

**MODEL QUESTION PAPER – 4**  
**SUBJECT: BIOLOGY (36) PUC II**

**Time: 3 Hours and 15 minutes**

**Maximum Marks: 70**

**GENERAL INSTRUCTIONS:**

- i) *The question paper consists of four parts A, B, C and D. Part D consists of two parts, Section-I and Section-II. Part A contains of 10 questions of one mark each, Part B is of 8 questions of two marks each, Part C is of 8 questions of three marks each, Part D – Section I is of 6 questions of five marks each and Part D – Section II is of 5 questions of five marks each.*
- ii) *All the parts are Compulsory.*
- iii) *Draw diagrams wherever necessary. Unlabelled diagrams or illustrations do not attract any marks.*

**PART – A**

**Answer the following questions in one word or one sentence each:**

**10 x 1 = 10**

11. What are homogametes?
12. Give an example for allosomal trisomy.
13. What is saltation?
14. Name the microorganism which produces butyric acid.
15. What is biopiracy?
16. Define immigration.
17. What are sacred grooves?
18. Expand B O D.
19. What is food web?
20. What are meiocytes?

**PART – B**

**Answer any FIVE of the following questions in 3 – 5 sentences each, wherever applicable: 5 x 2 = 10**

11. What is placenta? Mention any one hormone secreted by placenta.
12. Name any two reproductive health problems.
13. What is test cross? Write its significance.
14. Mention the different types of RNAs.
15. What is phenylketonurea? Write two symptoms.
16. Write the chemical compounds of primordial earth
17. Name the causative organisms of a) Typhoid b) Malaria.
18. Mention the names of cry genes of Bt-cotton.

**PART – C**

**Answer any FIVE of the following questions in 40 – 80 words each, wherever applicable: 5 x 3 = 15**

19. Differentiate asexual reproduction from sexual reproduction.
20. Explain the structure of pollen grain.
21. What are IUDs? Give any two examples.

22. Write any three salient features of human genome project.
23. Distinguish between homologous and analogous organs.
24. What are single cell proteins? Write their significance in nutrition.
25. What is gene therapy? Write any two applications of gene therapy.
26. Define biodiversity. Mention its types.

**PART – D      Section –I**

**Answer any FOUR of the following questions in 200 – 250 words each, wherever applicable:                      4 x 5 = 20**

27. Draw a neat labeled diagram of T S of anther.
28. Explain incomplete dominance with example.
29. Describe the structure of double helix model of DNA.
30. Draw a neat labeled diagram of human sperm.
31. Explain the steps involved in rDNA technology.
32. Draw a neat labeled diagram of retro virus (HIV) life cycle.

**Section -II**

**Answer any THREE of the following questions in 200 – 250 words each, wherever applicable:                      3 x 5 = 15**

33. Discuss the steps involved in plant breeding technique.
34. Write the role of microbe's in house hold food products.
35. What is mutualism? Explain any four examples of mutualism.
36. Justify the phosphorus cycle is an incomplete cycle.

37. a) Write a note on e-wastes.                      3
- b) Write any two preventive measures of air pollution.                      2

**SCHEME OF EVALUATION PUC II**

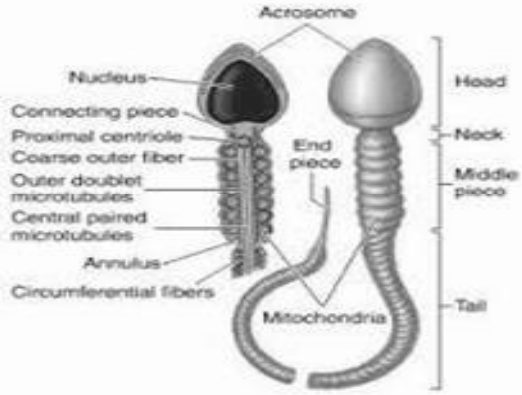
No	Answers	Marks	Page No
<b>PART-A</b>			
<b>1</b>	<b>What are homogametes?</b> These are the gametes similar in appearance	<b>01</b>	<b>10</b>
<b>2</b>	<b>Give an example for allosomal trisomy.</b> Klinefelter's syndrome	<b>01</b>	<b>91</b>
<b>3</b>	<b>What is saltation?</b> Single step mutation leads to speciation is called saltation	<b>01</b>	<b>135</b>
<b>4</b>	<b>Name the microorganism which produces butyric acid.</b> Clostridium butylicum	<b>01</b>	<b>183</b>

