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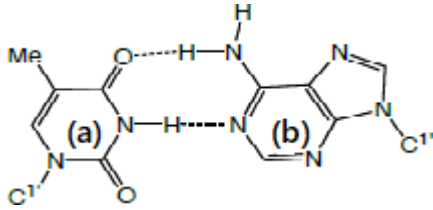
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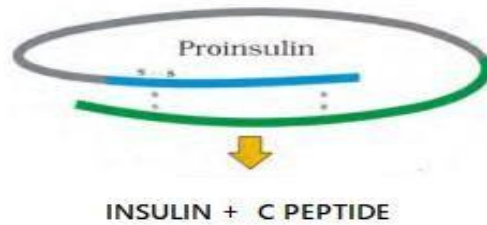
Gudha Public School Campus, Delhi Sikar Bypass Raod, NEEEMKATHANA, RAJ.

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Q.NO	QUESTIONS	MARKS
1	<p>How many functional megaspores are likely to be formed in an ovary containing 40 megaspore mother cells? If all ovules are fertilized, how many seeds will develop.</p> <p>A. 40 and 80 B. 60 and 80 C. 40 and 40 D. 40 and 10</p>	1
2	<p>Name the hormone secreted in large amount by the corpus luteum</p> <p>A. Androgens B. Estrogen C. Progesterone D. Lactogen</p>	1
3	<p>If the guanine content in a DNA sample is 32%, how many cytosine bases would be found in a 1000 base pair (bp) fragment of DNA?</p> <p>A. 160 B. 320 C. 520 D. 640</p>	1
4	<p>Contrast the regulatory mechanisms of the lac operon when lactose is present versus when it is absent. Which statement best describes their differences?</p> <p>A. When lactose is present, the lac repressor binds to the operator, preventing transcription, while in the absence of lactose, the repressor is inactive and transcription occurs. B. When lactose is present, the lac repressor is inactive and does not bind to the operator, allowing transcription, whereas in the absence of lactose, the repressor binds to the operator and blocks transcription. C. When lactose is absent, the lac operon is continuously transcribed due to high levels of cAMP, while in the presence of lactose, cAMP levels drop and transcription is inhibited. D. When lactose is present, the lac operon is repressed by the presence of glucose, while in the absence of glucose, the operon is always active regardless of lactose.</p>	1
5	<p>What is the process for introducing recombinant DNA into a host cell?</p> <p>A. Growing the host cell in an ampicillin-containing growth media. B. Covering the DNA with carbohydrates to encourage cell engulfment of the DNA. C. Stimulating cells with electrical pulses or calcium ions to make them more permeable. D. Administering proteins to host cells to increase their permeability.</p>	1

6	<p>The following schematic diagram represents a part of DNA showing the Watson and Crick base pairs. Identify the correct nitrogen base in (a) and (b).</p>  <p>A.(a) Thymine and (b) Adenine  B.(a) Adenine and (b) Thymine  C.(a) Guanine and (b) Cytosine  D. (a) Cytosine and (b) Uracil</p>	1
7	<p>A man with hemophilia (<math>X^hY</math>) marries a woman who is a carrier for hemophilia (<math>X^HX^h</math>). Analyze the genetic cross and determine which of the following statements accurately describes the potential offspring.</p> <p>A. All daughters will have hemophilia.  B. Sons have a 50% chance of having hemophilia.  C. Daughters have a 25% chance of being carriers of hemophilia.  D. All sons will be unaffected.</p>	1
8	<p>How many chromosomes do drones of honeybees possess, and what type of cell division is involved in the production of their sperm?</p> <p>A. 16 chromosomes; Mitosis  B. 32 chromosomes; Meiosis  C. 16 chromosomes; Meiosis  D. 32 chromosomes; Mitosis</p>	1
9	<p>Identify the options that include types of bioenergy:</p> <p>A. Animal energy and chemical energy  B. Solar energy and nuclear energy  C. Fossil fuels and bioenergy  D. Animal energy and biofuels</p>	1
10	<p>Which of the following was not included in theory of special creation?</p> <p>A. The earth is about 4000 years old.  B. All the living organisms that see today were created as such  C. The solar system came from a massive body.  D. The diversity was always the same since creation and will be the same in future.</p>	1
11	<p>Which of the following factors does NOT affect the rate of ethanol production in yeast fermentation?</p> <p>A. Temperature</p>	1

