

**COURSE NO.-AHDS-242 COURSE TITLE- LIVESTOCK BREEDING
AND NUTRITION CREDIT-1+1**

NOTES- THESE ARE PROBABLE OBJECTIVES. WHILE DOING STUDY OF THESE OBJECTIVES ALSO REFER COMPLETE NOTES.

Probable Objectives of Theory

1. **Leonardo a Vinci** revealed the fact that the male and female parents contribute equally to the heredity of offspring.
2. **Wright** discovered firstly mutation in male lamb which had short legs.
3. According to **Charles Darwin**, every cell of organs produce minute particle known as PANGENESIS.
4. **Gregor Johann Mendel an Australian monk** has been called the “Father of Genetics”.
5. **Hugo Devries , a Dutchman** , proposed r theory known as “Mutation Theory”.
6. **Robert Hooke** of England applied the term Cell in **1665**.
7. Most cells range in diameter from about **10 to 100 micra**.
8. Animal cells are **eukaryotic** cells.
9. Cell membrane shows the **lipid bi-layer model** of the plasma membrane.
10. Cell membrane is made up of **phospholipids** which has polar(hydrophilic) heads and non- polar (hydrophobic) tails.
11. **Cell membrane** provides shape and rigidity of the cells.
12. **Cytoplasm** contain dissolve protein, electrolytes, glucose and small quantities of phospholipids, cholesterol and esterified fatty acids.
13. **Nucleus** is the house for most of the cells genetic material- the **DNA and RNA**.
14. The **RNA** helps in protein synthesis through transcription process.
15. **Nucleus** regulates synthesis of protein of cell.
16. **Mitochondria** is the main **energy** source of the cell.
17. **Mitochondria** are called the **power house** of the cell because energy.
18. **Mitochondria** produce energy for cell by the process of **cellular respiration**.
19. **ER (Endoplasmic reticulum)** is the transport system of the cell.
20. **Golgi bodies** are the packaging center of the cell.
21. **Ribosomes** is the site for protein synthesis.

22. **Lysosomes** is the digestive system of the cell.
23. **Centrosomes** and is known as the 'microtubule organizing center' of the cell.
24. Through **Mitosis** each daughter cell is genetically identical to the parent cell.
25. Through Meiosis the number of chromosomes in the daughter cells is reduced by half to produce haploid gametes.
26. Mitosis is sometimes called an ” **Identical Reproduction of Cells**”.
27. Division of **nucleus** is call as **Karyokinesis**.
28. Division of **cytoplasm** is called as **Cytokinesis**.
29. **Mitosis** helps the cell in maintaining its proper size.
30. **Mitosis** helps the organisms in the asexual reproduction.
31. The term meiosis was coined by **J.S. Farmer in 1905**.
32. By reducing the number of chromosomes of the diploid germ cells into the haploid gametes the meiosis maintains a constant number of the chromosomes in the species. Thus, meiosis division also known as **Reduction Division**.

33. **Prophase I** is the longest phase of meiosis.
34. **Crossing over** takes place in **Pachynema** of **Prophase I** in meiosis I.
35. **Chiasmata** is a location /place where crossing over takes place.
36. **Meiosis II** is also known as **equational division**.
37. Production of haploid gametes from diploid mother cells is known as **gametogenesis**.
38. The synthesis of sperms in the testis of male reproductive system of animals is known as **spermatogenesis**.
39. **Testosterone** and **follicle-stimulating hormone (FSH)** are hormones play major role in spermatogenesis.
40. **Spermatogonia** the diploid stem cells of male.
41. Process of production of primary spermatocytes is known as **spermatocytogenesis**.
42. Process of Production of secondary spermatocytes (spermatids) is known as **spermatidogenesis**.
43. Spermatids differentiate into functional sperm by **spermiogenesis**.
44. **Oogenesis** is the process of synthesis of ova or egg in ovaries.
45. The process of production of diploid primary oocytes, is known as **oocytogenesis**.
46. Primary oocytes gets arrested at **prophase I**, and cells called as **dictyate**.
47. A **gene** is the basic physical and functional unit of heredity.
48. In 1905, **Wilhelm Johannsen** introduced the term ‘**Gene**’.
49. **Gene action** refers to the way in which certain genes exert their effects on the body.

