



Do. Believe and Conquer.

2019 HSC BIOLOGY LECTURE GIFT

1000 QUESTIONS
(FREE RESPONSE & MCQ QUESTIONS)

PART III
(300/1000)

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Question 201: Define the term 'true breeding plants'?

Question 202: It is known that genotype and environmental factors can affect an individual's phenotype. Which is another factor that can affect an organism's phenotype?

- (A) Multiple allele inheritance
- (B) The amount of sunlight available in the forest, affecting plant height
- (C) Dominant and recessive genes
- (D) Lifestyle choices

Question 203: Explain the role of genes, environmental factors and lifestyle choices on a human's phenotype.

Question 204: Evaluate the effectiveness of a named education program in reducing the incidence and prevalence rate of a disease.

Question 205: Model the different stages involved in DNA replication, provide labels where necessary.

Question 206: A biology teacher has been notified that two out of her twenty students are suffering from cystic fibrosis. It is a non-infectious, inherited disease that affects about one in one thousand people. So, seeing that she has two students suffering from the disease is uncommon. The biology teacher proposes that the reason why she had two students suffering from the disease in her class is due to the idea of "original settlers". Name the theory that the teacher is thinking about and describe how the theory help explain this rare situation that she is facing in her classroom.

Question 207: Explain the relationship between genotype and environment on an offspring's phenotype.

Question 208: Explain the reason why traits acquired during an organism's lifetime will not be passed on to the next generation.

Question 208: Two unicorns with straight, white hair are mating to produce offsprings. The resulting unicorn offsprings varied in their phenotype. Some had straight, curly hair. Others had straight, black hair. Lastly, there were some unicorns that had had straight, white hair.

Which of the following genetic laws help explain the mode of inheritance.

- (A) The law of dominance
- (B) The law of random segregation
- (C) The law of independent assortment
- (D) None of the above.

Question 209: Define the term 'recombinant DNA'.

Question 210: Describe the application of recombinant DNA technology.

Question 211: Describe the social benefits of the application of biotechnology in the past.

Question 212: Describe the social benefits of the application of biotechnology in the present.

Question 213: Evaluate the social benefits of the application of biotechnology in the future.

Question 214: Assess the effect of mitosis on the continuity of a species' population.

Question 215: Assess the effect of meiosis on the continuity of a species' population.

Question 216: Describe the reproduction mechanisms in fungi, including budding and sporing.

Question 217: Describe the reproduction mechanism in bacteria.

Question 218: Describe the reproduction mechanisms in protists, including binary fission and budding.

Question 219: Describe the way in which plants can reproduce asexually.

Question 220: Describe the process in which plants reproduce sexually.

Question 221: Describe the relationship between the structure and function of protein in humans.

Question 222: Describe the role of crossing over in contributing to the genetic variation of a population.

Question 223: Describe the role fertilisation in contributing to the genetic variation of a population.

Question 224: Describe the role of mutation in contributing to the genetic variation of a population.

Question 225: Describe the role of independent assortment in contributing to the genetic variation of a population.

Question 226: Describe the role of random segregation in contributing to the genetic variation of a population.

Question 227: Describe the limitations of using single nucleotide polymorphism in analysing relationships in data.

Question 228: Describe the importance of Louis Pasteur's work.

Question 229: Describe the importance of Robert Koch's work.

Question 230: Describe direct contact as a mode of transmission of infectious disease, providing an example in your response.

Question 231: Describe indirect contact as a mode of transmission of infectious disease, providing an example in your response.

Question 232: Describe vector transmission as a mode of transmission of infectious disease, providing an example in your response.

Question 233: Discuss the implications of using antibiotics to treat bacterial diseases.

Question 234: Outline the difference between the nature of managing and assisting a disorder through the use of technology, provide an example of each.

Question 235: Describe the difference between education program and campaign, provide an example of each.

