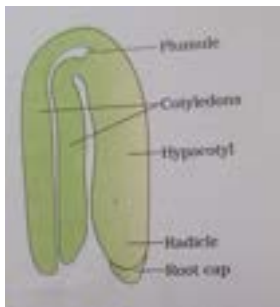


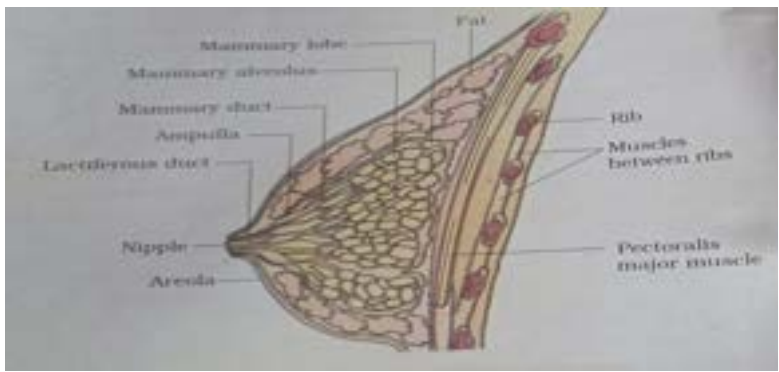
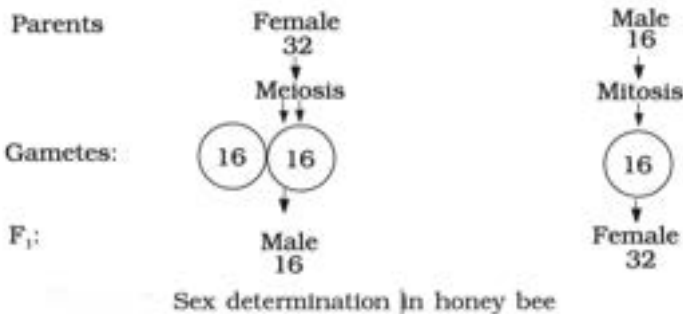
KARNATAKA SCHOOL EXAMINATION AND ASSESSMENT BOARD II PUC EXAM-1, MARCH 2025			
SUBJECT: 36-BIOLOGY		SCHEME OF EVALUATION	MAX. MARKS: 70
Q. NO.	PART-A I. Select the correct alternative from the choices given below: (15*1=15)	MARKS	
1	“Pollen grains are well preserved as fossils because of the presence of sporopollenin” as Statement I: Sporopollenin is the most resistant organic material known. Statement II: No enzyme that degrades sporopollenin is so far known. Ans: a) Both the Statements I and II are correct	1	
2	The process of transformation of spermatids into sperms is called Ans: b) Spermiogenesis	1	
3	Which one among the following is essential for the maintenance of endometrium and for the implantation of fertilized ovum? Ans: b) Progesteron	1	
4	Select the one among the given that is a probable reason for explosive growth of population in India- Ans: c) Increase in the number of people in reproducible age.	1	
5	Which one among the following is a contraceptive method that involves no medicine or device? Ans: d) Coitus interruptus	1	
6	Which one among the following ART can be used to rectify if the infertility is due to low sperm count? Ans: d) IUI	1	
7	Which one among the given is a symbol used in human pedigree analysis for consanguineous mating? Ans: b) 	1	
8	Which one among these represents the flow of genetic information? Ans: c) DNA → mRNA → Protein	1	
9	If the change in gene frequency occurs by chance, it is called Ans: d) Genetic drift	1	
10	Which is the test that can be suggested among the given for a patient with symptoms such as sustained high fever (39° C – 40 °C), weakness, stomach pain, constipation, headache and loss of appetite? Ans: a) Widal test	1	

11	Which among the following is an enzyme modified by genetic engineering and used as “Clot buster”? d) Streptokinase	1
12	In which method the plant cells are bombarded with high velocity microparticles of gold coated with DNA? Ans: b) Biolistics	1
13	The use of bioresources by multinational companies and other organizations without proper authorization and compensatory payment is called as Ans: c) Biopiracy	1
14	In which of the processes given, the humus is degraded by some microbes and release of inorganic nutrients occur? Ans: Mineralisation	1
15	Which one among these is an example for Ex-situ conservation? Ans: a) Cryopreservation	1
II Fill in the blanks by choosing appropriate word/words from those given below: (5*1=5)		
16	Few flowering plants have evolved a special mechanism to produce seeds without fertilisation called <u>Apomixis</u>	1
17	Single step large mutation is known as <u>Saltation</u>	1
18	<u>Oxytocin</u> acts on uterine muscle and cause stronger contractions during parturition.	1
19	Members of genus <u>Glomus</u> form mycorrhiza and absorb phosphorus from soil and supply it to the plant.	1
20	The step in which bands of DNA are cutout and extracted from gel piece is termed as <u>Elution</u> .	1
III	PART-B Answer any five of the following questions in 3 to 5 sentences wherever applicable: (5*2=10)	
21	Draw a neat labelled diagram of dicot embryo Ans: 	2
Any 4 correct labelling (half-marks each)		

