Conquer

Do. Believe and Conquer.

2019 HSC BIOLOGY LECTURE GIFT

1000 QUESTIONS
(FREE RESPONSE & MCQ QUESTIONS)

PART IV
(400/1000)

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Be sure to include your unique Lecture Ticket Number alongside your enquiry.

Best,
ConquerHSC Team

Question 301: Describe the process of fertilisation.

Question 302: Describe the process of implantation.

Question 303: Explain the importance of hormonal control of pregnancy.

Question 304: Describe the relationship between the structure and function of proteins, providing examples in your response.

Question 305: Evaluate the effective of existing control and prevention measures against nutritional or diseases caused by environmental exposure.

Question 306: Describe the stages of meiosis in which genetic variation is created.

Question 307: Evaluate the effect of mutation on the continuity of species.

Question 308: Evaluate the effect of gene flow on the continuity of species.

Question 309: Evaluate the effect of genetic drift on the continuity of species.

Question 310: Evaluate the impact of recombinant DNA technology on the continuity of species.

Question 311: The rice genome project is a large-scale international collaborative project aimed to map and record the genome of the rice species.

Outline a possible benefit of the rice genome project.

Question 312: Describe the steps involved the technique of DNA fingerprinting.

Question 313: Describe the steps involved in technique of DNA sequencing.

Question 314: Distinguish between point and chromosomal mutation, providing an example of each.

Question 315: Name two cells that is responsible for humans' acquired immunity.

Question 316: Outline two characteristics of human's innate immunity.

Question 317: Define the term 'immunity'.

Question 318: Patients who have undergone organ transplant needs to take lifelong immunosuppressive drugs. The reason for this to suppress the effect of autoimmunity which is the situation where the transplanted organ is attacked by the patient's own immune cells. If the drug is not taken, the transplanted organ will eventually be destroyed, known as graft rejection.

Explain why autoimmunity can occur in patients who do not the take drugs after they have undergone an organ transplant surgery.

Question 319: Name the mRNA codon that does not have a complementary tRNA anticodon, marking the release of the polypeptide chain.

Question 320: As part of your HSC Biology course, you are required to conduct a practical investigation pertaining to the microbial testing of water or food samples.

Comment on the results of your experiment.

Question 321: Evaluate the efficiency of a biotechnological process in the field of medicine.

Question 322: Evaluate the efficiency of a biotechnological process for industrial applications.

Question 323: Evaluate the efficiency of a biotechnological process in the field of agriculture.

For Question 324 – 326, refer to the following in your response.

As part of your HSC Biology course, you are tasked to gather information pertaining to the effectiveness of technologies used to assist and manage visual disorders.

Question 324: Describe how you would assess the validity of the information gathered used to address the aim of the course's task.

Question 325: Describe how you would assess the accuracy of the information gathered used to address the aim of the course's task.

Question 326: Describe how you would assess the reliability of the information gathered used to address the aim of the course's task.

Question 327: Define the term 'fertilisation'.

Question 328: Describe the evidence that supports different models of human evolution, including how the evidence helps to support the theories.

Question 329: Describe the two stages of homeostasis in the regulation of blood glucose concentration.

Question 330: Describe the two stages of homeostasis in thermoregulation.

Question 331: Describe the function of a named structure of the external ear.

Question 332: Describe the function of a named structure of the inner ear.

Question 333: Describe the function of a named structure of the middle ear.

Question 334: Describe the relationship between the use of cochlear implants, conduction implants and hearing aids with nature of the hearing impairment.

Question 335: Describe the relationship between the use spectacles and laser surgery and the nature of visual disorder.

Question 336: Compare renal dialysis to a kidney in terms of their structure and functions, include references to active and passive transport processes in your response.

Question 337: "The genetic code is almost universal across all organisms."

Comment on the quote's significance on the field of genetics.

Question 338: Define what is meant by "Indigenous cultural and intellectual property", providing an example in your response.

Question 339: Explain the importance of biodiversity in ensuring the continuity of a species.

Question 340: Explain the relationship between sexual reproduction and genetic diversity in a species.

Question 341: Explain the relationship between gamete production and genetic diversity in a species.

Question 342: Describe the practice of biotechnology during its early stages in history.

Question 343: A new pest has been identified on Planet X to be a vector of a deadly pathogen.

Justify the implementation of a strategy that involves pest management and prevention measures over a plan that uses control and treatment.

Question 344: Describe how named reproductive technologies are able to affect the genetic diversity of a population.

Question 345: Describe the mechanisms of natural selection and genetic drift in altering the genetic composition of a population.

Question 346: Describe the mechanisms of gene flow and mutation in altering the genetic composition of a population.

Question 347: Describe the mechanisms of reproductive technologies in altering the genetic composition of a population.

Question 348: Describe the mechanisms of genetic technologies in altering the genetic composition of a population.

Question 349: Construct a flow diagram to show the relationship between a receptor, stimulus, effector, response and messenger.

