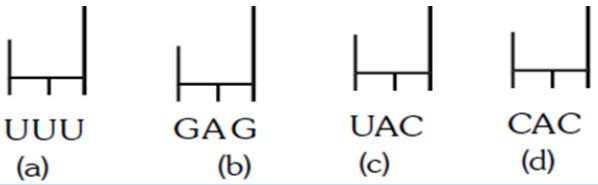
KENDRIYA VIDYALAYA SANGATHAN, LUCKNOW REGION
1st PRE BOARD EXAMINATION 2023-24
CLASS XII
BIOLOGY(044)

Maximum Marks: 70 **Time: 3 hours**

General Instructions:
(i) All questions are compulsory.
(ii) The question paper has five sections and 33 questions. All questions are compulsory.
(iii) Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section–C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.
(iv) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
(v) Wherever necessary, neat and properly labeled diagrams should be drawn.
(vi) Do not give irrelevant expansion / information while answering the questions.
(vii) Support your answer with suitable diagram /flowchart/sketches wherever necessary.

SECTION A

Q.No.	Questions	Marks
Q.1.	What is the ploidy of megaspore mother cell, functional megaspore, and endosperm- (a) 2n,n,n (b) N,n,n (c) 2n,n,3n (d) 2n,3n,3n	**1M**
Q.2.	Consider the statements given below regarding contraception and answer as directed thereafter- **A.** Medical Termination of Pregnancy (MTP) during first trimester is generally safe. **B.** Generally chances of conception are nil until mother breast feeds the infant up to two years. **C.** Intrauterine devices like Copper T are effective contraceptives **D.** Contraception pills may be taken upto one week after coitus to prevent conception. Which two of the above statements are correct? (a) C, D (b) A, C (c) A, B (d) B, C	**1M**
Q.3.	In the F2 generation of a Mendeliandihybrid cross, the number of phenotypes and genotypes are- (a) Phenotypes—4; genotypes—16 (b) Phenotypes—9; genotypes—4 (c) Phenotypes—4; genotypes—8 (d) Phenotypes—4; genotypes—9	**1M**

Q.4.	Occasionally, a single gene, may express more than one effect. The phenomenon is called (a) Multiple allelism (b) Mosaicism (c) Pleiotropy (d) Polygeny	**1M**
Q.5.	In a mRNA sequence of N_2base is 5' AUG GUG CUC AAA 3'. What is the correct sequence ofanticodons which recognizes codons of mRNA: (a) a, b, c, d (b) d, a, b, c (c) c, d, b, a (d) d, c, b, a  	**1M**
Q.6.	In E. coli, the lac operon gets switched on when: (a) Lactose is present and it binds to the repressor (b) Repressor binds to the operator (c) RNA polymerase binds to the operator (d) Lactose is present and it binds to RNA polymerase	**1M**
Q.7.	Which of the following refer to correct example(s) of organisms which have evolved due to changes in environment brought about by anthropogenic (human)action? (1) Darwin's Finches of Galapagos islands. (2) Herbicide resistant weeds. (3) Drug resistant eukaryotes. (4) Man-created breeds of domesticated animals like dogs. (a) only (1) (b) (1) and (3) (c) (2), (3) and (4) (d) only (4)	**1M**
Q.8.	In a species, the weight of newborn ranges from 2 to 5 kg. 97% of the newborn with an average weight between 3 to 3.3 kg survive whereas 99% of the infants born with weights from 2 to 2.5 or 4.5 to 5 kg die. Analyze which type of selection process is taking place? (a) Cyclical selection (b) Directional selection (c) Stabilizing selection (d) Disruptive selection	**1M**
Q.9.	Match the followingorganisms with the products they produce. *A.* *Lactobacillus* (i) Cheese *B.* *Saccharomyces cerevisiae* (ii) Curd *C.* *Aspergillusniger* (iii) Citric acid *D.* *Acetobacteracet i*(iv)Bread (v) Acetic acid	**1M**