Question 236: Describe the limitations of cochlear implants in assisting hearing disorders.

Question 237: Describe the limitations of bone conduction implants in assisting hearing disorders.

Question 238: Describe the limitations of hearing aids in assisting hearing disorders.

Question 239: Describe the limitations of kidney dialysis to a normal functioning kidney.

Question 240: Describe the limitations of spectacles in assisting visual disorders.

Question 241: Describe the limitations of laser surgery in assisting visual disorders.

Question 242: Contrast innate immunity with adaptive immunity in humans.

Question 243: Which one of the following processes is able to alter the frequency of alleles in a population and the number of species with a certain adaptation in the population via adaptive evolution.

- (A) Natural selection
- (B) Mutation
- (C) Gene flow
- (D) Genetic drift.

Question 244: Describe the role of rods and cones in the retina.

Question 245: Which of the following statements explains why gene flow is of greater importance compared to mutation in accounting for the evolution?

- (A) The rate of gene flow occurs more frequent than mutation for the genes of concern.
- (B) Gene flow can lead to the accelerated loss of alleles in the population.
- (C) Mutation does not occur in nature.
- (D) Gene flow typically leads to speciation.

Question 246: Which of the following evolutionary force is proposed to hinder speciation?

- (A) Gene flow
- (B) Genetic drift
- (C) Mutation
- (D) Natural Selection

Question 247: Describe the relationship between population size and genetic drift.

Question 248: Which of the following statements about evolution is correct?

- (A) Evolution is a change in the species' population level instead at an individual species level.
- (B) Evolution is a change in allele frequencies over time.
- (C) Evolution is associated with changes in inherited characteristics over time.
- (D) All of the above

Question 249: Which of the following statement is false?

- (A) Gene flow reduces genetic variation in the population where new species are migrating to.
- (B) Without genetic variation, genetic drift is not possible.
- (C) Without genetic variation, natural selection is not possible.
- (D) Gene flow is also known as migration.

Use the following information to answer Q250 – 251

The gene responsible for the colour of snapdragon plants are passed onto offspring via incomplete dominance mode of inheritance. Suppose that a red snapdragon are crossed with a white snapdragon. What are the chances of the F_1 generation offspring having a pink phenotype? Include a punnett square diagram in your response, showing the genotypes.

Question 250: What are the chances of the F_1 generation offspring having a pink phenotype? Include a punnett square diagram in your response, showing the genotypes.

Question 251: What are the genotypic and phenotypic ratios of the F_2 offspring that can be derived from the crossing of two of the F_1 snapdragons from Q251?

Use the following information to answer Q252 – 254

An alien species is found to have 3 different possible colours for its hair colour. Respectively, the genotypes of BB, Bb, bb have corresponding phenotypes of black, grey and white. You are informed that the alleles governing the phenotypes are located on the X chromosome, where male and female aliens have XX and XY sex chromosomes respectively.

Question 252: If a female alien is crossed with a male alien with hair colour being black and white respectively, what are the genotypic and phenotypic ratios of the offsprings that can be produced?

Question 253: If a grey female alien is crossed with a white alien, what are the genotype and phenotype ratios of the offspring from the two parents?

Question 254: Justify if it is possible, under normal conditions, that a male alien offspring with grey hair colour can be born in any generation?

Use the following information to answer Q255 – 257

Question 255: Describe codominance and incomplete modes of inheritance, providing an example of each in your response.

Question 256: Compare autosomal dominant and autosomal recessive modes of inheritance, providing an example of each in your response.

Question 257: Compare X-linked dominant and X-linked recessive modes of inheritance, providing an example of each in your response.

Use the following information to answer Q258 – 260

Colour-blindness is a sex-linked recessive disease that is governed by genes carried on the X chromosome. The two alleles responsible for the trait can be assigned as 'E' (dominant allele) and 'e' (recessive allele).

