STYLE OF QUESTIONS

Note: These questions are not what I will bring in the exam and are not all the types…..only examples. They do not cover all the lectures entering in the exam. They are only an example and all items in the lectures are important and can come in the exam.

Question I: Write labeled symbolism (genotype) of the followings

1) Person(s) possessing each type of erythrocytes and other(s) with both.

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2) The relative dominance relationships of the rabbit coat color.

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3) All different human blood types.

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4) F_2 ratio producing from crossing homozygous red and white flowers of:

a) *Pisum* subjected to complete dominance.

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b) *Antirrhinum* showing incomplete dominance.

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<u>Question II:</u> Choose the correct answer

1. AB blood type of Human is a type of …… Allelic relationships.

a) Over-dominance
b) Co-dominance
c) Incomplete dominance

2. When a trihydrid cross is performed, its F2 generation will have ……. and ……...

a) 2 phenotypes/ 3 genotypes
b) 4 phenotypes/ 9 genotypes
c) 8 phenotypes/ 27 genotypes

3. By crossing purple flowers with long pollens and red flowers with round pollens, the F2 ratios were 1528 purple-long : 106 purple-round : 117 red-long : 281 red-round due to ……..

a) Segregation
b) Independent assortment
c) Linkage

4. The number of gametes formed by each parents performing a dihydrid cross were ….....

a) Four
b) Two
c) Eight

5. Yellow rats show …….. gene lethality of some offspring by the presence of …… genotype.

a) Recessive / yy
b) Dominant / YY
c) Recessive / YY

6. When 2 genes (A and B) are linked, their parental gametes will be …… (with no crossover) and ……. (with crossover).

a) 100% / 50%
b) 50% / 100%
c) <50% / > 50%

7. Its phenotypic expression exceeds that of its homozygous dominant and recessive parents.

a) Co-dominant heterozygous organism
b) Over-dominant heterozygous organism
c) Incomplete dominant heterozygous organism

8. In double crossover, the percentage recombinants formed were ……..….. the actual (expected) distance that separates them.

a) More than
b) Less than
c) Equal to

9. In dominant epistasis, the dominant gene (A) masked the expression of the other dominant gene (B) producing …….. phenotypic ratio.

a) 12 : 3: 1
b) 15 : 1
c) 13 : 3

10. …….. epistasis happens when the homozygous (aa) gene is masking the expression of the other dominant gene(B).

a) Recessive
b) Dominant and recessive
c) Duplicate recessive

11. Variegation in *Mirabilis jalapa* may be due to mutation in ……. DNA

a) plastid
b) mitochondrial
c) nuclear

12. …… shows the actual distance between loci, while ……. describes relative positions of loci.

a) Physical mapping / genetic mapping
b) Genetic mapping / physical mapping
c) Physiological mapping / genetic mapping

13. Person will have sickle-cell anemia when …… in normal hemoglobin molecule is substituted by ……

a) Glutamic acid / Alanine
b) Valine / Glutamic acid

c) Glutamic acid / Valine

14. ……. represent how strong crossover between two pairs of genes to reduce the probability of a crossover of one them with a different gene in an adjacent region.

a) Single crossover
b) Double crossover
c) Interference

15. …… happened when the much closed genes are inherited as a single unit.

a) Incomplete linkage
b) Complete linkage
c) Partial linkage

16. …… is the action of a gene to induce more than one phenotypic effect

a) Polygenic trait
b) Pleiotropism
c) Epistasis

17. ……is used to determine the unknown genotype of a particular phenotype.

a) Punnett square
b) Test cross
c) Self-cross

18. ……. occurs when genetic materials are transferred by cells contact or by a special connection.

a) Asexual reproduction
b) Transduction
c) Conjugation

19. Segregation of white eyes in fruit flies is …… linked chromosome.

a) Autosome
b) X
c) Y

20. The genetic maps of human females' average 90% longer than the same maps in males, and their physical maps are ……..

a) Longer
b) Identical
c) Shorter

21. When the heterozygous dominant is near one of the homozygous, it is called …… dominance.

a) Complete
b) Partial
c) Incomplete

22. Crossing homozygous black and white Andalusian fowl subjected to co-dominance, produce an F1 generation with …… phenotype and …..……. genotype.

a) Patched fowls / C^BC^W
b) Black fowls / C^BC^B
c) Grey fowls / C^BC^W

23. The survival ratio of offspring when cross between 2 heterozygous green *Zea* plants is ……..

a) 2 green : 1 albino
b) 3 green : 1 albino
c) 3 albino : 1 green

24. The law of ……. states that each genetic character is controlled by alleles that come in pairs in individual organisms.

a) Dominance
b) Independent Assortment
c) Segregation

25. According to Mendel laws, (♀A x ♂B) and (♀B x ♂A) should give ……. results depending only on ……

a) same / dominance
b) same / maternal effect
c) different / dominance
d) different / maternal effect

26. Crossing a pollen grain carrying self-sterility alleles (S^1S^1) with the same alleles in its ovules produces …… offspring.

