

Animals and plants are used for food since evolution of man takes place same it primitive. Thousands of years ago, agriculture began. Today in the animal husbandry; dairy farming, poultry, apiculture, fisheries and in plant breeding. Various methods of breeding and tissue culture are applied for getting more food to fulfill the need of increasing human population.

• **Animal husbandry :**

Animal husbandry is an important from very beginning in development of human beings. It is important for food production, The dairy industry, covers the production, processing and distribution of milk. In Gujarat this industry is well developed.

- Apiculture, is the rearing of honey bee commonly in hives. The chief products of bee keeping industry are (i) Honey and (ii) Bee's wax.
- Fishery deals with catching, processing or selling of fish and other aquatic living organisms. Directly or indirectly the livelihood of over 500 million people in developing countries depend on fisheries.
- In 20th century poultry keeping has become an important small scale industry due to modern need for palatable and nutritive food which it provides in the form of eggs as well as adult animals.

- (1) What is apiary ?
- (A) honey bee rearing (B) a location where bees are kept
(C) a location for breeding bees (D) Hybridization in honey bees
- (2) IARI means,
- (A) International Agriculture Research Institute (B) Indian Agriculture Research Institute
(C) Imperial Agriculture Research Institute (D) Indian aeronautical Research Institute
- (3) Which of the following group is right for fresh water fishes ?
- (A) Catla, Rohu, Mackerel (B) Major carp, Hilsa, Sardines
(C) Mrigal, Mackerel, Promfrets (D) Rohu, Mrigal, Catla
- (4) Cattle, Keepers play central role in dairy faming because
- (A) They prepare house hold milk products
(B) They have brought white revolution in dairy farming
(C) Their dairy products are sold at national as well as inernational level
(D) They carries good varieties of cattle.
- (5) Honey is a viscous, sugary fluid...
- (A) It is thick liquid formed from the nectar within the stomach.
(B) It is thick liquid formed from the nematocytes of honeybee.
(C) It is thick liquid formed from Salivary glands of honeybee.
(D) It is secreted by the abdominal gland of bees.
- (6) Numbers of worker bees found in the colony are
- (A) 40,000 to 50,000 (B) 30,000 to 50,000
(C) 40,000 to 60,000 (D) 30,000 to 60,000
- (7) Which of the following group is right for edible marine fishes ?
- (A) Sardines, Pomfrets, Mackerel (B) Catla, Rohu, Mrigal
(C) Hilsa, Pomfrets, Catla (D) Sardines, Mackerel, Mrigal

- (8) What is the full form of IVRI ?
 (A) Indian Veterinary Research Institute (B) Imperial Viral Research Institute
 (C) Imperial Veterinary Research Institute (D) International Veterinary Research Institute
- (9) Which of the following sentence is true for the researches carried out by the IVRI ?
 (A) There are several Government poultry farms in India.
 (B) They have demonstrated the high biological value of eggs and recommended the consumption of eggs.
 (C) Recommended the consumption of meat for proper nutrition.
 (D) Little attention has been paid for the proper nutrition.
- (10) Who was a pioneer of dairy industry in India ?
 (A) Whenson (B) Huber (C) Dr. Varghese Kurien (D) Fahiyam

Answers : (1-B), (2-B), (3-D), (4-D), (5-A), (6-B), (7-A), (8-C), (9-B), (10-C)

- In animal breeding the improved varieties can be more useful to man, various methods are there like, inbreeding, outbreeding, interspecific breeding.
- Through plant breeding methods improved variety can be obtained. The major goals are as per animal breeding. By the various methods species are obtained with genetic variation.
- One of the sources of proteins for animals and human nutrition is single cell protein (SCP) even many people uses mashroom as a food.
- Plant tissue culture means growing and maintaining the cell, tissue and organ in culture medium. In tissue culture (1) Callus culture even suspension culture and (2) Embryo culture are included.

