and Ascidae
   c) Families of Diptera
   d) Subfamilies of Cyclorrhapha

110. The invaginations of body wall, strengthening exoskeleton and providing areas for attachment of muscles in insects are:
   a) Tentoriurn
   b) Apophyses
   c) Apodemes
   d) Ocelli

111. In the males of many insects, the sperms that pass through the vas deferens are then held in a storage structure:
   a) Spermatheca
   b) Spermatophore
   c) Vasa efferentia
   d) Seminal vesicle

112. "Imms General Textbook of Entomology" 10th edition (1977) is authored by:
   a) O.W. Richards and R.G. Davies
   b) A.D. Imms and O.W. Richards
   c) O.W. Richards and R.C. Davies
   d) O.V. Richards and R.G. Davies

113. Dr. M.L. Roonwal had contributed immensely to the taxonomy of:
   a) Thysanoptera
   b) Locusts and grasshoppers
   c) Isoptera
   d) Diptera

114. In endopterygote insects, the wing development is:
   a) Internal occurring at postembryonic stage
   b) External occurring at postembryonic stage
   c) Internal occurring in the embryonic stage itself
   d) Internal occurring in the larval stage only

115. First entomologist to the Govt. of India was:
   a) de Lionel Niceville
   b) Lionel de Niceville
   c) Maxwell Lefroy
   d) T.B. Fletcher

116. Entomological investigations on tea were started in:
   a) 1905 at Kanyakumari (West Bengal)
   b) 1905 at Kanyakumari (Assam)
   c) 1913 at Toockial (Assam) by UPASI
   d) 1913 at Vaiporai (Tamil Nadu) by UPASI

117. NBAII and NCIPM are located at:
   a) Bangalore and Hyderabad, respectively
   b) Bangalore and Faridabad, respectively
   c) Bangalore and New Delhi, respectively
   d) Hyderabad and Faridabad, respectively

118. Honey bee species whose nests consist of multiple combs and single combs are:
   a) Apis nigrocincta and Apis nuluensis, respectively
   b) Apis kosheevnikovi and Apis mellifera, respectively
   c) Apis andreniformis and Apis nigrocincta, respectively
   d) Apis nuluensis and Apis brevitigula, respectively
119. The secretion of the following glands are supposed to have the functions of softening the wax and production of royal jelly, respectively in honey bees
a) Glands in 4th abdominal segment and lateral pharyngeal glands, respectively
b) Glands in 4-7 abdominal segments and mandibular glands, respectively
c) Mandibular glands and lateral pharyngeal glands, respectively
d) Alkaline glands and accessory glands, respectively

120. Of the following, the coleopterans consumed as food are
a) Cybister japonicus and Crocethemis servilia
b) Grotopsytilia nigrofasciata and Anax guttatus
c) Cybister tripectatus and Aulonogyrus strigosus
d) Gonimbrasia belina and Rhynchorphorus phoenicis

121. Pick the right and sensible combination in the following:
   a) Degree days – temperature control – diurnal temperature curve
   b) Degree days – life history – developmental rate
   c) Degree days – minimum temperature – maximum temperature
   d) Degree days – temperature control – developmental rate

122. The following is one of the models used in systems analysis as a prelude to IPM
   a) Statistical through regression models
   b) Optimization through mechanistic models
   c) Optimization through simulation models
   d) Statistical through pest development models

123. The plant quarantine activity leading to issue of import permits for seeds and germplasm for research and experimental purposes is looked after as a nodal agency by the
   a) National Seeds Corporation and ICRISAT
   b) National Plant Quarantine Station, New Delhi
   c) NBPG, New Delhi
   d) NBPG + IARI, New Delhi

124. Pick the right and sensible sequential combination out of the following:
   a) Cym IA; npt II, Tn5; and aad, Tn7
   b) Bt; k; aad, Tn7; and npt II, Tn5
   c) Cry IA; npt II, aad; and Tn5, Tn7
   d) Bt; Cry IA; npt II, Tn5; and aad, Tn7