	Select the correct option. **(A) (B) (C) (D)** (a) (ii) (i) (iii) (v) (b) (ii) (iv) (v)(iii) (c) (ii) (iv) (iii) (v) (d) (iii) (iv) (v) (i)	
Q.10.	If a recombinant DNA bearing gene for ampicillin resistance if transferred into E.Coli cells and the host cells are spread on agar plates containing ampicillin, then: (a) both transformed and untransformed recipient cells will die (b) both transformed and untransformed recipient cell will be grow (c) transformed recipient cells will grow and untransformed recipient cells will die **(d)** transformed recipient cells will die and untransformed recipient cells will grow	**1M**
Q.11.	cry-gene which synthesize crystal protein isolated from :- (a) Bacillus thuriengensis (b)Rhizobium (c) Bacillus polymyxa (d) Clostridium	**1M**
Q.12.	Mycorrhizae are the example of: (a) Amensalism (b) Antibiosis (c) Mutualism (d) Fungistasis	**1M**
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.		
Q.13.	**Assertion:** The testes are situated outside the abdominal cavity within the scrotum (extra abdominal cavity). **Reason:** Muscles in scrotum helps to maintain low temperature of testes, necessary for spermatogenesis.	**1M**
Q.14.	**Assertion:** Heterochromatin is genetically inactive. **Reason:** Heterochromatin lacks genes.	**1M**
Q.15.	**Assertion :** Interferons help in the elimination of fungal infections. **Reason :** Interferons released by infected cells, reach nearby unaffected cells and make them resistant to viral infection.	**1M**
Q.16.	**Assertion:**Ethidium bromide (EtBr) under Ultra Violet radiation gives bright orange coloured bands. **Reason:** The separated DNA fragments can be seen after staining the DNA with compound EtBr.	**1M**
SECTION B		
Q.17.	Geitonogamous flowering plants are genetically autogamous but functionally cross pollinated, Justify.	**2M**
Q.18.	Mr. Jones has a black guinea pig. (In guinea a pig, black is dominant to white). He wants to know if the guinea pig is pure, because he wants to breed her and raise black guinea pigs to sell. He brings the guinea pig to you. What would you tell Mr. Jones? What would you do? How would you interpret your results?	**2M**

Q.19. Identify **A, B, C** and **D** in the following table: **2M**

Name of the human Disease	Name of the causal bacteria/virus	Specific organ or its part affected
1. Typhoid	*Salmonella typhi*	**A**
2. Common cold	**B**	**C**
3. Pneumonia	*Streptococcus pneumoniae*	**D**

Q.20. Refer to the diagram given below and answer the questions that follows **2M**

(i) The diagram shown above is insulin or proinsulin, justify.
(ii) How is mature insulin synthesised?

Q.21. Provide one example of well-known brood parasites and their host species. What are the specific interactions between them? **2M**

Or

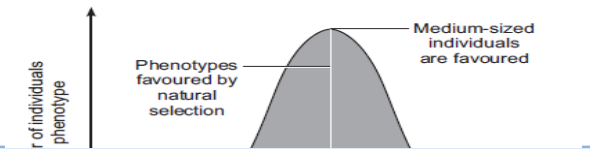
Define commensalism with example.

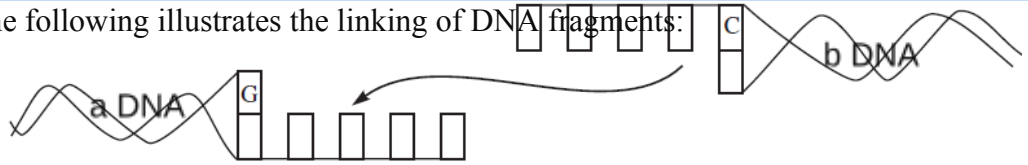
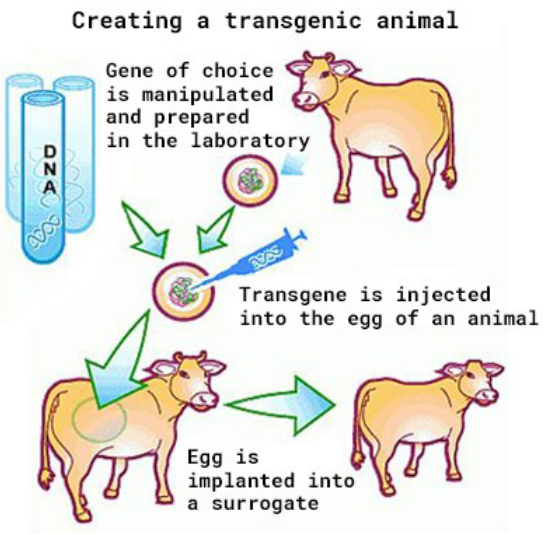
SECTION C

Q.22. Differentiate between microsporogenesis and megasporogensis. **3M**
Which type of cell division occurs during these events?