- (11) Which type of hybridization gave mule ?
 (A) Outbreeding hybridization (B) Inbreeding hybridization
 (C) Interspecific hybridization (D) Intraspecific hybridization
- (12) How much amount of protein is produced by *Methylophilus methylotrophus* bacteria per day ?
 (A) 230 gms (B) 250 gms (C) 200 gms (D) 280 gms
- (13) Which of the following statement is true for single cell protein ?
 (A) It is the source of proteins for animals and plant nutrition.
 (B) It's utilization increases environmental pollution.
 (C) It is produced by fermentation.
 (D) Fungi cannot be used for single cell protein production.
- (14) Select the correct sequence for plant breeding.
 (A) Collection of variability → Selection of superior recombinants → Cross hybridization among the selected parents
 (B) Collection of variability → Evaluation of selection of parents → Cross hybridization among the selected parents → Selection of testing of superior recombinants → Testing, release and commercialization of new cultivation
 (C) Selection and testing of superior recombinants → Collection of variability → Evaluation and selection of parents → Testing, release and commercialization of new cultivation
 (D) Selection of parents → Cross hybridization among the selected parents → Collection of variability → Selection of superior recombinants
- (15) What is application of the embryo culture method ?
 (A) Replication of plantlets (B) Protoplast isolation
 (C) Development of plantlets from dormant seeds (D) An increase in the biomass of cells and tissues

- (16) Which of the following is not proper for callus and suspension culture ?
 (A) Regeneration of saplings (B) Formation of cell biomass
 (C) Hybrid plantlet of interspecific plants (D) Protoplast isolation
- (17) Which of the following sequence correct for events following during callus culture ?
 (A) explant → cell division → callus → cytokinin are added to the medium → cells converted to meristematic tissue
 (B) explant → callus → cell division → cytokinin are added to the medium → cells converted to meristematic tissue
 (C) callus → cytokinin are added to the medium → cell division → cells converted to meristematic tissue → explant
 (D) cell division → cytokinin are added to the medium → callus → explant → cells converted to meristematic tissue
- (18) What can be developed in plant cells, tissue or organ by tissue culture ?
 (A) totipotency (B) stored food (C) interspecific hybridization (D) seed dormancy
- (19) In maize hybrids have twice the amount of amino acid.
 (A) tyrosine (B) glycine (C) lysine (D) serine
- (20) is the medium for maintaing callus.
 (A) Agar Agar gel (B) Agarose gel (C) IBA (D) 2-4 - D

Answers : (11-C), (12-C), (13-C), (14-B), (15-C), (16-C), (17-A), (18-A), (19-C), (20-A)

- (21) Select the proper pair :

Column - I

- (P) Milk
 (Q) Honey
 (R) Agar-agar
 (S) Rotary shaker
 (T) Eggs
 (A) P - i, Q - iii, R - ii, S - iv, T - v
 (C) P - iii, Q - iv, R - ii, S - v, T - i

Column - II

- (i) Palatable and nutritive food
 (ii) Callus culture
 (iii) Pasteurization
 (iv) Medicinal value
 (v) Suspension culture
 (B) P - iii, Q - iv, R - v, S - ii, T - i
 (D) P - i, Q - ii, R - iii, S - iv, T - v

- (22) Select the proper pair :

Column - I

- (P) *Santa gertrudis*
 (Q) Orchid
 (R) *Hybrid maize*
 (S) Mule
 (T) Methylophilus
 (A) P - iii, Q - iv, R - i, S - iii, T - v
 (C) P - v, Q - i, R - ii, S - iii, T - iv

Column - II

- (i) Rapid clone distribution
 (ii) Interspecific hybridization
 (iii) Reduces environmental pollution
 (iv) Outbreeding
 (v) Biofortification
 (B) P - iv, Q - i, R - v, S - ii, T - iii
 (D) P - i, Q - ii, R - iii, S - iv, T - v

- (23) Select the proper pair :

Column - I

- (P) Single cell protein
 (Q) Callus culture
 (R) Hybrid maize
 (S) The father of modern bee - science
 (A) P - i, Q - ii, R - iii, S - iv
 (C) P - iv, Q - i, R - iii, S - ii

Column - II

- (i) Cytokinin
 (ii) Huber
 (iii) Twice the amount of the lysine and tryptophan
 (iv) Fermentation
 (B) P - ii, Q - i, R - iii, S - iv
 (D) P - iii, Q - iv, R - ii, S - i