125. Pick the right and sensible combination in the following:
   a) Gypsymoth: trans 10 cis-12 hexadecadienol; pink bollworm : 10 propyl-trans-5,9, tridecadienyl acetate
   b) Gypsymoth: 10 propyl-trans-5,9, tridecadienyl acetate; pink bollworm : trans 10 cis-12 hexadecadienol
   c) Gypsymoth: trans 12 cis-10 hexadecadienol; pink bollworm : 10 propyl-trans-5,9, tridecadienyl acetate
   d) Gypsymoth: 10 acetoxy-cis-7- hexadecenol; pink bollworm : 10 propyl-trans-5,9, tridecadienyl acetate

126. Concentrate Insecticide Liquids essentially include
   a) Non-volatile solvents
   b) Emulsifier
   c) High viscosity emulsifier
   d) Emulsion of oil in water type solvents

127. Mosquito mat vapourisers, which repel and kill mosquitoes have their active ingredients dissolved in
   a) Base made of only wood powder/starch/coconut shell powder
   b) Base made of cellulose fibre board or cardboard or plastic mat with evaporation inhibitors
   c) Base made of only cellulose fibre board but evaporation inhibitors are not important
   d) Base made of cellulose fibre boards or cardboard or plastic mat but traces of perfumes not important

128. Of the following an exact example of acetyl choline mimics is
   a) Neonicotinoids but not spinosad
   b) Neonicotinoids and spinosad
   c) Blenazate and abamectin
   d) Pyrethrins and pyrethroids

129. Of the following example of quinazolone acaricide is
   a) Chlormenapyr
   b) Fenpyroximate
   c) Fenazaquin
   d) Fipronil

130. Concentration of insecticide required to inhibit 50% of cholinesterases is
   a) Ce I50
   b) Ch I50
   c) I50
   d) I50
135.  
- Hormone involved in cuticle hardening and darkening: a) Ecdysone  
- Lipoprotein layer of epicuticle: b) Formamidine  
- Mosquito and fly repellent: c) Cucullin  
- Hormone from prothoracic gland initiating growth, moulting of cuticle: d) Bursicon  
- Synthetic organic amine insect neurotransmitter: e) DEET

136.  
- Low reproductive and high survival rate: a) K strategist  
- High reproductive rate and low survival rate: b) Secondary pest outbreak  
- Interplay between populations and environment: c) r strategist  
- Pest with general equilibrium position far below economic injury level: d) Population dynamics  
- One pest suppressed and replaced by another innocuous pest: e) Sub-economic pest

137.  
- Ants: a) Laksha  
- Bees: b) Pipilika  
- Lac: c) Maksicha  
- Shadpada: d) Amarakusa  
- Silk worm: e) Yogayajna vaikya

138.  
- Linnaeus: a) Natural History of Insects  
- Fabricius: b) Arcana Entomologica  
- Westwood: c) Indian Ants  
- Donovan: d) Entomologia Systematica  
- Rothney: e) Systema Natura

139.  
- Indian Thysanoptera: a) G.M. Das  
- Tubulifera of India: b) R.N. Mathur  
- Pests of Tea in NE India: c) Ayyar and Margabandhu  
- Psyllidae of India: d) Sardara Singh  
- Bee Keeping in India: e) T.N. Ananthakrishnan

140.  
- Periodical cicada: a) Spoladea re curvalis  
- Painted lady butterfly: b) Coccinia  
- Dactylethrella candida: c) Tephrosia purpurea  
- Lasioptera cephelantea: d) Pyrethrum cordul  
- Leaf skeletoniser: e) Seventeen year locust
Short questions (No. 141 to 146); each question carries FIVE marks. Write answers, including computation / mathematical calculations if any, in the space provided for each question on the question paper itself.

141. (i) What is an artificial diet?
(ii) List the three types of insect diets.
(iii) Give the composition of any example.
(iv) Explain the role of artificial diet in entomological studies.

142. Explain briefly, the physiological changes in the integument of an insect at moult.
143. State the different aspects of thermoregulation in insects and bring out how insects adjust to the extremes, giving suitable examples?

144. (i) Define IPM. Explain how it differs from Integrated Pest Control.
(ii) Write any two equations for calculating Economic Injury levels.
(iii) Write two important detailed information that will be required for validation of IPM technologies.
145. (i) List the type of actions of insecticides that are mixtures of active substances. 
(ii) Explain what are combination products or premixes. 
(iii) Give two examples of each of these.

146. (i) What are invasive pest species? 
(ii) Give three examples of introduced pests in India. 
(iii) Explain one such hemipterous pest species giving its background, hosts, biology and at least two important management measures.