50. **Gene frequency** refers to the proportion of a population that carries one type of allele, at a locus.
51. Gene frequency is also known as **allele frequency**.
52. **Genotype** refers to the genetic makeup of an organism.
53. **Genotype frequency** is a proportion or ratio of a particular genotype amongst all the individuals in a population.
54. **Gene expression** is the process by which information from a **gene** is used in the synthesis of a functional **gene** product.
55. **Mutation** is a sudden discrete and heritable change in genotype of an organism is called Mutation.
56. **Gene Mutation** is also called as **Point Mutation**.
57. Chance or probability of the simultaneous occurrence of two or more independent events equal to the product of the probability that each will occur separately is a **Law of Probabilities**.
58. Alleles segregate or separate from each other during gamete formation and pass on to different gametes in equal number, without their admixture in the hybrid is a **Law of Segregation**.
59. When two pairs of gene enter in F1 combination, both of them have their independent dominant effect. These genes segregate when gametes are formed, but the assortment occurs randomly and quite freely is **Law of Independent Assortment**.
60. Relative frequencies of various kinds of genes in a large and randomly mating population tend to remain constant from generation to generation in the absence of mutation and natural selection is a **Hardy Weinberg Law**.
61. **Chromosome** is a dark staining rod like or rounded bodies visible under microscope.
62. **Chromosomes** are the compact bundle of deoxyribonucleic acid molecule, portion of which represents gene.
63. **Chromosome Number Of Animals-**

Species	2n (Diploid)	N (Haploid)
1. Chicken	78	39
2. Cattle	60	30
3. Goat	60	30
4. Sheep	54	27
5. Buffalo-(swamp)	48	24
(water)	50	25
6. Horse	60	30
7. Ass	58	29
8. Human	46	23
9. Pig	38	19

64. Sometimes one or more pairs of homologous chromosomes fail to separate during gamete formation is known as **Non Disjunction**.
65. **Deletion** results when a broken segment fails to rejoin the segment containing the centromere.
66. **Inversion** occurs when the segment of chromosome breaks off and rejoins the opposite ends from the original arrangement.
67. A part of one chromosome breaks and the broken part gets attached to the homologous pair is a **Duplication**.
68. a piece of chromosome becomes broken off affected to another chromosome, usually of another pair is a **Translocation**.
69. **Variation** is a structural or functional difference between closely related individual within species.
70. **Hereditary variations** are defined as the variation or difference in composite genotypes in individual animals.
71. **Recombination** is a new combinations of existing genes, which occur through gamete formation, crossing over and fertilization.
72. **Polyploidy** is a occasional increase in the number of chromosomes adding or subtracting a part of whole set of haploid complements.
73. **Temperature, Light, Food, Soil** are the source of Non Hereditary Variation.
74. The traits are controlled by anyone or very few genes, with almost no environmental effect to modify the gene effect called **qualitative traits**.
75. Horned or hornless condition of cattle, .Black and white colour of guinea pig are examples of **qualitative traits**.
76. The traits which cannot be grouped into distinct types or classes, they are called **quantitative or metric traits**.
77. Single Colour of cow ,colour of man are examples of **quantitative traits**.
78. **Inbreeding** is a mating of related animals.
79. **Outbreeding** is a mating of Unrelated animals.
80. **Close breeding** is mating of more closely related individuals.
81. **Line breeding** mating of more distantly related individuals.
82. Examples of Close Inbreeding- **Dam X Son, Daughter X Sire , Full Brother X Full Sister**
83. Examples of Line Inbreeding- **Half Brother Half Sister (Cousin mating), Grand Son X Grand Mother, Grand Daughter X Grand Father**
84. **Inbreeding** increases homozygosity.
85. **Out crossing** is a mating of unrelated animals within the same (pure) breeds.