(24) Select the proper pair :

Column - I

- (P) Palanpur
(Q) Mehsana
(R) Anand
(S) New Delhi
(T) Izatnagar
(A) P - i, Q - v, R - ii, S - iii, T - iv
(C) P - ii, Q - v, R - i, S - iv, T - iii

Column - II

- (i) Dudh sagar dairy
(ii) IARI
(iii) Banas dairy
(iv) IVRI
(v) Amul dairy
(B) P - ii, Q - i, R - v, S - iv, T - iii
(D) P - iii, Q - i, R - v, S - ii, T - iv

(25) Select the proper pair :

Column - I

- (P) Worker
(Q) Queen
(R) Drone
(S) *Santa gertrudis*
(A) P - iv, Q - i, R - ii, S - ii
(C) P - iii, Q - ii, R - iv, S - i

Column - II

- (i) only breeding female in colony
(ii) work as breeding only
(iii) directly used in inbreeding
(iv) unfertile female bees
(B) P - i, Q - iii, R - ii, S - iv
(D) P - iii, Q - iv, R - i, S - ii

Answers : (21-C), (22-B), (23-C), (24-D), (25-A)

• **A - Assertion, R - Reason questions :**

Choose the correct option of the following :

- (A) A and R both are correct. R is correct explanation of A.
(B) A and R both are correct. R is not correct explanation of A.
(C) A - Correct, R - False
(D) A - False, R - Correct

(26) Assertion A : Single cell protein is produced by fermentation.

Reason R : Genetic engineering is used for production of single cell protein.

- (A) (B) (C) (D)

(27) Assertion A : As compared to the callus culture growth is fast in suspension culture.

Reason R : The culture constantly rotates over rotary shaker at 100 to 250 rpm speed in the culture media. So cells easily get aeration and the contents of the medium are thoroughly mixed.

- (A) (B) (C) (D)

(28) Assertion A : Today Mushroom is used as a food.

Reason R : As a food source, heterotrophs mushrooms are being cultivated world.

- (A) (B) (C) (D)

(29) Assertion A : Honey is popularly used medicine.

Reason R : Honey is popularly used as cosmetics.

- (A) (B) (C) (D)

(30) Assertion A : Continue inbreeding is not desirable.

Reason R : Due to continued inbreeding possibility is increased to collect harmful recessive genes. Therefore, fertility of offsprings gradually increases.

- (A) (B) (C) (D)

Answers : (26-B), (27-A), (28-A), (29-C), (30-A)

• **True - False (T - F) types questions :**

Choose the correct option :

- (31) (1) In plant breeding nutrient contents in the medium increases.
(2) In this method the biomass of cells and tissues increases.
(3) Decrease in volume of the medium due to evaporation.
(4) In this method, culture is transferred to new glass apparatus containing a fresh medium.
(A) T, T, T, F (B) T, T, F, F (C) F, T, T, T (D) F, T, T, F
- (32) (1) Milk is important product used as valuable food stuffs.
(2) Milk is the fresh lacteal secretion of animals.
(3) Milk exploited as an commodity of food by human being.
(4) Milk is used for a variety of preparations like curd, butter, cheese, sweet, etc.
(A) F, F, F, T (B) T, T, T, T (C) F, F, F, F (D) F, T, F, T
- (33) (1) In embyo culture, a small embryo from a developing seed is kept inside the seed and then cultured on media.
(2) Rapid clone distribution is application of callus culture.
(3) Some seeds stay in dormant condition for longer time. Through embryo culture method plantlets can be developed from such seeds.
(4) Orchid contain stored food.
(A) T, F, T, T (B) T, T, F, F (C) F, T, T, T (D) F, F, T, F
- (34) (1) Bee's wax is secreted by the abdominal gland of bees.
(2) Queen is *infertile* female in a colony.
(3) Worker is the only breeding female in the colony.
(4) Drone found in many numbers and work as breeding male drones.
(A) T, F, F, T (B) T, T, F, F (C) F, T, T, F (D) F, F, T, T
- (35) (1) Higher yield of milk is the goal of animal breeding.
(2) In the outbreeding approach, animals of two different species are interbred.
(3) *Santa gertrudis* is example of outbreeding approach.
(4) Due to continued inbreeding fertility of offspring gradually increases.
(A) T, F, F, F (B) F, F, T, T (C) T, F, T, F (D) T, F, F, T

