

GOVERNMENT OF KARNATAKA
KARNATAKA SCHOOL EXAMINATION AND ASSESSMENT BOARD
II PU SUPPLEMENTARY EXAMINATION – MAY/JUNE 2023
SCHEME OF EVALUATION

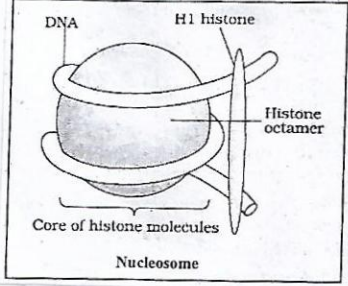
SUBJECT: BIOLOGY

SUBJECT CODE:36

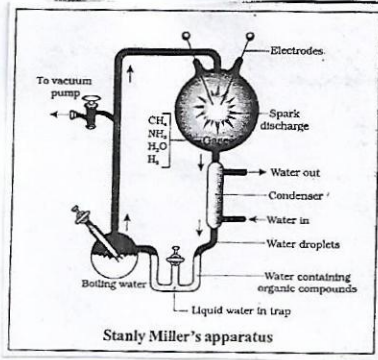
NOTE: 1. Unlabelled and incorrectly labeled diagrams do not attract any marks.
2. Answers written in Kannada also should be valued.

KEY ANSWER / VALUE POINTS		Marks	Page No. in Text Book
PART-A			
I. Select the alternative from the choices given below.		15 x 1=15	
1.	Which of the following is an example of unisexual species? c) Cockroach	1	11
2.	Endosperm persist in the mature seed in b) Castor	1	35
3.	In females Oogenesis is initiated during d) embryonic development stage	1	48
4.	The assisted reproductive technologies in which a sperm is directly injected into the ovum is a) ICSI	1	64
5.	The percent of energy transferred to each trophic level from lower trophic level in the grazing food chain is d) 10%	1	247
6.	Female heterogamety is seen in c) Birds	1	68
7.	Elephantiasis is caused by b) Filarial worm	1	149
8.	The method of producing thousands of plants through tissue culture is called a) Micropropagation	1	177
9.	Bio active molecules Cyclosporin-A is produced by a) Fungus	1	183
10.	Enzymes which remove nucleotides from the ends of the DNA are b) Exonucleases	1	196
11.	Which of the following is an IUD? c) LNG-20	1	60
12.	The disorder caused due to the absence of one of the X-chromosome is b) Turner's syndrome	1	91
13.	The interaction in which one species is benefited and the other is neither benefited nor harmed this association is called c) commensalism	1	233

14.	Herbivores belong to the b) second trophic level	1	246	
15.	In primary succession in water, the pioneers are d) Phytoplankton.	1	251	
II.	Fill in the blanks by choosing the appropriate word from those given below. (Polymerase chain reaction, Perisperm, Gene flow, Standing State, t-RNA)	5 x 1 =5		
16.	The technique that serve the purpose of early diagnosis is _____	1	212	
17.	The amount of nutrients such as carbon, nitrogen, phosphorus and calcium are present in the soil at any given time is referred to as _____	1	253	
18.	The residual persistent nucellus present in some seeds is called _____	1	36	
19.	_____ is Adaptor molecule.	1	114	
20.	The factor that affects Hardy-Weinberg equilibrium is _____	1	137	
PART-B				
III.	Answer any five of the following questions in 3 to 5 sentences each, wherever applicable. 5x2=10			
21	What is external fertilization? Mention its disadvantage.	1	14	
	Fusion of male and female gametes takes place outside the female body i.e., in water medium.			
	Disadvantage: 1. Offspring are more vulnerable to predators.			
22	Distinguish between homogametes and heterogametes.	1	11	
	Homogametes			Heterogametes
	1. Morphologically similar in appearance.			1. Morphologically distinct in appearance.
	2. Cannot be categorized into male and female gametes.	2. Can be categorized into male and female gametes.	1	
23	What is parthenocarpy? Give an example.	1	36	
	Ovary develops into fruit without fertilization such fruit is called parthenocarpic fruit. This phenomenon is called parthenocarpy. e.g., Banana			
24	List any four symptoms of Down's syndrome.	½ mark each	91	
	1. Individual is short statured with small round head.			
	2. Furrowed tongue and partially open mouth.			
	3. Palm is broad with characteristic palm crease.			
	4. Physical, psychomotor and mental development is retarded.			
25	What is Imcomplete dominance? Give an example.	1	76	
	It is a phenomenon in which the F1 had a phenotype that did not resemble either of the two parents and was in between the two. Or			
	It is phenomenon in which heterozygous condition produces intermediate phenotype or character. e.g. Inheritance of flower colour in the Dog flower (snapdragon or <i>Antirrhinum</i> species.)			
		1		

