(NO. OF PAGES : 2)

(FOR THE CANDIDATES ADMITTED DURING THE ACADEMIC YEAR 2022 ONLY)

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REG.NO.:

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI
END-OF-SEMESTER EXAMINATIONS : May 2023

B.Sc.-BOTANY **MAXIMUM MARKS: 50**
II SEMESTER **TIME : 3 HOURS**

PART – III

ECONOMIC ZOOLOGY

SECTION - A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.
MULTIPLE CHOICE QUESTIONS.

1. Saprolegniasis is a disease in fish caused by
   a) Bacteria b) Virus c) Fungi d) Protozoa

2. The male bee (drone) takes _____days for development.
   a) 16 days b) 19 days c) 22 days d) 24 days

3. Silk contains a protein known as
   a) casein b) fibroin c) sericin d) both (b) and (c)

4. Which of the following is the Bird flu virus also known as Avian flu virus
   a) H5N1 b) H1N5 c) N5H1 d)N1H5

5. Brown color patches, longitudinal fissures and splits on outer surface of the coconut husk is due to
   a) Curculionidae b) Eriophyidmite c) Rhinoceros beetle d) Black headed caterpillar

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES:

6. Write a short note on fin fish structure?
7. Define Bee venom**.**
8. Name a few disinfectants?
9. Is coccidiosis a viral disease?
10. Comment on pediculosis capitis.

(CONTD….2)

SECTION – B (3X5=15 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.
(Qn. No. 11 to 15)Questions for Short Answers with internal choices – 2 questions from each unit

11. a) Write short notes on Gill rot disease in fish. **(OR)**
    b) Describe the structure of pearl oyster.

12. a) Enumerate the characteristic features of Apisindica. **(OR)**
    b) Briefly explain the nutritive value of milk.

13. a) What are the vegetative propagation methods used in mulberry cultivation?
    (OR)
    b) Describe the structure of silk gland.

14. a) Discuss about rearing methods of broilers.
    (OR)
    b) Write a short note on Ranikhet disease.

15. a) Explain about the common pests in sugar cane
    (OR)
    b) What are the diseases are caused by Culexquinque fasciatus?

SECTION - C (5X5=25 MARKS)

ANSWER ANY FOUR OUT OF SIX QUESTIONS
(16TH QUESTION IS COMPULSORY AND ANSWER ANY THREE QUESTIONS (FROM QN. NO : 17 TO 21)

16. a) Enumerate the various type of fisheries in India.
    (OR)
    b) Discuss about the edible and pearl Oyster culture method.

17. a) Explain the general characteristic features of Apis indica, Apis mellifera and Apis dorsata. **(OR)**
    b) Give an account on various diary by products and their uses.

18. a) Explain the life cycle Bombyx mori with suitable diagram.
    (OR)
    b) Elaborate about the cocoon market in Inida.

19. a) Describe the causes, mode of transmission,symptoms of livestock diseases.
    (OR)
    b) Demonstrate the construction of a poultry house.

20. a) Distinguish between biological and chemical best control method.
    (OR)
    b) Describe the life cycle of cluex quinquefasciatus with a neat sketch.

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI
ESTER EXAMINATIONS : May 2023

Course name: **Economic Zoology** Maximum Marks: 70
Semester: Even Time : 3 Hours

******BY2A2 **Economic Zoology**

ETHICAL PAPER

SECTION - A (10 X 1 = 10) Answer The Following Questions.

1. c)fungi

2.d) 24 days

3. d) both (b) and (c)

4.a) H5N1

5.b) Eriophyidmite

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES

6. The dorsal fin is a median fin located on the dorsal side of the fish. The anal fin and caudal fin are also median fins. Paired fins are arranged in pairs, like human arms and legs. The pelvic and pectoral fins are both paired fins.

7. Bee venom (BV) is a complex mixture of proteins and contains proteins such as phospholipase and melittin, which have an effect on blood clotting and blood clots.

8. Disinfection describes a process that eliminates many or all pathogenic microorganisms, except bacterial spores, on inanimate objects

9. Coccidiosis is a parasitic disease of the intestinal tract of animals caused by coccidian protozoa. The disease spreads from one animal to another by contact with infected feces or ingestion of infected tissue. Diarrhea, which may become bloody in severe cases, is the primary symptom.