	B. Type of yeast C. Presence of oxygen D. Type of nitrogen source	
12	Which of the following is called as a detrivore? A. plant feeding on an animal B. An animal feeding on a plant C. An animal feeding on decaying organic matter D. An animal feeding on another animal	
	Question No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below: A. Both A and R are true and R is the correct explanation of A. B. Both A and R are true and R is not the correct explanation of A. C. A is true but R is false. D. A is False but R is true.	
13	Assertion (A): The microspores, as they are formed, are arranged in a cluster of four cells called the microspore tetrad. Reason (R): The microspores are immediately dispersed after formation without undergoing further development.	1
14	Assertion (A): The base pairing confers a very unique property to the polynucleotide chains. Reason (R): One strand is complementary to each other, and therefore if the sequence of bases in one strand is known then the sequence in other strand can be predicted.	1
15	Assertion: A Fungi are also known to form symbiotic associations with higher plants known as mycorrhiza. Reason (R): The fungi enhance nutrient and water absorption for the plant while receiving carbohydrates in return.	1
16	Assertion (A): A plasmid can be used as a vector to deliver an alien piece of DNA into the host organism. Reason (R): Plasmids are small, circular DNA molecules that replicate independently of the host chromosome and can carry foreign DNA.	1
<b>SECTION-B</b>		
17	<b>Attempt either option A or B.</b> In the process of spermatogenesis, describe the role of testosterone and how its levels affect the production and maturation of sperm in the testes.  <b>(OR)</b> Considering the hormonal regulation of spermatogenesis, suggest how an imbalance in testosterone could influence male fertility and propose a possible treatment option for such a condition.	2
18	<b>Attempt either option A or B.</b> (i). Name the two basic amino acids that provide positive charges to histone proteins. (ii). If the base adenine constitutes 31% of an isolated DNA fragment, then what is the expected percentage of the base cytosine in it? <b>(OR)</b> With reference to schematic diagram given below. Describe the chemical change that proinsulin undergoes, to be able to act as mature insulin.	2



19	Imagine you are advising a patient who has been diagnosed with an STI. Explain the importance of early diagnosis and treatment by identifying two curable and two incurable STIs.	2
20	(i) Identify the a, b, c and d from the given diagram. (ii) Why Biotechnologist will not select a plasmid without “ori” site?	2
21	<b>Attempt either option A or B.</b> A scientist conducting research in fruit flies and growing fruit flies in the laboratory. Calculate the death rate if 8 individuals in a laboratory population of 80 fruit flies died during a particular week.  <b>(OR)</b> "Judge the effectiveness of metabolic suspension strategies in ensuring the survival of organisms during unfavourable conditions. To what extent do these strategies enhance their chances of survival compared to organisms without such adaptations?"	2
<b>SECTION-C</b>		
22	"Analyse how the processes of gross primary productivity and net primary productivity impact the overall energy flow and productivity within an ecosystem. How does respiration affect the energy available to consumers?"	3
23	List the different parts of human oviduct through which the ovum travels till it meets the sperm for fertilization.	3
24	"The widespread use of contraceptive methods have a significant role in checking uncontrolled growth of population, however they also cause possible ill-effects " As a student of Biology, give three valid reasons.	3
25	The ability to taste the chemical PTC is determined by a single gene in humans with the ability to taste given by the dominant allele (T ) and inability to taste by the recessive allele ( t ).Suppose two heterozygous tasters (Tt) have a large family. a. Predict the proportion of their children who will be tasters and non-tasters. Use a Punnett square to illustrate how you make these predictions. b. What is the likelihood that their first child will be a taster? What is the likelihood that their fourth child will be a taster?	3

	c. What is the likelihood that the first three children of this couple will be non-tasters?	
26	Explain the different steps involved during primary treatment phase of sewage.	3
27	A bacterium <i>Bacillus thuringiensis</i> produces a toxic protein named <i>cry</i> protein. that is lethal to certain insects but not to bacterium. (a) Why this toxin does not kill the bacteria? (b) What type of changes occur in the gut of insects on consuming this protein? (c) How man has exploited this protein for his benefit?	3
28	Identify the examples of convergent evolution from the following (i) Flippers of penguins and dolphins (ii) Eyes of Octopus and mammals (iii) Vertebrate brains	3