Question 350: Artificial selection, also known as selective breeding, performed on plants and animals is a form of past biotechnology. More specifically, it is an example of genetic engineering that has been performed by mankind well before the discovery of DNA and the publication of genetic laws that we know of today. Therefore, it can be performed by humans without knowing DNA's role in determining and passing on hereditary traits.

Assess the social implications associated with the use of artificial selection by humans.

Question 351: Explain how treatment and prevention measures deployed to against diseases have impacted the continuity of species in terms of genetic variation.

Question 352: Artificial selection performed on plants and animals is a form of past biotechnology.

Assess the ethical implications associated with the use of artificial selection.

Question 353: Genetic engineering is a large area of the biotechnology field. That being said, biotechnology do not solely involve the manipulation of genetic information. Fermentation is a process used in the field of biotechnology to produce ethanol, a renewable fuel, that is produced from sugar cane for use in our vehicles. It is seen as an alternative to the non-renewable fossil fuel, octane.

(a) State a benefit of fermentation.
(b) Comment on the importance of fermentation.

Question 354: Name a modern technology that has the capacity to affect the continuity of a named plant species in the future.

Question 355: A student used the analogy that "in polypeptide synthesis, translation involves the switch between languages."

Which of the following statement best represents what is the student referencing with her analogy?

(A) The complementary base pairing between DNA nucleotides and RNA nucleotides to make the mRNA molecule.
(B) The conversion from DNA nucleotides to amino acids.
(C) The conversion from codons to nucleotides.
(D) The conversion from codons to amino acids.

Question 356: Model the complementary nature of codons on mRNA and tRNA molecules.

Question 357: Justify the need for the implementation of vaccination programs.

Question 358: Outline the contributions of James Watson and Francis Crick towards the field of genetics.

Question 359: Bacteria can be used in gene cloning processes. Outline the reason why bacteria are able to identify and translate the foreign gene to produce a protein.

Question 360: Explain the mechanism behind why some point mutation can lead to significant changes in the specified protein whereas other point mutations result in less significant changes.

Question 361: A chromosomal mutation resulted in an inversion to occur on the chromosome. Which of the following statement is most correct?

(A) Multiple nitrogenous bases are removed from the chromosome.
(B) Recessive alleles in the inverted chromosome section could become dominant alleles.
(C) There is a shift in the reading codon sequence by the ribosome.
(D) The amino acid sequence will be altered due to a different reading of the nitrogenous bases by the ribosome.

Question 362 – Random true or false Question – Geographical isolation can prevent gene flow to occur and allows speciation.

Question 363: A giant underwater wall has been built in the Baby Shark Sea by a group of angry fishermen, separating red (cute) sharks on one side of the sea from blue (cute) sharks on the other.

Which of the following statement is most correct in describing the baby shark population moving into the future?

(A) A founder effect will be observed in the baby shark population.
(B) The rate of mutation in the baby shark population will drop.
(C) A drop in the chance of genetic drift in the baby shark population.
(D) Gene flow in the baby shark population will be prevented resulting in speciation.

Question 364: Outline a similarity between spontaneous mutation and genetic engineering.

Question 365: What is the number of DNA helixes in a double-stranded chromosome?

(A) One
(B) Two
(C) Three
(D) Four

Question 366: What is the number of double-stranded DNA molecule(s) in a chromatid?

(A) One
(B) Two
(C) Three

(D) Four

Question 367: Compare the structure and function of mRNA with tRNA.

Question 368: Which of the following is the name of the step involving using mRNA to produce a protein?

(A) Replication
(B) Transcription
(C) Translation
(D) Transpiration

Question 369: Describe how the practice of genetic engineering has affected the medicine industry.

Question 370: State a part of a flower responsible for the production of gametes and named the reproduction process used to produce the gametes.

Question 371: A mutation removed several nucleotides in a gene originally made up of 90 bases. This had the effect of the amino acid sequence to be changed after translation.

Which of the following is the most likely number of nucleotides that are removed?

(A) 2
(B) 3
(C) 9
(D) 12

Question 372 – Random true or false question – Binary fission is a type of asexual reproduction that can only be performed by unicellular organisms.

Question 373: Name a lifestyle factor that is capable of causing mutation.

Question 374: Name an environmental factor that is capable of causing mutation.

Question 375: "Somatic mutation has no effect on the population of a species' evolution."

Comment on whether you agree with the quote.

Question 376: Explain how reproductive technology have shaped the application of agriculture, providing examples in your response.

Question 377: Modern biotechnology has involved a project involving the extraction of plant oils to manufacture biodiesel that is renewable compared to its non-renewable counterparts. Biotechnologists have cloned the gene and inserted multiple copies of the gene to the plant such each modified plant can produce larger quantities of oil.

Evaluate the social and ethical implications of this project.

Question 378: Humans' DNA are polymers, a term referring to molecules that are made up of many repeating units called monomers.

How many types of monomers is/are there in our DNA?