Q.23. Analyze why ZIFT is a boon to childless couples? Explain the procedure. **3M**

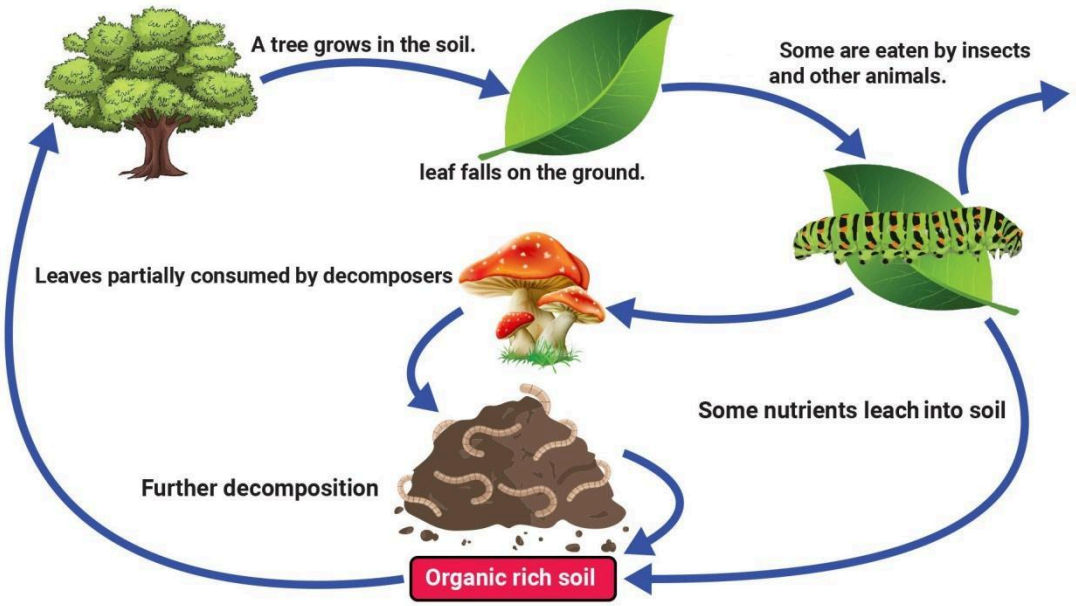
Q.24. Explain the three different ways in which natural selection can affect the frequency of inheritable trait in a population shown in the graph given below. **3M**



Q.25.	a. Define convergent evolution and divergent evolution. b. Identify the following pairs as homologous or analogous organs: (i) Sweet potato and potato (ii) Eye of octopus and eye of mammals (iii) Thorns of *Bougainvillea* and tendrils of *Cucurbits* (iv) Forelimbs of Bat and Whale	**3M**
Q.26.	(a) Why do the symptoms of malaria not appear immediately after the entry of sporozoitesinto the human body when bitten by female *Anopheles*? Explain. (b) Give the scientific name of the malarial parasite that causes malignant malaria in humans.	**3M**
Q.27.	The following illustrates the linking of DNA fragments:  (i) Name 'a' and 'b'. (ii) Complete the palindrome which is recognised by *Eco*RI. (iii) Name the enzyme that can link the two DNA fragments.	**3M**
Q.28.	Name the type of interaction seen in each of the following examples: (*i*) *Ascaris*worms living in the intestine of humans (*ii*) Wasp pollinating fig inflorescence (*iii*) Clown fish living among the tentacles of sea-anemone (*iv*) Mycorrhizae living on the roots of higher plants (*v*) Orchid growing on a branch of a mango tree (*vi*) Disappearance of smaller barnacles when *Balanus*dominated in the coast of Scotland. **OR** (a) Explain "birth rate" in a population by taking a suitable example. (b) Write the other *two* characteristics which only a population shows but an individual cannot. (c) If 8 individuals in a laboratory population of 80 fruit flies died in a week, then what would be the death rate of population for the said period?	**3M**
	SECTION D	
Q.29.	Read the follow given below:  29(i) to 29(iv)	**4M**

