**Tikrit University**
**College of Veterinary Medicine**
***Dept. of.*** Public Health


**Class : 2nd stage**
**Subject: Genetics**

# *Questions Bank*

**Q1// choose the suitable answer:**

1-The rod-like chromosomes which have the centromere on the proximal end are known as-------

a. **Acrocentric** b. **Telocentric** **c. centromere.**

2-Inversion involves a rotation of a part of a chromosome or a set of genes by 180 on its own axis . It essentially involves occurrence of:

a. **breakdown. b. loss of chromatins** **c. breakage and reunion.**

3-When three or more alleles are found for any particular gene, these are called

**a. heterozygote** **b. multiple allele** **c. genome.**

4-agouti colour is dominant over all the remaining colour in rabbit and produces agouti colour in F1 and

**a. 3:1 ratio in F2** **b. 2:1 ratio in F2** **c. 3:2:1 ratio in F2.**

5-The frequency of the allele (A) refers to it by:

**a. P** **b. Q** **c. H**

6---------can be either due to the loss of one or more chromosomes or due to addition of one or more chromosomes to the complete chromosome

**a. Aneuploidy** **b. Euploidy**

7-The metacentric chromosomes are V-shaped and in these chromosomes the centromere occurs in the center and forming two equal arms.

**a. true** **b. falls**

8-The main body of rabbit is white while the tips of ear, feet, tail and snout are colored this is called–

**a. Chinchilla b. Albino c. Himalayan**

9---------refers to an substance or agent, which when introduced into the system of vertebrate animal induces the production of specific antibody.

**a. plasma. b. antigen c. globulin.**

10-The mutations occurring in gamete cells are called:

**a. parent mutation b. induced mutation c. gametic mutation.**

**a. genotype phenotype c. pusedolaaele d. multiple allele**

Q2// Classify the Mutation According to the Origin.

Q3// Classify the Mutation According to the Size and Quality.

Q4// write the genetic traits in F1 and F2, produced by crossed red flower and white flowers in the four-O' clock plant *Mirabilis Jalapa*. And mention the type of gene interaction.

Q5// Calculate the gene frequency (p, q) of the flower color in plants if you know that the total number of flowers is 800, the number of wiled type is 600 and the hybrids is 180.

Q6// define the genetic selection and classify the types of it, explain on of these type.

Q7// define the following terms:

1. Multiple alleles.
2. Monosomy.
3. Artificial selection
4. Translocation
5. Pseudoallele
6. Mutation.
7. Hardy-Weinberg Model.
8. Metacentric chromosome.

Q8// Enumerate the Important features of multiple alleles.

Q9// write the genotype, antigen, antibody and, the type of the blood group of ABO blood group system.

Q10// Enumerate the shapes of chromosome according to position of the centromere.

Q11// describe the Artificial Selection in Humans and provide your answer with diagram.

Q12//What are the possible blood types of a child whose parents areboth heterozygous for "B" blood type?

Q13//In cattle, red animal color is dominant to black. Suppose acattle homozygous for red to crossed with one homozygous for black. Determine the appearance of

a. The $F_1$ animals,
b. The $F_2$ animals
c. The offspring of a cross of the $F_1$ animals back to the red parent.
d. The offspring of a cross of the F1 animals back to the black parent

Q14// Calculate of phenotype, Gametes and Genotype for the following:

ZzNnSsTTAACcddQqBb, rrggYY

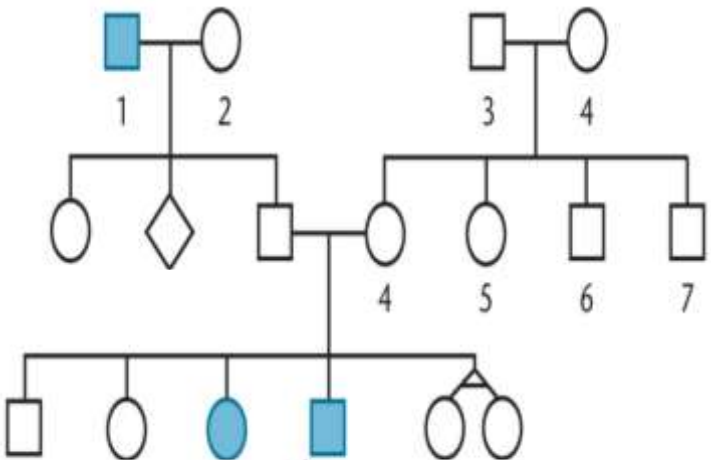
Q15// What is means the 15p20.5-p20.7 ?