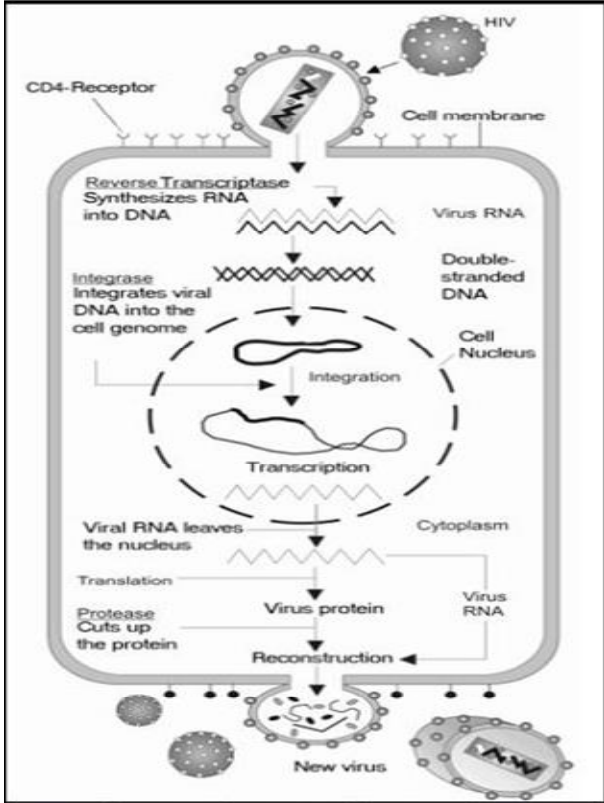
5	<b>What is biopiracy?</b> The use of bioresources by multinational companies without proper authorization from the countries and people concerned without compensatory payment.	01		214
6	<b>Define immigration.</b> It is the number of individuals of the same species that have come into the habitat from elsewhere during the time period under consideration.	01		228
7	<b>What are sacred grooves?</b> These are the small forest patches have protected trees and wildlife.	01		267
8	<b>Expand B O D.</b> Biochemical oxygen demand	01		275
9	<b>What is food web?</b> It is the natural interconnection of food chains	01		246
10	<b>What are meiocytes?</b> These are specialized cells in diploid organisms undergo meiosis.	01		11
<b>PART-B</b>				
11	<b>What is placenta? Mention any one hormone secreted by placenta.</b> It is the structural and function unit between developing embryo and maternal body. Human chorionic gonadotrophin (hCG), Human placental lactogen (hPL), Estrogens and Progestogens. <b>Any one hormone one mark each</b>	01 01		53
12	<b>Name any two reproductive health problems.</b> <ul style="list-style-type: none"> <li>• Improper development and abnormal functions of reproductive organs.</li> <li>• Reduced knowledge about adolescence and related changes.</li> <li>• Lack of information about menstrual cycles.</li> <li>• Insufficient awareness of safe and hygienic sexual practice</li> <li>• Believing in myths and misconception about sex related aspects.</li> </ul> <b>Any two one mark each</b>	02		58
13	<b>What is test cross? Write its significance.</b> The cross made between F <sub>1</sub> hybrids with the recessive parents. To know the genotypes of parents.	02		74
14	<b>Mention the different types of RNAs.</b> rRNA, tRNA,snRNAs, mRNA, hnRNA. <b>Any four ½ mark each.</b>	02		111
15	<b>What is phenylketonurea? Write two symptoms</b>	01		90