86. **Species Hybridization** is a crossing between two different species.
87. **Grading Up** is method of breeding is used when we want to improve non - descript animal.
88. **Crossing breeding** is mating of animals of different breeds.
89. When two breeds are crossed **alternatively** is called as **Criss Crossing** Breeding.
90. When three breeds are crossed in **Rotational** Manner is called as **Triple Crossing or Rotational Crossing.**
91. **Back Crossing** is a mating of crossbred back to one of the pure parents.
92. **Phule Triveni** is a breed of cow achieved through of Triple Crossing which is evolved by MPKV Rahuri.
93. **Sunandini** is a breed of cow achieved through **Grading Up.**
94. **Selection** is the tool in the hand of the breeder to improve the performance of the animal.
95. Selection on the basis of individual phenotypic performance is called **individual selection or performance Testing.**
96. Selection on the basis of performance of the ancestors is called as **pedigree selection.**
97. Selection of the individuals on the basis of average performance of their progeny is called **progeny testing.**
98. A **selection index** is used when the breeder simultaneously selects for several traits.
99. Green succulent fodder contain **70-80%** water.
100. Dry fodder contain **10 -15 %** water.
101. Concentrates contains **8-10 %** water.
102. **Carbohydrates** is the principle constituents of the plant.
103. Cell wall of plant composed of **cellulose.**
104. **Starch** is the major storage of carbohydrates in plant.
105. **Plant seeds** rich in **starch.**
106. **Proteins** are the major **nitrogen** containing compound protein present in plant.
107. **Legume** are always rich in **calcium.**
108. Animal tissues contain **70-90 %** water.
109. Animal embryo contains **95%** water.
110. Adult animal contains **50-60%** water.
111. **Proteins** are known as **building blocks** of animal body.
112. **Proteins** are the constituents of **antibodies, hormones** and **enzymes** of animal body.
113. **Fat** is localized in adipose tissues.
114. Animal body contains **3-5 %** of mineral matter.
115. More than **98%** of calcium is present in teeth and bones as phosphate and hydroxide.
116. **Carbohydrates** is present less than **1%** in animal body.

117. Roughages contain **more than 18 % Crude Fiber (CF)** and **less than 60 % Total Digestible Nutrients (TDN).**

118. Concentrates contain **less than 18 % crude fiber** and **more than 60 % TDN.**

119. Roughages contains high crude fiber / carbohydrates.

120. Examples of Succulent Roughages-

- Pasture - young growing grasses.
- Cultivated fodder crops
 - Legume – Cowpea, cluster bean, green pea, berseem, lucerne
 - Non Legume- Sorghum, Maize, pearl millets, oat, Sudan grass
- Tree leaves- babul, neem etc.
- Silage
- Root crops- turnips, carrot, mangos, fodder beet

121. Examples of Dry Roughages- Hay , wheat and rice straws, husks, stover

122. Examples of Energy Rich Concentrates-

- Cereal grains- Maize, barley, wheat, oat, sorghum
- Mill byproducts- Wheat bran, rice bran, , gluten
- Roots and tubers. – cassava, sugar beets, turnips

123. Examples of Protein Rich Concentrates-

- Plant origin e.g. Oilseed cake, pulse chuni, Brewer's grains and yeast.
- Animal origin e.g. Fish meal, Meat meal, Blood meal

124. Feed supplements used to improve the nutritional deficiency.

125. Vitamins and Minerals are examples of Feed Supplements.

126. Feed additives are the non-nutritive substances use for to improve feed efficiency and productive performance of the animals.

- Antibiotics e.g. Terramycin, Zinc bacitracin, Flavomycin
- Enzymes e.g. Amylase, lipase, protease, pepsin
- Hormones eg. Estrogen, progesterone, hexosterol
- Thyroprotein e.g. Iodinated casein.
- Probiotics e.g. Microbial species. Lactobacillus.
- Biostimulators e.g. Extracts of living organs like liver, ovary, chick embryo
- Antioxidants e.g. Vitamin E (Tocopherols), BHT (Butylated hydroxy toluene).
- Mold inhibitors e.g. Propionic acid, acetic acid.
- Colouring agents

127. Hydrolysis is an important chemical process in digestion and metabolism.

128. **Water** acts as a lubricant to prevent friction and drying in joints pleura, conjunctive.
129. **Proteins** are the complex **nitrogenous** compounds of high molecular weight and they are **colloidal** in nature.
130. Proteins are made up of various combinations of up to **26 amino acids**.
131. **Essential amino acids** are arginine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine.
132. Every day, 3 to 5 percent of the body's proteins are rebuilt.
133. **Insulin** proteins function as hormones and enzymes.
134. Protein supply energy- **1 gm of protein = 4.3 calories**.
135. **Carbohydrates** are compound of **carbon, oxygen and hydrogen**.
136. **Lignin** is classified with carbohydrates but it is **not true carbohydrates** .
137. Carbohydrates oxidized **fat and proteins**.
138. **Examples of Fat soluble vitamins**- Vitamins A, D, E, and K
139. **Examples of Water soluble vitamins**- Vitamin C and the B vitamins.
140. **Lipids** act as electron carriers and stores of energy
141. Lipids include **fatty acids, natural fats, steroids, phosphatides, prostaglandins , cholesterol, triglycerides, chlorophyll fat soluble vitamins**.
142. **Night Blindness** causes due to deficiency of **Vit. A**
143. **Diseases due to Mineral deficiency-**