Grey seed color (**G**) in garden peas is dominant to white and seed color (**g**). in the following crosses, the indicated parents with known phenotypes, but unknown genotypes, produced the progeny listed.

| Parents | Progeny | | Female parent |
|---|---|---|---|
| **Female X Male** | **Grey X White** | | **Genotype** |
| grey X white | 81 | 82 | ? |
| grey X grey | 118 | 39 | ? |
| grey X white | 74 | 0 | ? |
| grey X grey | 90 | 0 | ? |

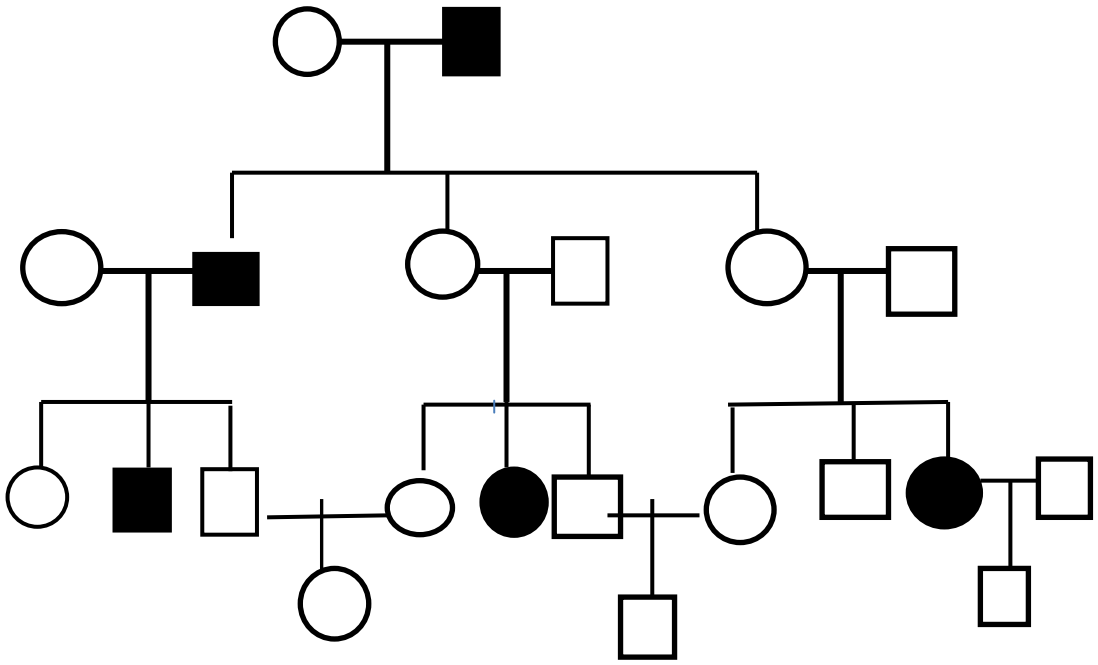
Based on the segregation data, give the possible genotypes of each female parent.

