

# KARNATAKA BOARD 2ND PUC MODEL QUESTION PAPER-SET 1

## BIOLOGY

TIME: 3.15 HRS

MAX MARKS: 70

### GENERAL INSTRUCTIONS:

- The question paper consists of four parts A, B, C and D
- All the parts are compulsory
- Draw diagrams wherever necessary. Unlabelled diagrams or illustration do not attract any marks

### PART -A

Answer the following questions in one word or one sentence each: 1x 10=10

1. What is polyembryony?
2. Define saltation
3. Name the disease diagnosed by Widal test
4. Mention the chemical present in Heroin
5. What are somaclones?
6. What are microbial flocs?
7. What is insertional inactivation?
8. Define Natality
9. What is in-situ conservation?
10. Define solid wastes

### PART- B

Answer any five of the following questions in 3-5 sentences each wherever applicable: 2x5=10

11. What are vegetative propagules? Mention the vegetative propagules of i) Agave  
ii) Ginger
12. Define syngamy and triple fusion
13. Name the hormones secreted by Leydig cells and corpus luteum
14. How do hormonal IUDs differ from non-medicated IUDs as contraceptives?
15. Define the terms linkage and recombination
16. Explain any two properties of genetic code
17. Distinguish between Benign and malignant tumor
18. Differentiate between out-breeding and out-crossing

### PART – C

**Answer any five of the following questions in 100 - 150 words each:**

**3x5=15**

19. Explain the phases of life span in organisms
20. Mention any three strategies of reproductive health
21. What are Mendelian disorders? Mention any two of them
22. Explain the stages of post-transcriptional modification
23. Name the pathogen, vector and a symptom of filariasis
24. What is ecological succession? Mention the types with an example
25. Mention any three ecosystem services to humans
26. Mention any three reasons of loss of biodiversity

**PART – D**

**SECTION – I**

**Answer any four of the following questions in 200 – 250 words each wherever**

**applicable: 5x4=20**

27. Mention any five difference between microsporogenesis and megasporogenesis
28. Draw a labeled diagram of Human male reproductive system
29. Give the schematic representation of one gene inheritance with respect to law of dominance
30. Explain the structure of Nucleosome
31. Give the diagrammatic representation of Stanley Miller's experiment
32. Mention any five microbes and their commercial or industrial products

**SECTION – II**

**Answer any three of the following questions in 200 – 250 words each wherever**

**applicable: 5x3=15**

33. Describe the major steps involved in plant breeding programmes  
3 + 2
34. Draw a labeled diagram of Simple stirred and sparged tank bioreactor
35. How are genetically modified plants useful to mankind
36. a) Mention any four major abiotic factors b) Name the type of interaction in the following organisms i) Fungi – Roots of higher plants ii) Cattle – Egret iii) Cuckoo – Crow  
3 + 2
37. Discuss the consequences of : a) Global warming b) Ozone depletion  
3 + 2