Minerals	Deficiency
Calcium (Ca)	Rickets (muddus) , milk fever , fragile (weak) bones
Phosphorus (P)	Stiffness of joints (hardness to bend)
Magnesium (Mg)	Convulsions (irregular movement of body),grass tetany (intermittent muscular contraction) hypomagnesaemia in calves
Iodine (I)	Goiter (galgund)
Chlorine	Depress growth

144. Ruminant animal has **4 (Four)** compartment stomach namely Rumen (paunch), Reticulum(honeycomb), omasum (manypiles), Abomasum(true stomach).
145. Stored food is brought back to the mouth for mastication and mixing of food with saliva to make a pasty material which is fit for digestion, this process is known as **Rumination**.

146. The action of bringing swallowed food up again to the mouth., that process is known as **Regurgitation**.
147. Rumen contains microbes which digest **cellulose** contain plant material which is known as **Ruminant digestion**.
148. The heavy or solid objects, which are swallowed by animal, are dropped in **Reticulum**.
149. **Abomasum** is also known as True stomach.
150. The length of small intestine is about **130 feet** in cattle.
151. When carbohydrates reach in rumen, breakdown by enzymes with the production of **Volatile Fatty Acids (VFA)** , **carbon dioxide** and **methane**.
152. Propionic acids after reaching the liver is either oxidized or converted to **glucose**.
153. Animal body can utilize **acetic acid** for milk formation.
154. **Butyric acid** is mostly converted to **ketone** bodies in rumen.
155. Protein available to the ruminant are digested by the process of **proteolysis**.
156. **Ammonia** in rumen liquor is the key intermediate in the microbial degradation and synthesis of proteins.
157. **Urea** is a very common **NPN (Non Protein Nitrogen)** compound.
158. **Crude protein (CP)** given a measure of **total nitrogen** present in feed
159. DCP is determined by **digestibility trial**.
160. **Total Digestible Nutrients (TDN)** sum of all digestible organic nutrients.
161. **TDN** represents the approximate energy value of feed.
162. $TDN = \text{digestible NFE} + \text{digestible CF} + \text{digestible CP} + (\text{digestible EE} \times 2.25)$
163. While estimation of TDN, DEE always multiply by **2.25** because it represents fat fraction of feed which has 2.25 times more energy value as compared to carbohydrates and proteins.
164. **Gross Energy (GE)** is determined by **Bomb's Calorimeter**.
165. **Gross Energy** is expressed as **Kilo- calories** per kilogram of feed.
166. Some energy is lost through feces. When loss of energy if measured and subtracted then we gets **Digestible Energy(DE)**
 $DE = GE - \text{loss of energy through feces}$
167. Some losses of energy through urine and combustible gases like methane produced by body. When the loss of energy though urine and gases were worked out and subtracted from DE, we get **Metabolizable Energy (ME)**
 $ME = DE - \text{Energy loss through Urine} + \text{Gases}$
168. Losses of energy through **Heat Increment (HI)** like for digestion, chewing, increased work of heart and lungs etc is subtracted from metabolizable energy , the reminder is called Net energy.

$$NE = ME - HI$$

169. **Starch Equivalent(SE)** is the number of kg of starch that would be required to produce the same amount of fat as 100 kg of any particular feed

$$SE = \frac{\text{Wt. of fat stored per unit wt of food}}{\text{Wt. of fat stored per unit wt of starch}} \times 100$$

170. **Nutritive Ration(NR)** is the ratio between **digestible crude protein** and other **digestible non-nitrogenous** constituents.

171. Types of Nutritive Ratio (NR)-

i. **Narrow Nutritive Ratio-** The ratio between **1:1 to 1.4** is called narrow nutritive ratio and generally advocated to the **young growing animals**.

ii. **Medium Nutritive Ratio-** The ratio between **1:4 to 1.6** is called medium nutritive ratio and generally advocated to the **milch animals**.

iii. **Wide Nutritive Ratio-** The ratio between **1:6 and above** is called narrow nutritive ratio and generally advocated to the **working animals**

172. **Feedings Standards (FS)** are the tables, which indicate the quantities of nutrients to be fed to the various classes of livestock for different physiological functions.

173. **Feed processing** usually means altering the physical and chemical nature of feed to optimize utilization by animals.

174. **4%** urea is recommended for treatment of low quality roughages

175. The pH of silage should be maintain at **4**.

176. Silage should be prepare in **Anaerobic** condition.

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