a) 100% sterile
b) 100% fertile
c) 50% sterile : 50% fertile

27. ..…….. is represented by genes that are apart by nucleotides.

a) Gene mapping
b) Physiological mapping
c) Physical mapping

28. The allelic dominance of ABO blood types are ……

a) I^A and I^B alleles are dominant over I^o
b) I^A allele is dominant over I^o and I^B
c) I^B allele is dominant over I^o and I^A

29. When 2 genes (A and B) are linked, the % recombination is ……. when crossover happens.

a) 50%
b) 100%
c) Between 50-100%

30. …… used in organ transplants to achieve better matches between recipients and donors

a) Gene mapping
b) Physiological mapping
c) Physical mapping

31. The law of ……. states that each genetic character is controlled by alleles that come in pairs in individual organisms.

d) Dominance
e) Independent Assortment
f) Segregation

32. When 2 genes (A and B) are linked, the % recombination is ……. when 10 cells from 50 reproductive cells perform crossover.

d) 10%
e) 80%
f) 20%
g) None of the previous

33. Cross-fertilization happens between …… generation, while self-fertilization happens between …… generation.

a) F_1/P
b) F_1/F_2
c) P/F_1
d) P/F_2

<u>Question III:</u> Answer the following questions

1. Define the horizontal gene transmission.

What are its major and minor ways of transmitting the genetic materials?

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2. Chemotherapy affects both normal and cancer cells. *Explain briefly*

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3. Indian corn appears with different colors, blotches, dots, streaks or mottling degrees. *Name and Define the causative agent, and How it works?*

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Question IV: State the scientific term of all the following:

1) Gene in which male allele prevent the fertilization of the female egg and the development of the offspring.

(……)

2) The introduction, uptake and expression of foreign genetic material either naturally or artificially.

(……)

3) When 2 alleles for a trait are the same in an organism.

(……)

4) Mitotic stage in which sister chromatids split apart at their centromere and begin to move to opposite poles of the spindles.

(……)

5) Genetic map unit.

(……)

6) Alleles arrangement when (bn^+ /det^+) has linked on one chromosome and its homologous has (bn/ det) alleles.

(……)

7) When the homozygous (aa) gene is masking the (B_, Bb or BB) gene.

(……)

8) Genes or DNA sequences that move completely or as a copy from one location to another on a chromosome within the genome.

(……)

9) Gene action may produce more than one phenotypic effect.

(……)

10) Where the phenotype of the heterozygote is above the phenotypical range of both homozygote parents.

(…….)

11) Genes that are inherited together in form of single unit.

(…….)

14) Successfully pass accurate DNA strands from parental genomes to daughter cells.

(…….)

15) The process of exchanging segments over regions of homology.

(…….)

16) The cross producing 64 offspring with 8 phenotypes and 27 genotypes.

(…….)

17) Cytoplasmic division of germ cells

(…….)

18) Sister chromatids with different genes

(…….)

19) Stage between the two Meiotic divisions

(…….)

20) A shorthand way of finding the expected proportions of possible genotypes in the offspring of a cross

(…….)

21) A phenotype of organism that matches another of known genotype

(…….)

22) The process in which a bacterial cell transfers genetic material to another cell by cell-to-cell contact

(……)

23) The process in which bacterial DNA is moved from one bacterium to another by a bacteriophage

(……..……)

<u>Question V:</u> Mitochondrial genes may cause bad influence (or even diseases) to the offspring in both plants and human after reproduction. Explain.

<u>Type of Inheritance:</u>

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<u>One Example each:</u>

In plants:

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In Human:

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Who is responsible for that?

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Why that happens?

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How that happens?

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<u>Question VI:</u> Put (√) or (X) on the following sentences

1. In horizontal gene transmission, the genetic material is transferred from one generation of to the next one. (……)
2. Transduction is a process used to insert novel genes directly into plant for fungal or salt tolerance. (……)
3. In Conjugation, the donor bacteria always ensure that the recipient bacteria do not already contain a similar element. (……)
4. Recessive gene produces the same phenotype in the organism whether or not its alleles are identical. (….)

<u>Question VII:</u> Compare between the following pairs

	Cohesin proteins	**Shugoshin proteins**
Action in Division	……..... …….....	……..... …….....

	Cis alleles	**Trans alleles**
Allelic arrangement	……..... …….....	……..... …….....

	Cohesin proteins	Synaptonemal proteins
Action in Division	……..... …….....	……..... …….....

Question VIII: Complete

a) Genetic mapping technologies have useful applications in Forensic studies as …….. and ……..

b) ……... and ……..…… are methods used to insert novel genes into plants for fungal or salt tolerance.

c) According to Mendel's rule, …….. and ……. genotypes have the same phenotype.

Question IX: Give reason for

1. Gregor Mendel didn't observe linkage

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2. Crossover is not uniform along the entire length of chromosome

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3. When Thomas Morgan crossed white-eyed male fly to red-eyed female, the traits of the F1 progeny showed no white-eyed females.

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