26	<p>Draw a neat labeled diagram of nucleosome structure.</p> 	4 labellings ½ mark each	99
27	<p>What are Analogous organs? Give an example.</p> <p>The organs which are different in structure and origin but perform common functions are called Analogous organs.</p> <p>e.g.,</p> <ol style="list-style-type: none"> 1. Wing of birds, bats and insects. 2. Eye of octopus and of mammals. 3. Flippers of Penguins and Dolphins 4. Root modification in Sweet potato and Stem modification in potato 	1 1 (any one)	131
28	<p>List the effects of particulate matter.</p> <ol style="list-style-type: none"> 1. Responsible for causing the greatest harm to human health. 2. Fine particulates can cause breathing and respiratory symptoms, irritation, inflammation and damage to the lungs and premature deaths. 	1 1	271
PART-C			
IV. Answer any five of the following questions in about 40 to 80 sentences each, wherever applicable. 5x3=15			
29.	<p>List the functions of human placenta.</p> <ol style="list-style-type: none"> 1. Placenta facilitates the supply of oxygen and nutrients to the embryo and also removal of carbon dioxide and excretory/waste materials produced by the embryo. 2. Placenta connected to the embryo through an umbilical cord which helps in the transport of substances to and from the embryo. 3. It also acts as an endocrine tissue and produces hormones like human placental gonadotropin (hCG), human placental lactogen (hPL), estrogens, progesterones, etc. 	1 1 1	53
30.	<p>What is infertility? Give reasons for infertility in humans.</p> <p>Couples unable to produce children inspite of unprotected sexual co-habitation.</p> <p>Reasons: Physical, congenital, diseases, drugs, immunological or even psychological.</p>	1 2	63

31	<p>Briefly explain sex-determination in human beings.</p> <ul style="list-style-type: none"> • In humans, sex determination is XY type. • During spermatogenesis, males produce two types of gametes, 50 per cent of the total sperms carry X-chromosome and the rest 50 per cent has Y-chromosome besides autosomes. • Females produce only one type of ovum with an X-chromosome besides autosomes. • In case, the ovum fertilizes with a sperm carrying X-chromosome the zygote develops into a female (XX) and the fertilization of ovum with Y-chromosome carrying sperm results into a male offspring. 	1 1 1	86
32	<p>Mention the types of carcinogens with an example for each.</p> <ol style="list-style-type: none"> 1. Physical carcinogens- Ionizing radiations like X-rays and gamma rays. Non –ionizing radiations like UV rays. 2. Chemical carcinogens –present tobacco smoke. 3. Biological agents- oncogenic viruses. 4. Cellular oncogenes (c-onc) or proto oncogenes. 	Any three – 1 mark each	157
33	<p>a) Single cell proteins can be used as an alternative source of proteins for human-nutrition- illustrate with two examples.</p> <ul style="list-style-type: none"> • Microbes like <i>Spirulina</i> can be grown easily on materials like waste water from potato processing plants, straw, molasses, animal manure and even sewage, to produce large quantities and can serve as food rich in protein, minerals, fats, carbohydrate and vitamins. • 250 g of a micro-organism like <i>Methylophilus methylotrophus</i>, because of its high rate of biomass production and growth, can be expected to produce 25 tonnes of protein. <p>b) How virus-free plants can be produced by tissue culture? The meristem (apical and axillary) is free of virus. Meristem can be removed and grown <i>in vitro</i> to obtain virus-free plants.</p>	2 1	176 -177
34	<p>Schematically represent the phosphorus cycle.</p> <pre> graph TD Consumers[Consumers] Producers[Producers] Detritus[Detritus] Soil[Soil solution] Rocks[Rock minerals] Producers --> Consumers Producers -- "Litter fall" --> Detritus Detritus -- "Decomposition" --> Soil Rocks -- "Weathering" --> Soil Soil -- "Uptake" --> Producers Soil -- "Run off" --> Detritus </pre>	3	255