10.Pediculosiscapitis (PC) is an ectoparasitic disease caused by infestation of the scalp with head lice (Pediculushumanuscapitis). It is a ubiquitous disease in pediatric population in the age group of 6–12 years and is especially frequent in poor communities in developing countries.

SECTION – B (5 X 4 = 20)

11. a)**Gill rotCAUSATIVE AGENTS:***Branchiomyces* spp.

SPECIES AFFECTED: Carps, goldfish, eels.

GROSS SIGNS: Gills become pale with brownish areas due to hemorrhage and thrombosis, or grayish as a result of ischemia. Necrotic areas might slough-off at a later stage becoming a focus for saprolegnian infections.

EFFECTS ON HOSTS: Fungal hyphae in the gills obstruct the circulation of the blood. Necrosis and proliferation of lamellar epithelial cells and lamellar fusions may be observed. The disease can appear suddenly and often has a rapid course with losses as high as 30-50% occurring in 2-4 days. Death is due to anoxia.

DIAGNOSIS: Microscopic examination will reveal the branched and coenocytic mycelia of the pathogen within the affected gill tissues.

PREVENTION AND CONTROL: Various chemicals have been used to treatbranchiomycosis, which include: malachite green, benzalkonium chloride, copper sulfate sodium chloride

11.b**) Pearl Oyster**marine, sedentary and found attached to rocks and stones. shell is external and comprised of two unequal beautifully coloured valves. two valves the left is large and right is small. umbo (raised area) lies on anterior side and the surface of each valve is irregular and rough. mantle lines the two valves and is without any tentacles or ocelli.

gills are paired and crescentric and the foot is absent in adults. byssus groove is present in front but is without byssus threads. Adductor muscle is single and is divided into unequal parts. individuals behave as males and females alternately.They are much liked as food.

- 12.a)**Apisindica**Commonly called as Honey bee.
- Body divisible into head, thorax and abdomen in all castes.
- Queen is largest and fertile. Worker is smallest - Head triangular, containing compound eyes in dorsolateral position and many jointed antennae besides ocelli.
- Clypeus, labrum and other mouth parts visible in lateral position. Mouth parts are rasping and lapping type.

- Thorax is divided into prothorax, mesothorax and metathorax each containing a pair of legs. Prothoracic leg contains eye brush, velum or fibula, antennae comb and pollen brush. Mesothoracic leg contains spur, pollen brush and pulvillus. Metathoracic leg contains pollen basket, pollen comb. Thorax contains a pairs of wings.
- Abdomen has 6 segments. Last segment contain sting. Ventral surface of last four segments contains wax plates and wax glands. Spiracles are found over abdomen.
- Workers act as repairers, store keepers, cleaners, nector (honey) collectors and defenders.
- Drones are male members. They fertilize the eggs laid by queen. They do not do any work.

12.b) **Nutritive Value Of Milk**Milk is a complex fluid containing protein, fat, carbohydrates, vitamins and minerals. The main protein in milk is casein and it constitutes 3.0-3.5 percent of milk. The fat content of milk varies from 3.5 percent in cow's milk to about 8.0 percent in buffalo's milk. Fat is present in the form of fine globules varying in diameter from 1 to 10µm(micrometers).Milk also contains phospholipids and cholesterol.

Table 4.7 Nutritive value of milk and milk products (per 100 g)

Food	Energy (Kcal)	Protein (g)	Fat (g)	Calcium (mg)	Iron (mg)
Cow's milk	67	3.2	4.1	120	0.2
Buffalo's milk	117	43	6.5	210	0.2
Curd	60	3.1	4.0	149	0.2
Paneer	265	18.3	20.8	208	-

Lactose is the sugar present in milk. The important minerals in milk are calcium, phosphorus, sodium and potassium. Milk is an excellent source of riboflavin and a good source of Vitamin A. However, milk is a poor source of iron and ascorbic acid. The small amount of iron present is bio available.