Question 258: If an unaffected (normal vision) male has an offspring with a female who is suffering from colour-blindness, what are the genotype and phenotype ratios of the offspring from the two parents?

Question 259: What would be the genotypic and phenotypic ratio of the offspring from the cross between a male with normal vision and a female who is homozygous?

Question 260: Propose a situation of the parent's genotype such that the possibility of a newborn baby suffering from colour-blindness is present.

Question 261: Explain whether or not it is possible for a male to be a carrier.

Question 262: A male who is affected with colour-blindness is married to a female who has normal vision and is not a carrier. What are the genotypic and phenotypic ratio of their offspring?

Question 263: A male who is affected with colour-blindness is married to a female who is also colour-blind but is a carrier. What is the probability of their offspring will be colour-blind?

Question 264: Define the term 'homozygous', providing an example in your response.

Question 265: Define the term 'heterozygous', providing an example in your response.

Question 266: Explain the reason why a male offspring can have blue eyes if both of his parents have brown eyes.

Question 267: Name the process through which traits are passed through generations.

Use the following information to answer Q268 - 270

Question 268: Describe what is meant by complementary base pairing during DNA replication.

Question 269: Distinguish between eukaryotes and prokaryotes.

Question 270: Describe the role of enzymes in DNA replication.

Question 271: Assess the role and impact of biotechnology in the medical industry with reference to driving forces that govern its future uses.

Question 272: Describe what is meant by the primary immune response and why it is beneficial for humans.

Question 273: Describe what is meant by the secondary immune response and why it is beneficial for humans.

Question 274: Contrast the primary and secondary immune response.

Question 275: Explain the role of memory cells in the secondary immune response.

Question 276: Assess the impact of vaccines on society.

Question 277: Assess how modern humans' use of biotechnology in preventing and treating disease can affect the genetic diversity of species.

Question 278: Describe Louis Pasteur's 'swan-neck flask' experiment.

Question 279: Evaluate how Louis Pasteur's 'swan-neck flask' experiment changed our understanding of disease.

Question 280: The advancement in our understanding of the structure and function of DNA have allowed gene cloning to be possible. Discuss the implications and a future application of gene cloning.

Question 281: Evaluate the potential of gene cloning in managing a named disease.

Question 282: Explain the role and importance of the hair cells in the Organ of Corti in hearing.

Question 283: Name a substance that is not part of the glomerulus filtrate in nephrons and explain why.

Question 284: Describe the role of rods and cones in the eye's retina and how they differ from each other.

Question 285: List prions, bacteria, fungi, viruses, protozoa, macro-parasites in the order of increasing size.

Question 286: Name a disease caused by bacteria and the disease's mode of transmission.

Question 287: Name a disease caused by fungi and the disease's mode of transmission.

Question 288: Name a disease caused by protozoa and the disease's mode of transmission.

Question 289: Name a disease caused by virus and the disease's mode of transmission.

Question 290: Name a disease caused by a macro-parasite and the disease's mode of transmission.

Question 291: There are heat-screening devices at many countries' airports that detect the core body temperature of humans entering the country. Explain the use of this technology in supporting the country's effort to prevent the spread of disease into its country with reference to the second line of difference.

Question 292: Outline a type of point mutation and its effect on human health.

Question 293: Outline a type of chromosomal mutation and its effect on human health.

Question 294: Construct a flowchart showing the steps used to clone an animal, for example Dolly the Sheep.

Question 295: Describe the interaction between B and T lymphocytes that result in the production of antibodies.

Question 296: Describe how homeostasis can be achieved using an internal coordination that uses hormones.

Question 297: Describe how homeostasis can be achieved using an internal coordination that uses neurones.

Question 298: Explain how antibiotics can be used to control diseases.

Question 299: Describe the occurrence, cause, symptoms, treatment (or management) of a non-infectious disease.

Question 300: Evaluate the effectiveness of a named education campaign in reducing the incidence and prevalence rate of a disease.