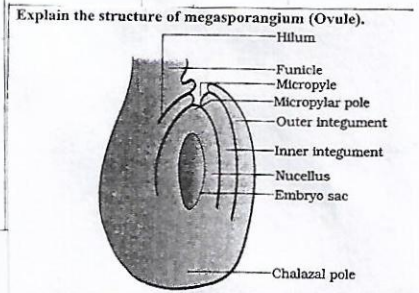
35	<p>Draw a neat labeled diagram of Miller's Experiment.</p>  <p style="text-align: center;">Stanly Miller's apparatus</p>	6 labellings ½ each	128
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36	<p>Mention any three examples of <i>Ex situ</i> conservation.</p> <ul style="list-style-type: none"> • Threatened animals and plants are taken out from their natural habitat and placed in special setting like Zoological parks, botanical gardens and wild life safari parks. • Gametes of threatened species can be preserved in viable and fertile condition for long periods using cryopreservation techniques. • Plants can be propagated using tissue culture methods. • Seeds of different genetic strains of commercially important plants can be kept for long periods in seed banks. 	1 mark each	267
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PART-D

V. Answer any three of the following questions in about 200 to 250 words each, wherever applicable: 3 x 5 = 15

37	<p>Explain the structure of ovule (megasporangium)</p> <ul style="list-style-type: none"> • Ovule is a small structure attached to the placenta by a stalk called funicle. • The body of the ovule fuses with funicle in the region called hilum. • Each ovule has one or two protective envelopes called integuments, which encircle the ovule except at the tip where a small opening called the micropyle is organized. • Opposite to the micropylar end, is the chalaza, representing the basal part of the ovule. • Enclosed within the integuments is a mass of cells called the nucellus. Cells of the nucellus have abundant reserve food materials. • Located in the nucellus is the embryo sac or female gametophyte. 	½ mark each	25
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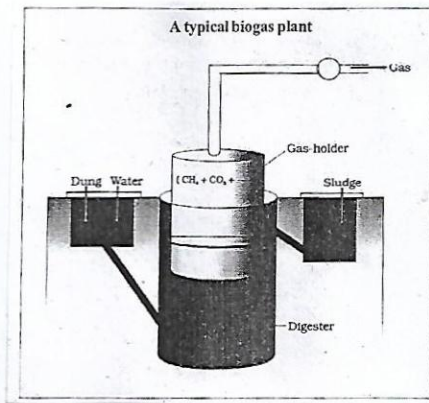


38	<p>Enumerate the salient features of Human-Genome project (HGP).</p> <ul style="list-style-type: none"> • The human genome contains 3164.7 million nucleotide bases. • The average gene consists of 3000 bases, but sizes vary greatly with the largest known human gene being dystrophin at 2.4 million bases. • 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 2 per cent of the genome codes for proteins. • Repeated sequences makeup very large portion of the human genome. • Chromosome 1 has most genes (2968) and the Y has the fewest (231). • It is identified about 1.4 million locations where single base DNA differences (SNPs- single nucleotide polymorphism, pronounced as 'snips') occurs in humans. 	Any 5 points - 1 marks each	120
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39	<p>Explain the inheritance of one gene with reference to stem height of garden pea plant.</p> <ul style="list-style-type: none"> • Mendel crossed a true breeding tall pea plant with a true breeding dwarf plant all the offspring in F1 generation were tall indicating that tallness is dominant over dwarf. • He allowed F1 tall plants for self pollination, in the F2 both tall and dwarf plants were produced in the ratio of 3:1. • Re-appearance of dwarf character inn F2 generation indicates that alleles for tallness and dwarf character have segregated during gamete formation. <p>Parents (phenotype)- Pure Tall X pure dwarf</p> <p>Genotype- TT tt</p> <p>Gametes- $\text{\textcircled{T}}$ $\text{\textcircled{t}}$</p> <p>F1 hybrid- Tt - All tall</p> <p>F1 selfed- Tt X Tt</p> <p>Gametes - $\text{\textcircled{T}}\text{\textcircled{t}}$ x $\text{\textcircled{T}}\text{\textcircled{t}}$</p> <p>F2 hybrids-</p> <table border="1" data-bbox="355 1519 651 1791"> <tr> <td></td> <td>$\text{\textcircled{T}}$</td> <td>$\text{\textcircled{t}}$</td> </tr> <tr> <td>$\text{\textcircled{T}}$</td> <td>TT tall</td> <td>Tt tall</td> </tr> <tr> <td>$\text{\textcircled{t}}$</td> <td>Tt tall</td> <td>tt dwarf</td> </tr> </table>		$\text{\textcircled{T}}$	$\text{\textcircled{t}}$	$\text{\textcircled{T}}$	TT tall	Tt tall	$\text{\textcircled{t}}$	Tt tall	tt dwarf	<p>½ mark</p> <p>½ mark</p> <p>½ mark</p> <p>½ mark</p> <p>2 mark</p>	71-72
	$\text{\textcircled{T}}$	$\text{\textcircled{t}}$										
$\text{\textcircled{T}}$	TT tall	Tt tall										
$\text{\textcircled{t}}$	Tt tall	tt dwarf										