22	Differentiate between Linkage and Recombination Ans: Linkage is a physical association of genes on a chromosome. Recombination is the generation of non-parental gene combination.	1 1
23	“AUG has dual function”. Justify the statement. Ans: AUG codes for Methionine (met) and also acts as initiator codon.	1 1
24	Analyse the table given in relation to the human evolution and write the scientific name for A and B respectively Ans: A- <i>Homo habilis</i> B- <i>Homo erectus</i>	1 1
25	Which drug is very useful in patients who have undergone surgery? And why? Ans: Morphine Because Morphine is a very effective sedative and pain killer	1 1
26	From which part of “Virus infected plant” healthy plants can be recovered? Name the technique involved. Ans: Meristem Tissue-culture/Meristem culture	1 1
27	“Tropical regions have greater biological diversity”. Give two hypothesis proposed by ecologists in favour of the above given statement. Ans: a) Tropical latitudes have remained relatively undisturbed for millions of years and thus had a long evolutionary time for species diversification b) Tropical environment is less seasonal, relatively more constant and predictable. Such constant environment promotes niche specialisation and lead to a greater species diversity c) More solar energy is available in the tropics which contributes higher productivity which in turn indirectly leads to greater diversity Any two points (even stated briefly)- one mark each	1 1 1
IV	PART-C Answer any five of the following questions in about 40-80 words each wherever applicable. (5*3=15)	
28	List the features required for the flowers pollinated by wind. Ans: • The pollen grains are light and non-sticky such that they can be transported in wind currents; • They often possess well exposed stamens; • They possess large often-feathery stigma to easily trap air-borne pollen grains; • Numerous flowers are packed into inflorescence. Any three points- one mark each	1 1 1 1



29	Name the human male accessory glands	1
	Ans:	
	- Paired seminal vesicles - A prostate - Paired bulbourethral glands	1 1 1
30	How do IUDs function in bringing about contraception effectively?	1
	Ans:	1
	- IUDs increase phagocytosis of sperms within the uterus - The Cu ions released suppress sperm motility and the fertilising capacity of sperms - The hormone releasing IUDs make the uterus unsuitable for implantation and cervix hostile to the sperms	1
31	a) Mention any two examples for evolution by anthropogenic action.	1
	Ans:	
	- Excessive use of herbicides, pesticides, etc. has resulted in selection of resistant varieties; - Anti-biotic or drug resistance developed by microbes employed against eukaryotic organisms	1
	b) State Hardy-Weinberg principle.	
	Ans: Allele frequencies in a population are stable and is constant from generation to generation or the gene pool (total genes and their alleles in a population) remains constant	1
32	What is a carcinogen? Give an example for each for physical and biological carcinogens.	
	Ans: Agents which cause transformation of normal cells into cancerous neoplastic cells are called carcinogens or cancer causing agents.	1
	- Physical carcinogens- UV radiations, X-rays, Gamma rays (one mark for any of the examples) - Biological carcinogens- oncogenic viruses (viral oncogenes), cellular oncogenes (c-onc) or proto oncogenes (one mark for any of the examples)	1 1
33	List the three uses of genetically modified plants.	
	Ans:	1
	- Such crops are more tolerant to abiotic stress (cold, drought, salt, heat); - Ensures reduced reliance on chemical pesticides (pest-resistant crops); - Helps reduce post-harvest losses - Helps increased efficiency of mineral usage by plants - Ensures enhanced nutritional value of food (E.g. Vitamin A enriched rice)	1 1 1
	One mark for any of the three stated above	
34	In an ecosystem the number of primary producers is 4 and primary consumers are 21. Construct an ecological pyramid for this ecosystem.	3
	Ans:	
		