**Q16// Which is affect ?, and write genotype, geration and number of off spring for the following digramme**




**Q17//A single recessive gene, r, is largely responsible for the development of** red hair in humans. The brown **R_** allele is dominant. The pedigree below represents the pattern in which red

hair is inherited. Answer questions **A** to **D based on this pedigree chart.**



**Q18// If you have traits and number for pea-plant of followings: 362** Round/Green, **359** Wrinkled / Yellow, **120** Wrinkled/Green and 1082 Round/Yellow. **Which are phenotypes, Genotype Ratios?**

**Q19// Questions A through E deal with the following Punnett square. (10 Marks).Female**

| | **AB** | **Ab** | **AB** | **Ab** |
|---|---|---|---|---|
| **AB** | **AABB** | **AABb** | **AABB** | **AABb** |
| **Ab** | **AABb** | **1** | **AABb** | **AAbb** |
| **aB** | **AaBB** | **AaBb** | **2** | **AaBb** |
| | | | | |
| **ab** | **AaBb** | **Aabb** | **AaBb** | **3** |

**A.** The genotype of the **Female** parent is _____

**B.** The genotype of the organism in box **1** is _____

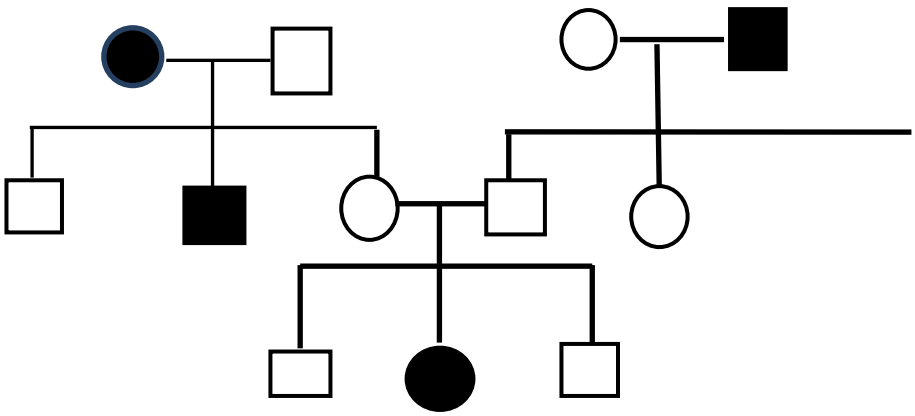
**C.** The organism in box **2** is _____for trait **A**

**D.** This organism exhibits _____(number) genetic traits

**E.** The organism in box **3** is _____for trait **B**

**Q20//** **A**. Fill in the genotype of each individual. Assume that the trait is recessive and that an individual who marries into the family and does not exhibit a trait, does not carry the recessive gene for it.

B. what is the probability that child resulting from the marriage of II-1 and II-5



Q21// Suppose pure line lima bean plants having green pods were crossed with pure line plants having yellow pods. If all the **F1** plants had green pods and were allowed to interbreed, **580 F2** plants, **435** with green pods and **145** with yellow pods would be obtained.Which characteristic is dominant and which is recessive? Of the **F2** plants, how many are homozygous recessive, homozygous dominant and heterozygous?Using G to represent the dominant gene and g represent the recessive gene.Write out a plan showing the segregation of genes from the parents to the **F2** plants.

Q22//A cross was made between two heterozygous pea plants, **TtYy X TtYy**. The following Punnett square was constructed:

Male

| Female | TT | Tt | Tt | tt |
|---|---|---|---|---|
| ttYY | TtYY | TtYY | TTYY | YY |
| ttYy | TtYy | TtYy | TtYy | Yy |
| ttYy | TtYy | TtYy | TTYy | Yy |
| ttyy | Ttyy | Ttyy | TTyy | yy |

phenotypic ratio:

9 tall, yellow seeds: 3 tall, green seeds: 3 dwarf, yellow seeds: 1 dwarf, green

**What is wrong with this Punnet square?**

**Q23// Choose the correct answer.**

**A.** ____A phenotype ratio of 9:3:3:1 can be expected when crossing. (1) any parental strains. (2) $F_1$ x $F_1$ heterozygotes with two pairs of factors being determined. (3) $F_2$ x$F_1$ heterozygotes with two pairs of factors being determined. (4) P x$F_2$ with three pairs of factors being determined.