	<p>phenotypic ratio: Tall : Dwarf 3 : 1</p> <p>Genotypic ratio: TT : Tt : tt 1 : 2 : 1</p>	<p>½ mark</p> <p>½ mark</p>	
40	<p>a) Mention any two techniques of cancer detection and diagnosis.</p> <ul style="list-style-type: none"> • Radiotherapy (use of X rays) • CT scan • MRI • Use of antibodies • Techniques of molecular biology. <p>b) Briefly explain any three prevention and control measures of drug / alcohol abuse.</p> <ul style="list-style-type: none"> • Avoid undue peer pressure- every child has his/her own choice and personality, which should be respected and nurtured. A child should not be pushed unduly to perform beyond his threshold limits. • Education and counseling- educating and counseling him/ her to face problems and stresses and to accept disappointments and failures. Child should be encouraged to take up healthy hobbies like sports, reading, music, yoga and other extracurricular activities. • Seeking help from parents and peers- the child should seek help from parents and peers to solve problems. • Looking for danger signs- parents, teachers and friends should be alert to identify danger signs associated with drug/alcohol abuse so that appropriated remedial measures or treatment can be initiated. • Seeking professional and medical help- affected individuals should seek the help of highly qualified psychologists, psychiatrists and de addiction and rehabilitation programmes to come out of the problem. 	<p>Any 2 ½ mark each</p> <p>Mentioning any 3 measures- ½ mark each Explanation of mentioned measures- 1/2 mark</p>	<p>157</p> <p>162-163</p>
41	<p>a) Name the bioactive molecule for the following:</p> <ol style="list-style-type: none"> 1. closter buster agent- streptokinase 2. immunosuppressive agent- cyclosporine A 3. Blood cholesterol lowering agent- Statins <p>b) What are bio fertilizers? Give one example. Organisms that enrich the nutrient quality of the soil. e. g., Rhizobium, Azospirillum, azotobacter, cyanbacteria.</p>	<p>1 1 1</p> <p>1 Any one- 1 mark</p>	<p>183</p> <p>188</p>

Describe the biogas plant with a neat labeled diagram.



42

diagram with 4 labellings- 1/2 marks each

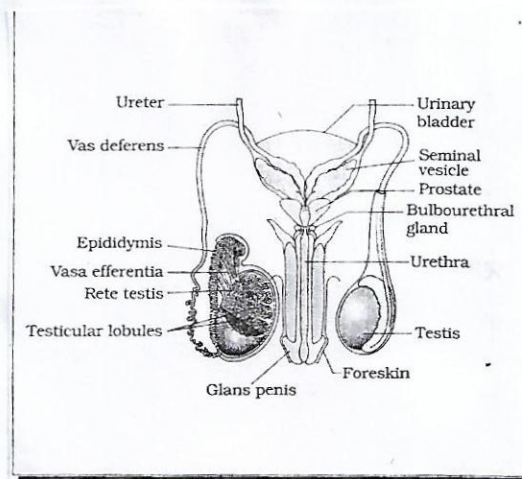
- The biogas plant consists of a concrete tank (10-15ft deep) in which bio wastes are collected and slurry of dung is fed.
- A floating cover is placed over the slurry which keeps on rising as the gas is produced in the tank due to microbial activity.
- The biogas plant has an outlet which is connected to a pipe to supply biogas to nearby houses.
- Used slurry is removed through another outlet and may be used as fertilizer.
- Biogas is used for cooking and lighting.

3 marks

186

VI. Answer any two of the following questions in about 200 to 250 words each. 2 x 5= 10

Draw a neat labeled diagram of human male reproductive system.