(A) One
(B) Two
(C) Four
(D) Over a thousand

Question 379: Calculate the average number of amino acids in a rainbow unicorn's protein given that a typical rainbow unicorn gene comprises approximately 9000 base pairs.

Question 380: Name a modern technology that has the capacity to affect the continuity of a named animal species.

Question 381: Point mutations can occur spontaneously as well as a result of mutagens. Describe the differences between the two causes of point mutation.

Question 382: Enzymes play an important role in our metabolism. Describe the relationship between shape and function of enzymes.

Question 383: Which of the following flowchart illustrates steps that must be performed successfully to yield two daughter cells that are genetically identical.

(A) Prophase I → Metaphase I → Cytokinesis I
(B) Prophase II → Metaphase II → Anaphase II → Cytokinesis II
(C) Interphase → Prophase → Metaphase → Anaphase → Cytokinesis
(D) Cytokinesis I only.

Question 384: Suppose that you found that a DNA molecule in a rainbow unicorn has 460,000 thymine and 320,000 cytosine bases. Calculate the total number of nucleotides present in the DNA.

Question 385: Discuss the ethical consideration relating to the collection and use of genetics data in large-scale collaborative projects to identify trends, patterns and relationships.

Question 386: Using the table below, outline the change that would result after a mutation, changing the mRNA base sequence from AACGUU to AAGGUU.

1st base

2nd base	U		C		A		G		3rd base
U	UUU	Phenylalanine	UCU	Serine	UAU	Tyrosine	UGU	Cysteine	U
	UUC	Phenylalanine	UCC	Serine	UAC	Tyrosine	UGC	Cysteine	C
	UUA	Leucine	UCA	Serine	UAA	Stop	UGA	Stop	A
	UUG	Leucine	UCG	Serine	UAG	Stop	UGG	Tryptophan	G
C	CUU	Leucine	CCU	Proline	CAU	Histidine	CGU	Arginine	U
	CUC	Leucine	CCC	Proline	CAC	Histidine	CGC	Arginine	C
	CUA	Leucine	CCA	Proline	CAA	Glutamine	CGA	Arginine	A
	CUG	Leucine	CCG	Proline	CAG	Glutamine	CGG	Arginine	G
A	AUU	Isoleucine	ACU	Threonine	AAU	Asparagine	AGU	Serine	U
	AUC	Isoleucine	ACC	Threonine	AAC	Asparagine	AGC	Serine	C
	AUA	Isoleucine	ACA	Threonine	AAA	Lysine	AGA	Arginine	A
	AUG	Methionine (Start)	ACG	Threonine	AAG	Lysine	AGG	Arginine	G
G	GUU	Valine	GCU	Alanine	GAU	Aspartic Acid	GGU	Glycine	U
	GUC	Valine	GCC	Alanine	GAC	Aspartic Acid	GGC	Glycine	C
	GUA	Valine	GCA	Alanine	GAA	Glutamic Acid	GGA	Glycine	A
	GUG	Valine	GCG	Alanine	GAG	Glutamic Acid	GGG	Glycine	G

Nonpolar, aliphatic Polar, uncharged Aromatic Positively charged Negatively charged

Source: https://commons.wikimedia.org/wiki/File:Codontable1.PNG

Question 387: The DNA double helix is often compared to the structure of a ladder.

Name the part of DNA that would represent:

(a) the 'rungs' of the ladder.
(b) the backbone, or side, of the ladder.

Question 388: Explain the significance of DNA replication in ensuring the continuity of a species.

Question 389: What does 'DNA' stand for?

Question 390: Name the group to which nitrogenous bases are bonded to.

Question 391: Compare RNA polymerase with DNA polymerase in terms of their structure and function.

Question 392: Name of the part of the nucleotide that contains the nitrogen.

Question 393: "It is often described that DNA replication is 'semi-conservative'." Using your knowledge of DNA replication, describe what the statement is referring to.

Question 394: Describe the role of ribosome in polypeptide synthesis.

Question 395: Name the event where a cytosine nucleotide is removed and replaced with a thymine base that occurred in 1% of the population.

Question 396: Distinguish between somatic and gametic cells, providing an example of each.

Question 397: Draw and label the main sections of a neuron.

Question 398: Name two products that can be removed from the blood into the dialysing fluid in the renal dialysis machine.

Question 399: In 2016, Ilik Saccheri and his team found that a single nucleotide polymorphism is responsible for turning grey peppered moths to black pepper moths.

(a) Define what is meant by 'single nucleotide polymorphism'
(b) Given that, in the peppered moth population, there are grey, white and black coloured peppered moths. Outline the impact of a rising population of black peppered moth as a result of single nucleotide polymorphism on the continuity of the peppered moth population.
(c) Suppose that the change in the single nucleotide, resulting in the emergence of black peppered moth, occurred in less than 1% of the population. What is the name of this change-in-nucleotide-composition event?

Question 400: Describe the mechanism in how phenotypic diversity of the human population has evolved through time.