**Model Paper I II P U Examination**  
**Scheme of Evaluation**

**Subject Code: 36**

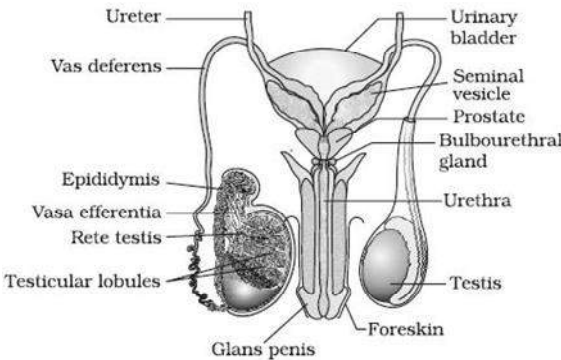
**Subject: Biology**

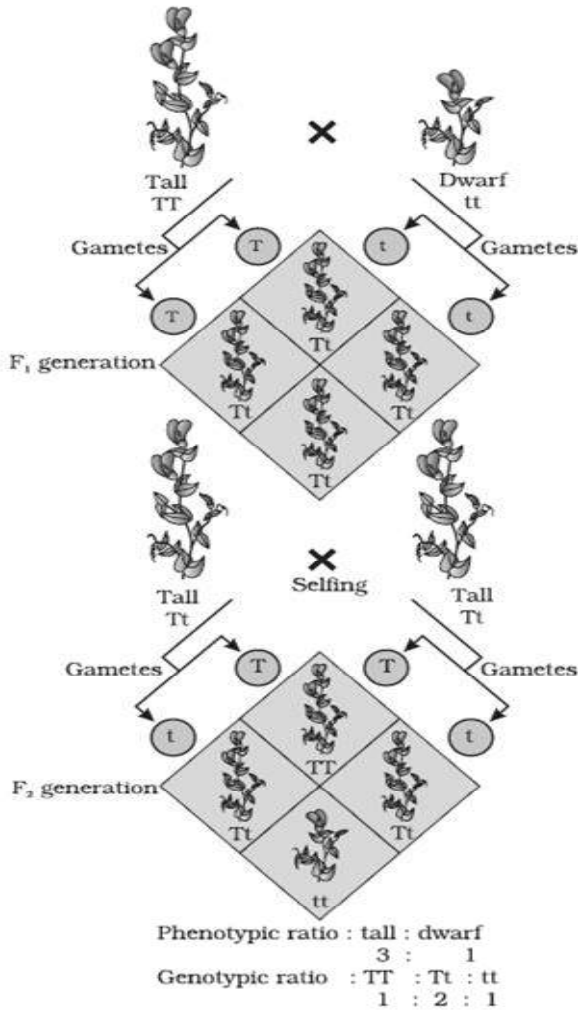
Q. No		Marks Allotted	Page number
	<b>Part – A</b>		
1	<b>What is polyembryony?</b> Occurrence of more than one embryo in a seed is referred as <b>polyembryony</b> .	1	39
2	<b>Define saltation</b> Single step mutation that results in speciation is the saltation	1	135
3	<b>Name the disease diagnosed by Widal test</b> Typhoid	1	147
4	<b>Mention the chemical present in Heroin</b> Diacetylmorphine	1	158
5	<b>What are somaclones?</b> Genetically identical plants produced through plant tissue culture	1	177
6	<b>What are microbial flocs?</b> The mass of bacterial and filamentous fungi that form a network of mesh during aerobic digestion	1	184
7	<b>What is insertional inactivation?</b> The process of inactivation of the expression of selectable marker gene by inserting a gene of interest into it	1	200
8	<b>Define Natalty</b> It is the number of organisms that are added to a population by birth, germination, multiplication of microbes	1	228
9	<b>What is in-situ conservation?</b> The conservation of plants and animals in their natural habitats	1	266
10	<b>Define solid wastes</b> All the waste goes as thrash is called solid waste	1	278
	<b>Part – B</b>		
11	<b>What are vegetative propagules? Mention the vegetative propagules of i) Agave ii) Ginger</b> Any vegetative parts of a plant that have the ability to give rise to new plants are called as vegetative propagules.	1 mark definition ½ mark each	7

	i) Agave - Bulbil    ii) Ginger - Rhizome		
12	<b>Define syngamy and triple fusion</b> Syngamy is the fusion of one of the haploid male gamete with female gamete or egg to form a diploid zygote.  Triple fusion is the fusion of diploid secondary cell or polar nuclei with second male gamete to form triploid primary endosperm nucleus	1 mark each	34
13	<b>Name the hormones secreted by Leydig cells and corpus luteum</b> Leydig cells – Testosterone or Androgens Corpus luteum – Progesterone	1 mark each	43/51
14	<b>How do hormonal IUDs differ from non-medicated IUDs as contraceptives?</b> The hormone releasing IUDs, make the uterus unsuitable for implantation and the cervix hostile to the sperms.	1 mark each	60
15	<b>Define the terms linkage and recombination</b> The physical association the two genes is called linkage. The generation of non-parental gene combinations is called recombination	1 mark each	83
16	<b>Explain any two properties of genetic code</b> Genetic code is triplet Genetic code is universal Genetic code is non-overlapping Genetic code is unambiguous Genetic code is without punctuation or comma less Genetic code has initial and terminator codons Genetic code is degenerative	1 mark each Any two	112
17	<b>Distinguish between Benign and malignant tumor</b> Benign tumor is confined to the region of its origin and do not spread to other parts of the body whereas the malignant tumor spreads to other region of the body from their origin site	1 mark each	157
18	<b>Differentiate between out-breeding and out-crossing</b>	1 mark each	168