43

Diagram with 10 labellings- 1/2 each

43

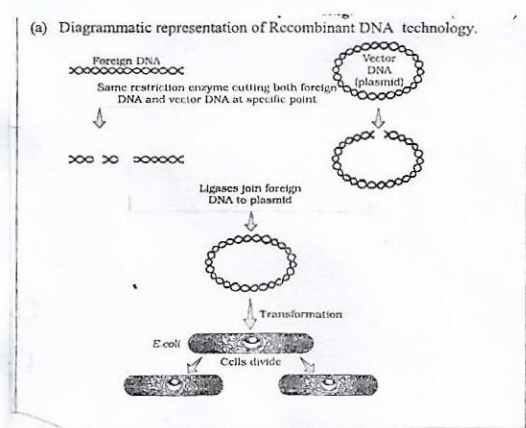
“One of the applications of biotechnology is the production of insect resistant crop plants”- justify the statement with reference to Bt-cotton.

44

- The ‘cry’ gene – ‘cry IAc’ and cry IIAb’ from *Bacillus thuringiensis* Coding for the toxins is transferred to cotton plants. The proteins encoded by these genes control the bollworms.

208-209

1

	<ul style="list-style-type: none"> • These Bt cotton plants express the Bt toxin gene by producing the toxin that provides insect resistance. • Bt toxin is a toxic insecticidal protein formed in the form of protein crystals that kills certain insects. • It exists as inactive protoxin and once an insect ingests the inactive toxin, it is converted into an active form of toxin due to the alkaline pH of the gut which solubilise the crystals. • The activated toxin binds to the surface of epithelial cells of the midgut and creates pores which cause cell swelling and lysis and eventually the death of the insect.s 	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	
45	<p>Write notes on the following:</p> <p>a) Radioactive wastes-</p> <ul style="list-style-type: none"> • Nuclear energy has two serious problems. The first accidental leakage as occurred in three mile island and Chernobyl and the second safe disposal of radio active wastes. • Radiation, that is given off by nuclear waste is extremely damaging to organisms, because it causes mutations at a very high rate. At high doses, nuclear radiation is lethal but at lower doses, it creates various disorders like cancer. • After sufficient pre-treatment, nuclear waste is placed in a suitable shielded containers buried within the rocks, about 500 m deep below the earth surface. <p>b) Global warming-</p> <ul style="list-style-type: none"> • Increase in the level of green house gases has led to considerable heating of earth is called global warming. • Rise in temperature leading to deleterious changes in the environment (El-Nino effect). • Polar ice caps melts, sea level rises submerging many coastal areas. 	<p>3 mark</p> <p>2 mark</p>	280-281
46	<p>a) Write diagrammatic representation of Recombinant DNA technology.</p> 	3 marks	197-204

	<p>b) Write a note on down streaming processing.</p> <ul style="list-style-type: none"> • Down streaming processing is series of processes before it is ready for marketing as a finished product. The processes include separation and purification. • The product has to be formulated with suitable preservatives. Such formulation has to undergo thorough clinical trials as in case of drugs. 	2 marks	
47	<p>Give a brief account on ozone depletion.</p> <ul style="list-style-type: none"> • There is a good ozone found in the upper part of stratosphere and bad ozone in troposphere. • Good ozone prevents the entry of UV rays to the earth surface. UV rays are highly injurious to living organisms, since DNA and proteins of living organisms absorb UV rays and its high energy breaks the chemical bonds within these molecules. • Thickness of ozone is measured in terms of Dobson units. • There should be a balance between production and degradation of ozone in the stratosphere. Of late the balance has been disrupted due to enhancement of ozone degradation by Chlorofluorocarbons (CFC). • In stratosphere UV rays acts on them releasing cl atoms, cl ions degrade ozone releasing molecular oxygen, with these atoms acting merely catalysts. Hence whatever the CFC are added to the atmosphere, they have permanent and continuous effect on ozone levels. • The thinning of ozone layer is called ozone depletion, commonly called as ozone hole. • Uv radiation of wavelength shorter than UV-B are almost completely absorbed by earth atmosphere, given that the ozone layer is intact. It causes damaging of DNA and mutation. It causes ageing of skin, skin cancer, in human eye, UV-B causes inflammation of cornea called snow-blindness, cataract, etc. 		282