13.a) **vegetative preparation** – stem cuttingMulberry is mostly propagated through cuttings.Cuttings may be planted straight away in the main field itself or nursery may be raised and the sprouted and rooted saplings may be planted in the main field.Mulberry can be vegetative propagated through stem cuttings, grafting, or budding. However, the success of these methods depends on a number of some factors such as genetic makeup of the plant, age, physiological conditions of the parental cutting, climatic conditions, and cultural practices.

b) **Structure Of Silk Gland(1) Posterior region:**Blunt, highly folded tubular posterior regions of both glands remain attached to tracheal bushes of silkworm. This part secretes fibroin as fibrinogen which converted to fibroin upon extrusion.

(2) Middle region: Most prominent and widest part of silk gland. It remains folded in a W-shaped structure and thus has 3 limbs — posterior, middle and anterior limbs. The posterior arm secretes sericin-I. It gets surrounded by serecin-II secreted from the middle limb.Thissericin again gets surrounded by sericin- III secreted from the anterior limb. The middle region of silk gland also acts as the reservoir of fibroin where the later gets mature during the storage period.

(3) Anterior region: The thin anterior region of silk gland has no secretory role and only transports the assembled silk to the spinneret.

Spinneret: It is a projection of the median part of the labium, which draws the silk out in the form of fine filament. The secreted silk comes out as a thread or filament as it passes through silk press which resembles a typical salivary pump. The two filaments coming out of two sides are called brins. The sericin (gum) layer of the two brins then bind together into a single filament or bave.

Histologically the entire gland has 3 layers:

(1) The outer tunica propia with uniform thickness;(2) The middle glandular layer with gland cells which increase in size during later instar stages of larval development and(3) The inner tunica intima: It has varying thickness.**Filippi's gland or Lyonnet'sgland:**In the head region of the larvae, a pair of glands is situated which open into the anterior part of silk gland near its opening into the spinneret.

*14.*a**) Rearing of broilers** Broilers can also be reared on cages. Broiler cages are similar to that of grower cages. To prevent the breast blisters, the bottom of the cage may be coated with some plastic materials. The floor space requirement in cages is 50% of the floor space needed in deep-litter. The relative advantages and disadvantages of cage rearing of broilers are,

- Higher density of rearing possible
- Easy to catch the birds at market time and hence reduces bruising
- No expenditure on litter
- No incidences of coccidiosis
- Reduced cannibalism

- Cleaning and disinfection easier
- Better growth and feed efficiency

Free-Range or Extensive System:

This is the oldest system of farming used by general farmers, where there is no shortage of land and monetary involvement-birds permitted to roam freely instead of being contained in any manner-rural area in small scale. A free range chicken must have daytime access to open-air runs during at least half of their life..**Indoor or Intensive Method**: chickens are kept indoors but with more space (around 12 to 14 birds per square metre). They have a richer environment, for example, with natural light or straw bales that encourage foraging and perching. The benefits of indoor systems are higher welfare with less crowding and more opportunities for natural behaviour. Intensive or indoor system includes two types — (A) Battery cage system and (B) Deep litter system.

b) **Ranikhet disease** Newcastle disease in the West. Newcastle disease or Ranikhet is a highly contagious viral disease. It is an infection of domestic poultry as well as other bird species with virulent Newcastle disease virus (NDV). It is also characterised by digestive, respiratory or nervous signs-occurs in almost all countries as well as it is normally assumed to be a severe form affecting birds of all ages. Mortality of flows of the disease varies from 50 to 100 percent. Ranikhet disease or Newcastle disease is largely a virus of flows, but it also affects birds like turkeys, pigeons, grows, ducks, geese, kohl pheasants, guinea-flows, partridges as well as doves. The Newcastle disease is also suspected to cause conjunctivitis among laboratory workers along with persons handling infected birds.

Symptoms of disease-

The symptoms of this disease vary according to the age of the affected birds. The first symptoms usually observed in young birds are sneezing, gasping often droopiness too. Within a short period of time after appearance of respiratory symptoms, deaths occur in a flock in quick succession and the number can from day to day.