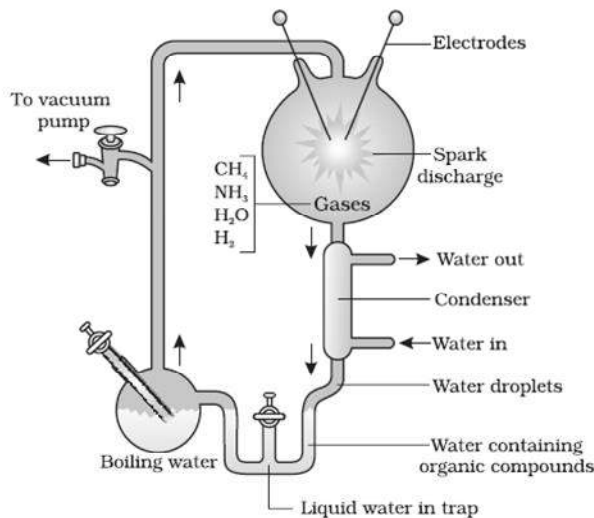
	<p>Out-breeding is the breeding of the unrelated animals, which may be between individuals of the same breed but having no common ancestors.</p> <p>Out crossing is the mating of animals within the same breed, but having no common ancestors on either side of their pedigree up to 4-6 generations.</p>		
	<b>Section – C</b>		
19	<p><b>Explain the phases of life span in organisms</b></p> <p>Juvenile or vegetative phase – The period from birth to reproductive maturity in animal or germination to flowering in plants respectively</p> <p>Reproductive phase – The phase at which an organism attain reproductive maturity and starts producing gametes</p> <p>Senescent phase – The terminal irreversible ageing that ultimately results in death of an organisms</p>	1 mark each	9
20	<p><b>Mention any three strategies of reproductive health</b></p> <ul style="list-style-type: none"> <li>• Reproductive health requires strong infrastructural facilities,</li> <li>• Professional expertise</li> <li>• Material support.</li> </ul>	1 mark each	58
21	<p><b>What are Mendelian disorders? Mention any two of them</b></p> <p>The genetic disorders that follow Mendelian laws of inheritance are called Mendelian disorders.</p> <p>Pheylketonuria, Sickle cell anemia, Thalassemia, Colorblindness, Hemophilia.</p>	1 mark each	88
22	<p><b>Explain the stages of post-transcriptional modification</b></p> <p>Capping – It is the process of addition of 5-methylguanosine to the 5' region of Pre- mRNA</p> <p>Splicing – It is the process of cutting of introns and ligation of exons by spliceosome complex</p> <p>Poly – A tailing – It is the process of addition of approximately 200 adenosine residues to the 3' end of Pre-mRNA</p> <p>(Labeled diagram can also be considered)</p>	1 mark each	111
23	<p><b>Name the pathogen, vector and a symptom of filariasis</b></p> <p>Pathogen – Waucheria bancroftii</p> <p>Vector – Female mosquito</p> <p>Symptom – Swelling of legs, scrotum and lymphatic vessels</p>	1 mark each	149

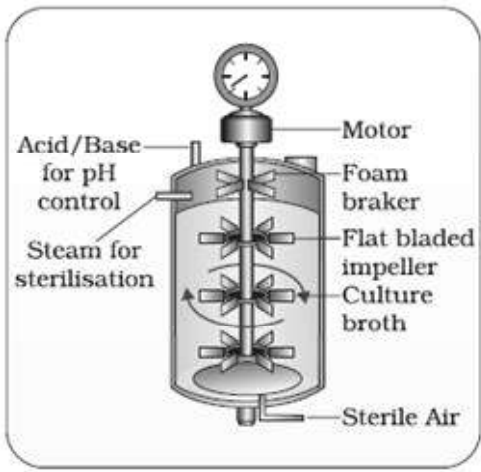
24	<b>What is ecological succession? Mention the types with an example</b> It is the fairly and gradual replacement of species composition in an area Xerosere Hydrosere	Definition 1 mark Example 1 mark each	250
25	<b>Mention any three ecosystem services to humans</b> <ul style="list-style-type: none"> <li>• Healthy forest ecosystems purify air and water, mitigate droughts and floods, cycle nutrients, generate fertile soils, provide wildlife habitat.</li> <li>• Maintain biodiversity, pollinate crops, provide storage site for carbon</li> <li>• Provide aesthetic, cultural and spiritual values.</li> </ul>	1 mark each	255
26	<b>Mention any three reasons of loss of biodiversity</b> <ul style="list-style-type: none"> <li>• Habitat loss and Fragmentation</li> <li>• Overexploitation</li> <li>• Introduction of Alien species</li> <li>• Co-extinction</li> </ul>		264/265
<b>Part – D Section – A</b>			