	‘Transgenic cows have extra gene or genes inserted into the DNA. Firstly the genes for the desired product is identified and sequenced. Then a gene construct, containing this desired gene, is introduced into female cow cells by transfection. Transgenic bovine cells are selected and fused with bovine oocytes that have had all of their chromosomes removed. Once fused with the oocyte, the transgenic cells chromosomes are reprogrammed to direct development into an embryo which can be implanted into a recipient cow. The resulting transgenic cow only expresses the transgene in her milk. This is because expression of the transgene is controlled by a promoter specific to lactating mammary cells. The first transgenic cow was “Rosie. (29.i) The desired gene is introduced into female cow cells by: (a) transformation (b) transduction (c) transfection (d) transplantation (29.ii) Production of transgenic cow fulfill the objective of (a) increased milk production (b) increased meat production (c) molecular farming (d) all of these (29.iii) The name of first transgenic cow is (a) Tracy (b) Dolly (c) Rosie (d) (b) AND (c) (29.iv) Which of the following best describes a transgenic cow? (a) A cow with a unique coat color (b) A cow that can produce human protein-enriched milk (c) A cow that exclusively eats genetically modified feed (d) A cow with high milk production Or (29.iv)What may the potential benefit of transgenic cows that produce pharmaceuticals in their milk? (a) Enhanced meat quality (b) Reduced methane emissions (c) Lower milk production costs (d) Access to valuable medical treatments	
Q.30.	Read the following paragraph and answer any four questions from 30(i) to 30(iv) given below: You may have heard of the earthworm being referred to as the farmer’s ‘friend’. This is so because they help in the breakdown of complex organic matter as well as in loosening of the soil. Similarly, decomposers break down complex organic matter into inorganic substances like carbon dioxide, water and nutrients and the process is called decomposition. Dead plant remains such as leaves, bark, flowers and dead remains of animals, including faecal matter, constitute detritus, which is the raw material for decomposition. The important steps in the process of decomposition are fragmentation, leaching, catabolism, humification and mineralisation.	**4M**

Decomposition is largely an oxygen-requiring process.The rate of decomposition is controlled by chemical composition of detritus,temperature, soil moistureand climatic factors.



(30.i) Which of the following is a raw material for decomposition?
(a) Fresh leaves (b) Any dead plant parts
(c) Flowers only (d) Living Animals

(30.ii) When water soluble inorganic nutrients goes down in the soil and precipitated as unavailable salts, then the process is called as:
(a) Catabolism (b) Fermentation
(c) Humification (d) Leaching

(30.iii) Fill in the blank:
_____ Gas used in the process of breaking down organic materials into simpler substances by microorganisms?

(30. iv) Write a very short note on Mineralisation?

Or

(30.iv) What is the primary agent responsible for the decomposition of organic materials in nature?
(a) Oxygen
(b) Water
(c) Bacteria and fungi
(d) Sunlight

SECTION E

Q.31. (a) Give a schematic representation of spermatogenesis in humans. **3+**
(b) At which stage of life does gametogenesis begin in human male and female respectively? **1+**
(c) Name the organs where gametogenesis gets completed in human male and femalerespectively. **1=**
5M

OR

	(a) Draw a diagrammatic sectional view of a human seminiferous tubule, and label - Sertoli cells, primary spermatocyte, spermatogonium and spermatozoa in it. (b) Explain the hormonal regulation in the process of spermatogenesis in humans.	**4+ 1= 5M**
Q.32.	(a) Write the conclusion drawn by Griffith at the end of his experiment with *Streptococcus pneumoniae*. (b) How did O. Avery, C MacLeod and M. McCarty prove that DNA was the geneticmaterial? Explain. **OR** (a) The length of a DNA molecule in a typical mammalian cell is calculated to be approximately 2.2 meters. How is the packaging of this long molecule done to accommodate it within the nucleus of the cell? (b) Explain the process of charging of tRNA. Why is it essential in translation?	**2½ + 2½ = 5M** **2½ + 2½ = 5M**
Q.33.	**i.** Choose any three microbes, from the following which are suited for organic farming, which is in great demand these days for various reasons. Mention one application of each one chosen. Mycorrhiza; Monascus; Anabaena; Rhizobium; Methanobacterium; Trichoderma. **ii.**Explain the function of "anaerobic sludge digester" in a sewage treatment plant. **OR** a. Patients who have undergone myocardial infarction are given clot buster. Mention the clot buster administered and its microbial source. b. A person recuperating from illness is advised to have curd regularly. Why? c. Bottled fruit juices bought from the market are clearer as compared to those made at home. Give reason.	**3+2 = 5M** **2+ 2+ 1= 5M**