15.a)**Pest Of Sugar Cane**

1)Early shoot borer: *Chiloinfuscatellus* (Crambidae: Lepidoptera)

Distribution and status: India, Pakistan, Indonesia, Thiawan, Philippines, Korea, Afghanistan and Burma.**Host range**: Pearl millet, oat, barley and maize**Damage symptoms**Dead heart in 1-3

month old crop, which can be easily pulled out, rotten portion of the straw coloured dead-heart emits an offensive odour. A number of bore holes at the base of the shoot just above the ground level can be seen. It is major pest in the early stage of the crop.

2)Internode borer: *Chilosacchariphagusindicus* (Crambidae: Lepidoptera)

Distribution and status: India, Pakistan and Sri Lanka**Host range**: Pearl millet, rice and sorghum**Damage symptoms**Internodes constricted and shortened, with a number of boreholes and fresh excreta in the nodal region. Affected tissues become reddened.

3)**Top borer: *Scirpophagaexcerptalis* (Pyralidae: Lepidoptera)**

Distribution and status: India, Pakistan, China, Formosa, Japan, Philippines, Thailand, Bangladesh, Indonesia, Laos, Cambodia, Vietnam, Burma and Taiwan**Host range**: Millets and other grasses**Damage symptoms**Dead heart in grown up canes, which cannot be easily pulled; dead heart reddish brown in colour; parallel row of shot holes in the emerging leaves and red tunnels in the midribs of leaves; bunchy top appearance due to the growth of side shoots. Larva bores into the midrib of unfolded leaves and mine their way to the base.

15.b) **culexquinquefasciatus**

It transmits zoonotic diseases that affect humans and wild and domestic animals, such as lymphatic filariasis, avian malaria, St. Louis encephalitis, Western equine encephalitis, and West Nile fever, and may be a vector of the Zika virus.

SECTION - C **(4 X 10 = 40)**

Answer **any four** out of six questions

(**16th question is compulsory** and answer **any three** questions (from qn. no : 17 to 21)

- 16. **Diary byproductsmilk**
- **Liquid milk** is the most consumed, processed and marketed dairy product. Liquid milk includes products such as pasteurized, skimmed milk, standardized milk, reconstituted milk, ultra-high-temperature (UHT) milk and fortified milk. Worldwide, less and less liquid milk is consumed in its raw form.
- **Fermented milks** are commonly used to make other milk products. They are obtained from the fermentation of milk using suitable microorganisms to reach a desired level of acidity. Fermented products include yoghurt, koumiss, dahi, labneh, ergo, tarag, kurut and kefir.

- **Cheeses** are produced through the coagulation of milk protein (casein), which is separated from the milk's whey. Hundreds of varieties of cheese are produced, many of them being characteristic to a particular region of the globe. However, most cheese is produced in developed countries. Cheese can be soft, hard, semi-hard, hard ripened or unripened. Cheese's diverse characteristics derive from differences in the compositions and types of milk, processes applied and microorganisms used. Traditional cheeses produced in developing countries include ayib, gibnabayda, chanco, queso fresco, akawieh and chhurpi.
- **Butter and ghee** are fatty milk products. Butter is produced by churning milk or cream; in many developing countries, traditional butter is obtained by churning sour whole milk. Ghee is obtained by removing the water from butter and is especially popular in South Asia. Ghee has a very long shelf-life of up to two years.
- **Condensed milk** is obtained from the partial removal of water from whole or skimmed milk. Processing includes heat-treating and concentration. Condensed milk can be sweetened or unsweetened, but most is sweetened. In Latin America, for example, condensed milk is often used in cooking and baking instead of jam.
- **Evaporated milks** result from the partial removal of water from whole or skimmed milk. Processing includes heat-treating to make the milk bacteriologically safe and stable. Evaporated milks are generally mixed with other foods, such as in milky tea.
- **Dry milk or milk powder** is obtained from the dehydration of milk and is usually in the form of powder or granules.
- **Cream** is the part of milk that is comparatively rich in milk fat; it is extracted by skimming or centrifuging the milk. Cream products include recombined cream, reconstituted cream, prepared creams, pre-packaged liquid cream, whipping cream, cream packed under pressure, whipped cream, fermented cream and acidified cream.