27	<p><b>Mention any five difference between microsporogenesis and megasporogenesis</b></p> <table><tr><th>Microsporogeneiss</th><th>Megasporogenesis</th></tr><tr><td><ul style="list-style-type: none"><li>• Process of formation of mcirospores</li><li>• Occurs in the pollen chambers</li><li>• All the sporogenous cells differentiate into microspore mother cells</li><li>• Gamete mother cell or meiocytes are the microspore mother cells</li><li>• Each microspore mother cell give rise to four functional microspores</li></ul></td><td><ul style="list-style-type: none"><li>• Process of formation of megaspore</li><li>• Occur in the ovule</li><li>• Only one sporogenous cell differentiate into megaspore mother cell</li><li>• Gamete mother cell or meiocytes are the megaspore mother cell</li><li>• Each megaspore mother cell give rise to 1 – 4 functional megaspore</li></ul></td></tr></table>	Microsporogeneiss	Megasporogenesis	<ul style="list-style-type: none"><li>• Process of formation of mcirospores</li><li>• Occurs in the pollen chambers</li><li>• All the sporogenous cells differentiate into microspore mother cells</li><li>• Gamete mother cell or meiocytes are the microspore mother cells</li><li>• Each microspore mother cell give rise to four functional microspores</li></ul>	<ul style="list-style-type: none"><li>• Process of formation of megaspore</li><li>• Occur in the ovule</li><li>• Only one sporogenous cell differentiate into megaspore mother cell</li><li>• Gamete mother cell or meiocytes are the megaspore mother cell</li><li>• Each megaspore mother cell give rise to 1 – 4 functional megaspore</li></ul>	1 mark each	21/22/25 /26
Microsporogeneiss	Megasporogenesis						
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28	<p><b>Draw a labeled diagram of Human male reproductive system</b></p> 	Diagram 1 mark ½ mark each labeling	43				

29	<p><b>Give the schematic representation of one gene inheritance with respect to law of Dominance</b></p>  <p>The diagram illustrates the inheritance of the trait of height in pea plants. It starts with a P generation cross between a Tall plant (TT) and a Dwarf plant (tt). The gametes produced are T and t. The F<sub>1</sub> generation consists of all Tall plants (Tt). The F<sub>1</sub> generation is then selfed (crossed with itself). The gametes produced are T and t. The F<sub>2</sub> generation shows a phenotypic ratio of 3 Tall to 1 Dwarf and a genotypic ratio of 1 TT to 2 Tt to 1 tt.</p> <p>Phenotypic ratio : tall : dwarf 3 : 1</p> <p>Genotypic ratio : TT : Tt : tt 1 : 2 : 1</p>	<p>Up to F<sub>1</sub> 2 marks</p> <p>Up to F<sub>2</sub> 2 marks</p> <p>Ratio 1 mark</p>	73
30	<p><b>Explain the structure of Nucleosome</b></p> <ul style="list-style-type: none"> <li>The negatively charged DNA is wrapped around the positively charged histone octamer to form a structure called <b>nucleosome</b>.</li> <li>Histones are organised to form a unit of eight molecules called as <b>histone octamer</b>.</li> <li>A typical nucleosome contains 200 bp of DNA helix.</li> </ul>	1 mark each	99