Answers : (31-C), (32-B), (33-D), (34-A), (35-C)

• **Questions for NEET :**

- (36) Which is the chief method associated with agricultural biotechnology ?
(A) Tissue culture (B) Transformation
(C) Plant breeding (D) Recombinant DNA
- (37) Method of breeding crops for higher levels of vitamins and minerals or higher protein.
(A) Biofortification (B) Biomagnification (C) Micro Propagation (D) Somatic hybridization
- (38) Which type of breeding product Mule is ?
(A) Hybridization (B) Mutation (C) Interspecific hybridization (D) outbreeding
- (39) What is added to the medium for growth of roots in callus culture ?
(A) Auxin (B) Cytokinin (C) Gibberrelins (D) A and B both

- (40) Which is generally used auxin in callus and suspension culture ?
 (A) Nephthalene Acetic acid (B) Indole butyric acid
 (C) Dichlorophenoxyacetic acid (D) ABA
- (41) A superior male of any one species is mate with a superior female of other species.
 (A) Inbreeding (B) Outbreeding
 (C) Test cross (D) Interspecific hybridization
- (42) Uses of honey bee.
 (A) Honey production (B) Usefulness of larva
 (C) Wax production (D) Both A and C
- (43) The capacity of producing new organism from one cell.
 (A) totipotency (B) pluriopotency (C) heterozygocity (D) cyriendipity
- (44) Totipotency of cell means
 (A) Regeneration capacity (B) Producing the whole plant from one cell
 (C) Root inducing factor (D) Somatic featus generation
- (45) In which method of hybridization, animals of two different species are interbred ?
 (A) Inbreeding (B) Interspecific
 (C) Inter generic hybridization (D) Outbreeding
- (46) Which of the following statement is true for single cell protein ?
 (A) Microbes used for single cell protein production include algae, bacteria, yeasts and filamentous fungi.
 (B) It does not contain fat and carbohydrates.
 (C) It is produced by carboxylation.
 (D) None of the above.
- (47) Chief product of poultry is
 (A) Eggs (B) Hen (C) Meat (D) Eggs and Meat
- (48) Which is the main application of the embryo culture method ?
 (A) Production of alkaloids (B) Plantlets can be developed from dormant seeds
 (C) Inducing somatic hybridization (D) Protoplast isolation
- (49) In which type of bee wax gland is present ?
 (A) Worker (B) Queen (C) Drone (D) A and B both
- (50) In which part of the body honey bee stores the nectar of flower ?
 (A) Stomach (B) Mouth (C) Gizzard (D) Intestine

Answers : (36-A), (37-A), (38-C), (39-D), (40-C), (41-B), (42-D), (43-A), (44-B), (45-B), (46-A), (47-A), (48-B), (49-A), (50-A)

Animal Husbandry

- It is the science of rearing, feeding, caring, breeding and utilization of domesticated animals.
- The ever-increasing demand of food from animals and animal products both in terms of quantity and quality has been met by good animal husbandry practices.
- These practices include (1) management of farm and farm animals and (2) animal breeding.
- In view of the high nutritive value of honey and its medicinal importance, there has been remarkable growth in the practice of bee-keeping or apiculture.
- Fishery is another flourishing industry meeting the ever-increasing demand for fish, fish products and other aquatic foods.

Animal breeding

Natural breeding

Artificial breeding

Inbreeding

- It is mating of more closely related individuals within the same breed for 4-6 generations.

Outbreeding

- It is breeding of the unrelated animals.

Outcrossing

- Mating between unrelated members of the same breed.

Cross breeding

- Mating of superior males of one breed with superior females of another breed.

Interspecific hybridisation

- Mating between members of two different species.

Management of farm animals

- It includes management of cattle, buffaloes, sheep, goat and poultry.

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