### SECTION-D

29	<p>Observe the following bar diagram of graph and answer the questions given below.</p> <table border="1"> <caption>Data from Bar Diagram (a)</caption> <thead> <tr> <th>Driver of biodiversity loss</th> <th>Terrestrial (%)</th> <th>Marine (%)</th> <th>Freshwater (%)</th> <th>Other (%)</th> </tr> </thead> <tbody> <tr> <td>Climate change</td> <td>40</td> <td>50</td> <td>33</td> <td>33</td> </tr> <tr> <td>Habitat change</td> <td>28</td> <td>8</td> <td>11</td> <td>18</td> </tr> <tr> <td>Invasive species</td> <td>25</td> <td>15</td> <td>32</td> <td>32</td> </tr> <tr> <td>Overexploitation</td> <td>4</td> <td>16</td> <td>4</td> <td>6</td> </tr> <tr> <td>Pollution</td> <td>4</td> <td>10</td> <td>20</td> <td>10</td> </tr> </tbody> </table> <p>A. What is your observation related to the publication of articles and its major role in biodiversity loss?</p> <p>B. As a student of Biology write your ideas to reduce the percentage of over exploitation and pollution by publishing articles?</p> <p><b>Attempt either subpart C or D</b></p> <p>C. Is publication can alone help to reduce the biodiversity loss? (OR)</p> <p>D. Why only marine ecosystem more number of articles are published?</p>	Driver of biodiversity loss	Terrestrial (%)	Marine (%)	Freshwater (%)	Other (%)	Climate change	40	50	33	33	Habitat change	28	8	11	18	Invasive species	25	15	32	32	Overexploitation	4	16	4	6	Pollution	4	10	20	10	4
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30	<p>Proliferation of cells that have managed to evade central endogenous control mechanisms is a hallmark of cancer. Cancers are classified not only by their organ or tissue of origin, but also by the molecular characteristics of the cancer cells themselves. Because of recent scientific advancements, it is now possible to examine the genetic structure of various cancer types in great detail in a limited amount of time, the growing body of information about cancer's development and progression can be used to develop more accurate diagnostics and/or less toxic cancer treatments. In the long run, the aim is to provide each cancer patient with</p>	4																														

	<p>a treatment regimen that is optimally adapted to his or her condition and circumstance.</p> <p>A. What is the hallmark of cancer as mentioned in the passage?</p> <p>B. How are cancers classified apart from their organ or tissue of origin?</p> <p><b>Attempt either subpart C or D</b></p> <p>C. What recent scientific advancement has improved the study of cancer cells?</p> <p style="text-align: center;"><b>(OR)</b></p> <p>D. What is the long-term goal of cancer treatment according to the passage?</p>	
<b>SECTION-E</b>		
31	<p><b>Attempt either option A or B</b></p> <p>A. Answer the following questions based on Meselson and Stahl's experiment on E.coli.</p> <p>(i) Write the name of the chemical substance used as the only source of nitrogen in the experiment.</p> <p>(ii) Why did they allow the synthesis of the light and the heavy DNA molecules in the organism?</p> <p>(iii) How did they distinguish the heavy DNA molecules from the light DNA molecules?</p> <p>(iv) Write the conclusion the scientists arrived at, at the end of the experiment.</p> <p style="text-align: center;"><b>(OR)</b></p> <p>B.(i) It is established that RNA is the first genetic material. Explain giving three reasons.</p> <p>(ii) What are the transcriptional products of RNA polymerase-III?</p> <p>(iii) Differentiate between capping and tailing.</p> <p>(iv) Expand hnRNA.</p>	5
32	<p><b>Attempt either option A or B</b></p> <p>A. Name the nematode that damages the roots of tobacco plants. How a transgenic tobacco plant is made resistant to nematode using biotechnology?</p> <p style="text-align: center;"><b>(OR)</b></p> <p>B. Answer the following questions based on Hershey and Chase's experiments</p> <p>(i) Name the kind of virus they worked with and why?</p> <p>(ii) Why did they use two types of culture media to grow viruses in? Explain.</p> <p>(iii) What was the need for using a blender and later a centrifuge during their experiments?</p> <p>(iv) State the conclusion drawn by them after the experiments.</p>	5
33	<p><b>Attempt either option A or B</b></p> <p>A. Describe the process of megasporogenesis up to fully developed embryo sac formation in an angiosperm.</p> <p style="text-align: center;"><b>(OR)</b></p> <p>B. What does an interaction between pollen grains and its compatible stigma result in after pollination? List two steps in sequence that follows after the process.</p>	5