	PART-D V. Answer any four of the following questions in about 200-250 words each wherever applicable. (4*5=20)	
35	Draw a neat labelled diagrammatic sectional view of mammary gland. Ans:  10 correct labelling (half-mark each)	5
36	a) How phenylketonuria is an example for Pleiotropy? Ans: In pleiotropy, a single gene can exhibit multiple phenotypic expressions. In phenylketonuria, mutation of a single gene manifests multiple phenotypic expressions such as mental retardation, reduction in hair and skin pigmentation. b) Schematically represent the sex determination in honey bee Ans:  Sex determination in honey bee	2 3
37	Explain incomplete dominance with an example. Ans: Incomplete dominance is a condition that sometimes the F1 shows a phenotype that does not resemble either of the two parents and was in between the two. E.g. Inheritance of flower color in the dog flower (snapdragon or <i>Antirrhinum</i> sp.) In a cross between true breeding red-flowered (RR) and true breeding red flowered (rr), the F1 (Rr) was pink. When the F1 was self-pollinated, the F2 resulted in the following ratio 1 (RR) Red: 2 (Rr) Pink: 1 (rr) White. In the F2 generation, the phenotypic ratio changed from the 3:1 dominant: recessive ratio. Here, factor R was not completely dominant over factor r and this made it possible to distinguish Rr as pink from RR (red) and rr (white).	1 1 3

Schematic representation of phenotypic and genetic ratios (two marks)

38	Write any five salient features of human genome.
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Ans:

- Human genome contains 3164.7 million nucleotide bases
- Average gene consists of 3000 bases, but sizes vary greatly. Largest known human gene being dystrophin at 2.4 million bases
- The total number of genes is estimated at 30,000- much lower than previous estimates of 80,000 to 1,40,000 genes
- Almost all (99.9 per cent) nucleotide bases are exactly the same in all people
- The functions are unknown for over 50 per cent of the discovered genes
- Less than two per cent of the genome codes for proteins
- Repeated sequences makeup very large portion of the human genome
- Repetitive sequences are stretches of DNA sequences that are repeated many times. They are thought to have no direct coding functions but they shed light on chromosomes structure, dynamics and evolution
- Chromosome 1 has most genes (2968) and Y has the fewest (231)
- Scientists have identified about 1.4 million locations where single base DNA differences (SNPs-Single Nucleotide Polymorphism) occur in humans.

Any 5 of the above (one-mark each)

39 a) Name the biocontrol agents of aphids and mosquitoes respectively

Ans:

- Apids: Lady bird
- Mosquitoes: Dragonfly

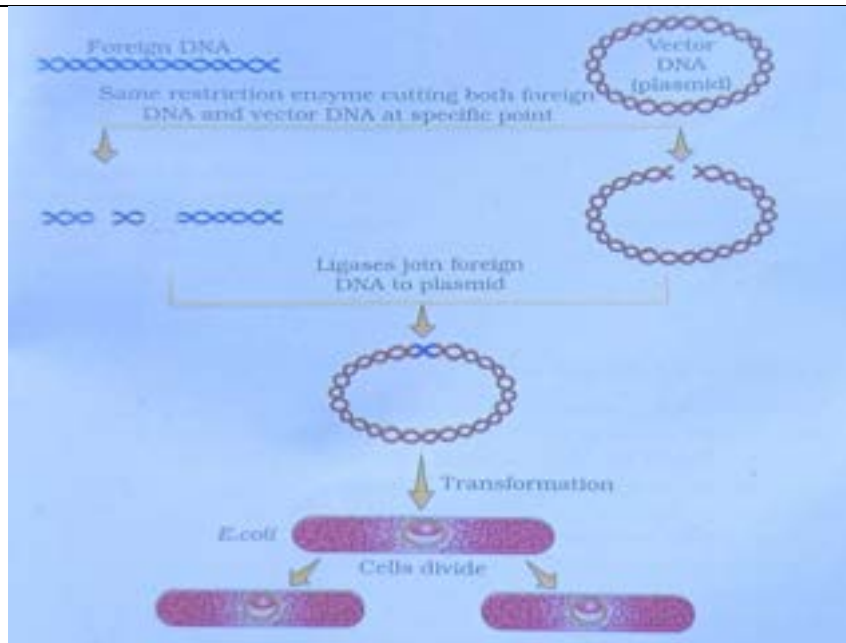
b) How *Bacillus thuringiensis* can be used as biocontrol agent?