17.Types of Fisheries Fisheries play an important role in the economy of India. Fisheries help in augmenting food supply, generating employment, raising nutritional level and earning foreign exchange. Fish forms an important part of the diet of many people living in the coastal areas of Kerala, West Bengal, Orissa, Andhra Pradesh, Tamil Nadu, Goa and Maharashtra.

The major forms of fisheries in India are as follows:

(i) Marine Fisheries: Accounting for about 40 per cent of the total annual production of fish and being confined to coastal waters in the west from Kachchh, Malabar coast to Coromandal coast in the east, they are spread over narrow belts of continental shelf and slope running to 5,600 km with a total fishable area of about 2,81,600 sqkm.They lie between the coast and 200 m limit. More than 75 per cent of the total marine fish are from west coast. Higher phosphate and nitrate content results in greater plankton productivity. Major fishes are sardines, mackerel and prawns. On the eastern coast, the important fishes are horse mackerels, clupeids and silver bellies.

Off-shore and Deep Sea fishing which accounts for a small production of marine fish in the country has not been developed fully so far in India. Deep sea fishing consists of, fishing in off-shore and the high seas for surface, mid-water and bottom forms of fish.

(ii) Freshwater or Inland Fishery::

Freshwater fishery is carried on in rivers, canals, irrigation channels, tanks, ponds, lakes, etc. About 60 per cent of the country's total fish production comes from inland fisheries. (Of late, inland fishery production has overtaken marine fishery production.) Freshwater fishery can be divided into two categories.Pond fisheries suitable for quick growing fishes with non-predacious feeding habit. Examples are catla, rohita, kalabasil, mringal, mullets, carp, etc. The other is riverine fisheries. About one-third of the total fish production in India comes from rivers.Such fishing is very active during winter season when floods usually subside. During rainy season fishing is poor. River fish: catla, mringal, hilsa, etc. West Bengal, Bihar and Assam are important states for riverine fishery.

(iii) Estuarine Fisheries: This is confined to estuaries, backwaters, tidal estuaries, lagoons, inundated—areas and swamps along the entire coast, that is, important estuarine areas of the Ganga, Mahanadi, Godavari, Krishna, Cauvery, Narmada and Tapi, the brackish water lakes of Chilka and Pulicat, and the backwaters of Kerala. Prawn is an important variety.

(iv) Pearl Fisheries: Areas are usually on the ridges or rocks or dead corals forming extensive pearl banks at a depth of 18-22 m. The distance from the shore is about 20 km. Pearls of high value area obtained from pearl-oysters. Principal centres are the Gulf of Mannar, Gulf of Kachchh and Palk Bay and around Andaman and Nicobar Islands. They are a state monopoly.

18.**Livestock DiseasesBovine mastitis** is a condition typified by the persistent and inflmmatory reaction of the udder tissue due to either physical trauma or infections caused by microorganisms - fatal mammary gland infection, that is most common in dairy cattle worldwide.

CausesBacterial organisms known to cause mastitis are Pasteurellamultocida, Staphylococcus aureus; Str. Zooepidemicus; Str. agalactiae; Str. pyogenes; Str. faecalis; Mycobacterium bovis; Klebsiellaspp; Brucellaabortus; Pseudomonas pyocyaneus; E.coli; Leptospira Pomona, etc.Fungal entities responsible for mastitis are Aspergillusfumigatus; A.midulus; Candida spp; Trichosporonspp, etc.Physical injury to the mammary region, poor hygiene and/or trauma, also cause this condition.**Symptoms**The clear sign of mastitis is inflammation of the udder that turns into a red and hard mass. The swollen mammary gland is hot and the mere touching causes pain and discomfort to the animal. Animals do not allow touching of the udder even kicking to prevent milking. If milked the milk is usually tainted with blood clots, foul smelling brown discharge and milk clots.

The milk yield totally stops or is severely restricted. Body temperature of the animal increases. Other symptoms are lack of appetite, hindrance in mobility due to swollen udder and pain. The dairy animal develops sunken eyes, suffers from digestive disorders and diarrhoea.

Infected cattle are severely dehydrated and suffer from weight loss. Mastitis can be detected at an early stage (sub clinical) before the symptoms appear, through California Mastitis Test (CMT). It is a quick test that can be performed on small milk samples. Early detection helps in preventing the progress of the disease into clinical stages and causing heavy losses to dairy farmers.