	<ul style="list-style-type: none"> <li>Nucleosomes constitute the repeating unit of a structure in nucleus called <b>chromatin</b>, thread-like stained (coloured) bodies seen in nucleus.</li> <li>The nucleosomes in chromatin are seen as ‘beads-on-string’ structure when viewed under electron microscope</li> </ul>		
31	<p><b>Give the diagrammatic representation of Stanley Miller’s experiment</b></p>  <p>Diagram 1 Each labeling ½ mark</p>	128	
32	<p><b>Mention any five microbes and their commercial or industrial products</b></p> <ul style="list-style-type: none"> <li><i>Aspergillus niger</i> - citric acid,</li> <li><i>Acetobacter aceti</i> - acetic acid</li> <li><i>Clostridium butylicum</i> - butyric acid</li> <li><i>Lactobacillus</i> - lactic acid.</li> <li>Yeast (<i>Saccharomyces cerevisiae</i>) - ethanol.</li> <li>Penicillium notatum (a fungus) – Penicillin antibiotic</li> <li>Streptococcus sp. (bacterium) – Streptokinase</li> </ul>	1 mark each	182/183
	<b>Part – D Section – B</b>		
33	<p><b>Describe the major steps involved in plant breeding programmes</b></p> <p><b>Collection of variability:</b> The entire collection (of plants/seeds)</p>		

	<p>having all the diverse alleles for all genes in a given crop is called <b>germplasm collection</b>.</p> <p><b>Evaluation and selection of parents:</b> The germplasm is evaluated so as to identify plants with desirable combination of characters to be used as parents.</p> <p><b>Cross hybridisation among the selected parents:</b> This is possible by cross hybridising the two parents to produce hybrids that genetically combine the desired characters in one plant. Usually only one in few hundred to a thousand crosses shows the desirable combination.</p> <p><b>Selection and testing of superior recombinants:</b> This step consists of selecting, among the progeny of the hybrids, those plants that have the desired character combination.</p> <p><b>Testing, release and commercialisation of new cultivars:</b> The newly selected lines are evaluated in research fields is followed by testing the materials in farmers' fields, for at least three growing seasons at several locations in the country, representing all the agroclimatic zones where the crop is usually grown.</p>	1 mark each	171
34	<p><b>Draw a labeled diagram of Simple stirred tank bioreactor</b></p> 	Diagram 1 ½ ½ mark each for labeling	204
35	<p><b>How are genetically modified plants useful to mankind</b></p> <ul style="list-style-type: none"> <li>• Made crops more tolerant to abiotic stresses (cold, drought, salt, heat).</li> <li>• Reduced reliance on chemical pesticides (pest-resistant crops).</li> <li>• Helped to reduce post harvest losses.</li> <li>• Increased efficiency of mineral usage by plants (this</li> </ul>	1 mark each	208

	<p>prevents early exhaustion of fertility of soil).</p> <ul style="list-style-type: none"> <li>Enhanced nutritional value of food, e.g., Vitamin 'A' enriched rice.</li> </ul>		
36	<p>a) <b>Mention any four major abiotic factors</b> b) <b>Name the type of interaction in the following organisms</b> i) <b>Fungi – Roots of higher plants</b> ii) <b>Cattle – Egret</b> iii) <b>Cuckoo – Crow</b></p> <p>The four abiotic factors includes: Light, temperature, soil, water</p> <p>i) Fungi – Roots of higher plants: <b>Mutualism</b></p> <p>ii) Cattle – Egret: <b>Commensalism</b></p> <p>iii) Cuckoo – Crow: <b>Brood parasitism</b></p>	<p>2 (Any four)</p> <p>3</p>	236/237
37	<p><b>Discuss the consequences of :</b> a) <b>Global warming</b> b) <b>Ozone depletion</b></p> <ul style="list-style-type: none"> <li>Causes deleterious changes in the environment and resulting in odd climatic changes (e.g. El Nino effect) ,</li> <li>Leads to increased melting of polar ice caps as well as of other places like the Himalayan snow caps.</li> <li>Over many years, this will result in a rise in sea level that can submerge many coastal areas.</li> <li>It causes aging of skin, damage to skin cells and various types of skin cancers.</li> <li>In human eye, cornea absorbs UV-B radiation, and a high dose of UV-B causes inflammation of cornea, called <b>snow-blindness</b> cataract, etc. Such exposure may permanently damage the cornea</li> </ul>	<p>3</p> <p>2</p>	280/281/ 283