ABG 300 (Fundamentals of Animal Breeding & Genetics)

Tutorial questions

WEEK 1

1. Describe how cattle and poultry were domesticated giving the time, place reasons for (what led to) domestication.

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Poultry……
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2. Give a brief account of how three species of farm animal were domesticated

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3.In few concise statements, state the contribution of the following people to the development of Animal Breeding and Genetics. (i) Robert Bakewell (ii) Gregory Mendel (iii) Roland Fisher and Sewell Wright (iv) William Bateson (v) Angust Weishmann (vi) Ian Wilmut. (Bonus will be given for correct dates)

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WEEK 2

4. What is the implication of each of the following on Mendelian ratio? (i) Codominance (ii) Epistasis (iii) Incomplete dominance (iv) Dominance (Give good illustrations in each case)

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5. State the two Mendelian laws. With specific examples, explain what the law means

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WEEK 3

6. Define monohybrid and dihybrid inheritance

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7. State the law of independent assortment and indicate all possible gametes that could be produced by an animal with genotype *AaBb*.

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8. An animal heterozygous for two independently assorting pairs of genes (*AaBb*) is self fertilized. (i) With the aid of a punnet square, draw the inheritance of the interse mating (*AaBb* x *AaBb*) at F_2. (ii) Determine the expected frequency of the following genotypes in the progeny of such an animal: *AABB*, *AaBb*, *aaBB*.

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WEEK 4

9. State four facts that could explain the mechanism of inheritance.

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10.Differentiate between these pairs giving good examples. (i) Quantitative and Qualitative inheritance (ii) Codominace and No dominance (iii) Dilutin g and Inhibitory epistasis.

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11.Coat colours in cats are caused by the interactions of several genes, some affecting the ability to produce the black pigment eumelanin, some the red pigment phaeomelanin and some the patterns of deposition of pigment. A brown tabby cat is crossed to a solid cinnamon cat. All the kittens resulting from this cross are brown tabbies. When adult these F_1 were allowed to inter-cross freely with each other to produce an F_2. In the resulting exploding cat population four classes of cat could be seen, brown tabbies, cinnamon tabbies, solid blacks and solid cinnamons in the relative proportions 9:3:3:1. Account for these observations.

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12.The Manx cat follows Mendelian Ratio. True or false? Discuss

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1. With annotated diagrams only, distinguish between: (i) The major morphological classes of chromosomes. (ii) the behaviour of chromosomes during metaphase of mitosis, meiosis I and meiosis II (iii) What is the significance of meiosis to living organism

2. Define a karyotype and state 2 main features of a karyotype.

3. Write short notes on the following (i) Structure of chromosome. (ii) Classification of chromosomes based on the position of the centromere. (iii) Sex determination in Farm animals.

4. What is mitosis?

5. Assuming an organism has a haploid set of 2 chromosomes, show clearly
the behaviour of chromosomes during mitosis using annotated diagrams only.

6. Distinguish between mitosis and meiosis at prophase of cell division.

7. How is sex determined in animals?

8. Briefly discuss the significance of the following to living organisms. (i) Mitosis (ii) Meiosis.

9. Meiotic recombination is part of both haploid and diploid life cycles. Discuss

10. The number of chromosomes (2n) in the cell of a rabbit is 44. how many chromosomes are present in: (i) Primary spermatocyte (ii) Spermatozoa (iii) Ova (iv) Polar bodies?

11. A female animal with genotype AaBb is crossed with double recessive male (*aabb*)

12. State the law of product probability.

13. State one similarity and difference between dominance and epistasis.

14. State and briefly explain with an example the condition under which there could be a departure from the F_2 Mendelian ratio.

15. Short hair in rabbits is governed by a dominant gene (L) and a long hair by a recessive allele (l). Black hair results from the action of dominant genotype (B-) and brown from recessive genotype (bb)
(i) What genotypic and phenotypic ratios are expected among the progeny of crosses between homozygous short-black and dihybrid short-black rabbits?
(ii) What type of epistasis is in operation if mating between black rats of identical genotype produced cream-colored, black and albino offspring in the ratio 9:3:4?

16. How is epistasis different from dominance?

17. In short horn cattle, the homozygous genotype *RR* produces red, *rr* produces white and *Rr* produce roan (mixture of red and white). The presence of horns is produced by the homozygous recessive

genotype *pp* and the polled condition by its dominant allele P. if roan cows heterozygous for the horn gene are mated to roan-horned bulls, what are the expected phenotypic ratios in the offspring?

1. Write short notes on the following phenomena. (i) Penetrance and expressivity (ii) Pleitropy and Linkage (iii) Coupling and repulsion (iv) Interchromosomal and intrachromosomal recombination

2. Discuss the term penetrance and expressivity.

3. Write an essay on pleitropy

4. What is recombination

5. Define (i) Linkage (ii) Recombination.

6. A female animal with genotype *AaBb* is crossed with a double-recessive male (*aabb*). Their progeny include 442 *AaBb*, 458 *aabb*, 46 *Aabb* and 54 *aaBb*. Explain these results.

7. When true-breeding brown goats are mated with certain true-breeding white goats, all the F1 kids are white. The F2 from some F1 X F1 crosses were 118 white, 32 black and 10 brown kids. What is the genetic basis for these results?

PRACTICALS

1. List the characteristics features of Niger-hyb pig. Describe the other breeds in UNAAB Farm

2. Give two distinguishing features each between (a) named breeds of goats and (b) named breeds of sheep

3. Differentiate between a breed and strain. List 7 different strains found in poultry unit and their distinguishing features

4. Explain (i) Species (ii) Breed (iii) Strain.

5. List the different species of livestock available in COLANIM Farm

6. List at least two breeds available in four of them

7. Describe one breed from each of the four breeds