Prevention Provide clean, dry and adequate bedding for cows to lie, Cows should be clean while entering the milking area, Use different cloth or paper towel for cleaning the teats on each cow, Teats should be completely dry and clean before milking, Use germicidal teat dips after milking

2)Foot mouth disease

- It is caused by a virus **Apthous** of the family Picornaviridae highly infectious viral disease of farm animals.
- This disease mostly manifests the lesions in the mouth, feet and mammary gland.
- **Milk yield drops** dramatically in milking animals, **suckling calf usually die and pregnant animals may abort and infertility** may ensure following abortion.

- **Mode of Transmission**Generally by direct or indirect contacts between susceptible and infected animals.
- Through movement of clinically affected animals.
- Through inanimate vectors such as vehicles, fodders, utensils, equipments etc.,
- Through air. Infected animals have a large amount of aerosol virus in their exhaled air, which can infect other animal

symptomsHigh fever up to 104-106˚F (41˚C) and anorexia.Profuse salivation (saliva hanging in long ropy strings up to the ground).Animal stamps its feet and wounds in the interdigital space of legs followed by lameness.Oral ulcers and lesions.Smacking of lips.Vesicles in the mammary gland.

19.**Life Cycle BombyxMori** -female silk moth lays eggs. The caterpillar or larvae are hatched from the eggs of the silk moth. silkworms feed on mulberry leaves and give rise to pupa. In the pupa stage, a weave is netted around by the silkworm to hold itself. After that it swings its head, spinning a fibre made of a protein and becomes a silk fibre. Several caterpillars form a protective layer around pupa and this covering is known as the cocoon. The silk thread (yarn) is obtained from the silk moth's cocoon. s**tage 1: Egg** is the first stage of the life cycle of the silkworm- egg is laid by a female moth which is mostly the size of small dots. A female moth lays more than 350 eggs at a time. In the springtime, the eggs hatch due to the warmth in the air. This procedure happens once in every year.**Stage 2: Silkworm**A hairy silkworm arises after the eggs crack. In this stage of silkworms, the growth happens. they feed on mulberry leaves and consume a large amount of these leaves for around 30 days before going to the next stage.**Stage 3: Cocoon**In this stage, silkworms spin a protective cocoon around itself. It is the size of a small cotton ball and is made of a single thread of silk.**Stage 4: Pupa** motionless stage. In this stage, people kill the pupa by plunging the cocoon into boiling water and unwind the silk thread.**Stage 5: Moth**the pupa changes into an adult moth. The female moth lays eggs after mating and thus the life cycle of silkworm begins again.

20.**Construction of poultry house**

- Poultry house should be located away from residential and industrial area
- It should have proper road facilities.
- It should have the basic amenities like water and electricity.
- Availability of farm labourers at relatively cheaper wages.
- Poultry house should be located in an elevated area and there should not be any water-logging.
- It should have proper ventilation.
- Layout should not allow visitors or outside vehicles near the sheds.
- The sheds should be so located that the fresh air first passes through the brooder shed, followed by grower and layer sheds. This will prevent the spread of diseases from layer houses to brooder house.
- There should be a minimum distance of 50-100 feet between chick and grower shed and the distance between grower and layer sheds should be of minimum 100 metre.
- The egg store room, office room and the feed store room should be located near entrance to minimize the movement of people around the poultry sheds.
- The disposal pit and sick room should be constructed only at the extreme end of the site.

21. **IPM** Integrated Pest Management (IPM) is an ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties.

- It is an approach to control the pest in an integrated way.
- Under this method, pesticides are only used according to standard established guidelines and treatment is done with a goal of removing only the target organisms.
- It is a method which is used to solve pest problems without or at low level of risk to the people and the environment.
- It is an eco-friendly method of pest control.
- Furthermore, IPM can also be considered as a pest control program that combines several methods for prevention from the pest and protection of the plants.
- IPM incorporates several biological, ecological, physical and chemical strategies for controlling the pests' problems

- IPM programs use information on the life cycles of pests and their interaction with the environment. This information is then used to manage pest damage.