Ans:

- *Bacillus thuringiensis* (Bt) are available in sachets as dried spores which are mixed with water and sprayed on to vulnerable plants such as brassicas and fruit trees, where these are eaten by insect larvae
- In the gut of the larvae, the toxin is released and the larvae get killed
- The bacterial disease will kill the caterpillars but leave other insects unharmed

40	Diagrammatically represent the recombinant DNA technology.
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Ans:



One mark for each step

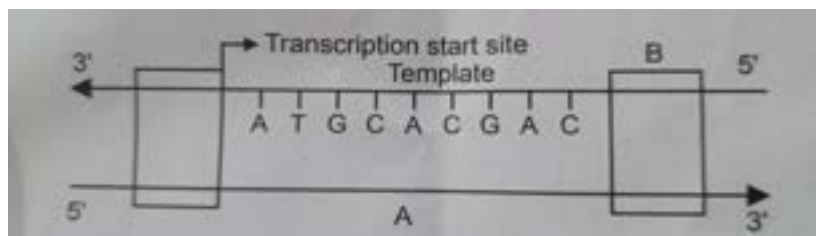
41	Give suitable terms for the following examples/statements with respect to population interactions.	1
	a) The method Mediterranean orchid ophrys employs to get pollinated- Ans: Sexual deceit	1
	b) Species facing competition might evolve mechanism that promote coexistence rather than exclusion- Ans: Resource partitioning	1
	c) The parasitic bird lays eggs in the nest of its host and lets the host bird incubate them- Ans: Brood parasitism	1
	d) The interaction between cattle egret and grazing cattle- Ans: Commensalism	1
	e) The interaction in which one species is harmed while, the other is unaffected- Ans: Amensalism	1



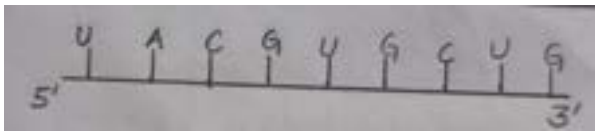
**VI. Answer any one of the following questions in about 200-250 words, wherever applicable.
(1*5=5)**

- 42 Read the below given statement and answer the given questions.
 “A breeder is interested in crossing different species of plants to combine desirable characters to produce commercially superior varieties”.
- a) What major approach in “Crop improvement programme”. Would you suggest to the breeder to achieve this goal?
 Ans: Artificial hybridization
- b) Discuss in detail the techniques involved in the process
 Ans:
- It is achieved by the techniques such as emasculation and bagging
 - If the female parent bears bisexual flowers, removal of anthers from the flower bud before the anther dehisces using a pair of forceps is necessary. This step is referred to as emasculation.
 - Emasculated flowers have to be covered with a bag of suitable size generally made up of butter paper to prevent contamination of its stigma with unwanted pollen. This process is called bagging.
 - When the stigma of bagged flowers attains receptivity, mature pollen grains collected from anthers of the male parent are dusted on the stigma and the flowers are rebagged, and the fruits allowed to develop.
- Mentioning of emasculation and bagging technique- 2 marks
 Explanation with valid reasons- 2 marks

- 43 Analyse the below given transcription Unit diagram and answer the given questions.



- a) Name the parts A and B in the diagram
 Ans:
- A- Coding strand
 - B- Terminator
- b) Which site of the transcription unit provides the binding site for RNA polymerase?
 Ans: Promoter
- c) Write the sequence of bases of the mRNA transcribed from the template given in the diagram.
 Ans:



44	“Our body is provided with different types of non-specific immunity barriers at the times of birth”. Justify the above statement with suitable examples. Ans: Innate immunity is non-specific type of defence that is present at the time of birth. Innate immunity consists of 4 types of barriers- • Physical barriers: Skin on our body is the main barrier which prevents entry of the microbes. Mucus coating of the epithelium lining the respiratory, gastro-intestinal and urogenital tracts help in trapping microbes entering our body • Physiological barriers: Acid in the stomach, saliva in the mouth, tears from eyes- all prevent microbial growth • Cellular barriers: certain types of leucocytes (WBC) of our body like polymorpho-nuclear leucocytes (PMNL neutrophils) and monocytes and natural killer (type of lymphocytes) in the blood and macrophages in tissues can phagocytose and destroy microbes • Cytokine barriers: Virus-infected cells secrete proteins called interferons which protect non-infected cells from further viral infection	1
7	PART E FOR VISUALLY CHALLENGED STUDENTS ONLY Failure of segregation of chromatids during cell division cycle results in _____ Ans: Aneuploidy	1

43	List the salient features of genetic code	5
	Ans: • The codon is triplet; 61 codons code for amino acids and 3 codons do not code for any amino acids. Hence, they function as stop codons. • One codon codes for only one amino acid. Hence, it is unambiguous and specific. • Some amino acids are coded by more than one codon. Hence, the code is degenerate. • The codon is read in mRNA in contiguous fashion. There are no punctuations. • The code is nearly universal. For example, from bacteria to human UUU would code for Phenylalanine (phe). Some exceptions to this rule have been found in mitochondrial codons and in some protozoans. • AUG has dual functions. It codes for Methionine (met) and it also acts as initiator codon. Any of the 5 points (one-mark each)	