**B.** ____The product of the fusion of the sperm and the ovum nucleus. (1) a haploid zygote. (2) a diploid zygote. (3) a triploid zygote. (4) a haploid zygote plus three extruded polar bodies

**C.** ____During mitosis the cell undergoes five different stages. In which stage does the cell replicate its DNA? (1) interphase (2) prophase (3) cytokinesis (4) metaphase (5) anaphase

**D.** ____The four stages in the cell cycle are (1) mitosis, G, $S_1$, $S_2$ (2) mitosis, $S_1$, G, T (3) mitosis, G, S (4) mitosis, S, $G_1$, $G_2$.

**E.** ____Chromatids joined together by a centromere are called (1) sister chromatids

(2) homologs (3) alleles (4) bivalents

**F.** _____ A cross between a homozygous dominant tall pea plant and a homozygous recessive dwarf pea plant would yield.

1. 4DD 2. 1DD, 2Dd, 1Dd. 3. 4Dd. 4. 3Dd, 1DD

**G.** _____Once called the in heritance "factors" by Mendel.

**1.** Phenotype 2. Chromosomes 3. Gene 4. Heterozygote

**H.** _____ Men have 22 pairs of autosomes and one pair of sex chromosomes

**1.** XX 2. XXX 3. XXy 4. Xy

**I.** ____ $F_1$ monohybrid cross result phenotype ratio and genotype ratio

3:3 and 3:1:3 (2) 2:2 and 1:3:3 (3) 3:1 and 1:2:1 (4) 2:2 and 1:2:1

**J.** ____ A boy has a blood type O and his sister has blood type AB, must their parents (1) A and **AB** group (2) **A** and **B** group (3) **B** and **O** group (4) **O** and **O** group

**Q24// Answer by "False" or "True" and correct the False.**

A. _____Punnett squares and chi-square tests work well for organisms that have small numbers of offspring and uncontrolled mating, but humans are large families and controlled mating

B. _____X-linked, the father's traits are passed to all sons.

C. _____If genes locate only on the X chromosomes, the trait calls sex linked trait

D. _____A boy has a blood type **O** and his sister has blood type **AB**, must their parents **A** group.

E. _____Test cross, is cross between individual known genotype and hetrozygous

F. _____The $G_2$ phase ("second gap") where the cell completes preparations for cell division, DNA replication

G. _____Heredity is any characteristic that can be passed from parent to offspring.

H. _____Homozygous genotype - gene combination of one dominant & one recessive allele; also called pure.

I. _____An organism having the genotype Gg contains on gamete.

J. _____$F_1$ monohybrid cross result phenotype ratio 3:3 and genotype ratio 3:1:3

K. _____A boy has a blood type O and his sister has blood type AB, must their parents A group.

L.

**Q25// Fill of the following blanks**

**A.** The cell cycle, Interphase has three subphases; _____ phase, _____phase and _____ phase

**B.** Test cross a mating between an individual of unknown _____ and a homozygous _____ individual

**C.** _____ any characteristic that can be passed from parent to offspring

**D.** The chromosomes number for horse are _____ , rabbit _____and sheep _____

**E.** Mendel's law, _____ and _____

**F.** _____ chromosomes have one long arm and a short stalk and often a bulb (*satellite*) as the other arm

**G.** _____ The total amount of genetic material in a chromosome set; in eukaryotes, this is the amount of genetic material in haploid set of chromosome of the organism.

**H.** _____ Two alleles are expressed (multiple alleles) in heterozygous individuals.

**Q26// Match the terms in column A to their appropriate descriptions in column B**

| B | A |
|---|---|
| **1. _____ Recessive**<br>**2. _____Law of independent assortment**<br>**3. _____ genome**<br>**4. _____Prokaryotes have**<br>**5. _____The karyotype for a normal human male**<br>**6. _____ Metacentric**<br>**7. _____ Cattle have** | **a. Each pair of alleles segregates independently during gamete formation**<br>**b. the centromere is approximately in the center of the chromosome**<br>**c. The physical and functional unit that helps determine the traits passed on from parents to offspring**<br>**d. 60 chromosomes**<br>**e. Is the site on the homologous chromosomes where crossover occurs.**<br>**f. The karyotype for a normal human male**<br>**g. single chromosome plus plasmids** |