	It is inborn errors of metabolism inherited due to autosomal recessive trait. Symptoms: 1. Accumulation of phenyl pyruvic acid and phenyl alanine in brain. 2. Excretion of phenyl alanine along with urine. $\frac{1}{2} \times 2 = 1$														
16	<b>Write the chemical compounds of primordial earth</b> Methane, Ammonia, Hydrogen and water vapour $\frac{1}{2} \times 4 = 2$			127											
17	<b>Name the causative organisms of a) Typhoid b) Malaria.</b> a) Salmonella typhi b) Plasmodium vivax / P. malaria/ P. flaciparum	01 01		147											
18	<b>Mention the names of cry genes of Bt-cotton.</b> cryI Ac , cryIIAb and cryIAb (Any two 1 mark each)	02		209											
<b>PART – C</b> <b>Answer any FIVE of the following questions in 40 – 80 words each, wherever applicable:</b>				<b>5 x 3 = 15</b>											
19	<b>. Differentiate asexual reproduction from sexual reproduction.</b>			<b>5 -6</b>											
	<table border="1"> <thead> <tr> <th>Sexual reproduction</th> <th>Asexual reproduction</th> <th></th> </tr> </thead> <tbody> <tr> <td>The reproductive process involve the fusion of male and female gamete.</td> <td>The reproductive process involves without involvement of gamete.</td> <td>01</td> </tr> <tr> <td>It is biparental</td> <td>They are uniparental</td> <td>01</td> </tr> <tr> <td>They are genetically un-identical.</td> <td>They are genetically and morphologically identical.</td> <td>01</td> </tr> </tbody> </table>	Sexual reproduction	Asexual reproduction		The reproductive process involve the fusion of male and female gamete.	The reproductive process involves without involvement of gamete.	01	It is biparental	They are uniparental	01	They are genetically un-identical.	They are genetically and morphologically identical.	01		
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20	<b>Explain the structure of pollen grain</b> Pollen grain represent male gametophyte. Pollen grains are generally spherical measuring about 25-50 micrometer in diameter. It has prominent two layered wall. The hard outer layer called as exine and is made up sporopollenin. Pollen grain exine has prominent aperture called as germ pore. The inner wall of pollen grain is called as intine. It is thin made up of cellulose and pectin When pollen grain is mature contain two cells called vegetative cell and generative cell.	03		23											

	Any three character 1 mark each										
21	<p><b>What are IUDs? Give any two examples.</b></p> <p>These are birth control devices, inserted by doctor or nurse in uterus through vagina.</p> <p>Examples: Lippes loop, Copper-T.</p> <p>Definition 1 Mark, Two examples - 1 Mark each</p>	1 1	60								
22	<p><b>Write any three salient features of human genome project.</b></p> <p>1) The human genome contains 3164.7 million nucleotide bases.</p> <p>2) Less than 2 % of the genome codes for proteins.</p> <p>3) Repeated sequences make up very large portion of the human genome.</p> <p>4) The functions of 50% genes discovered is unknown.</p> <p>6) The total genes is estimated is much lower than the previous estimates 80,000 – 140,000.</p> <p>Any 3 features – 1Mark for each.</p>	1 1 1	118								
23	<p><b>. Distinguish between homologous and analogous organs.</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Homologous Organs</th> <th style="width: 50%;">Analogous Organ</th> </tr> </thead> <tbody> <tr> <td>Similar in structure, perform different functions</td> <td>Different in structure, perform same function.</td> </tr> <tr> <td>Have common ancestry</td> <td>Have different ancestry</td> </tr> <tr> <td>Ex: i) Forelimbs of Whale, Bats, Cheetah etc. ii) Thorns Bougainvillea &amp; Tendrils of cucurbits</td> <td>Eyes of Octopus and mammals Potato-Stem, Sweet potato- Root.</td> </tr> </tbody> </table>	Homologous Organs	Analogous Organ	Similar in structure, perform different functions	Different in structure, perform same function.	Have common ancestry	Have different ancestry	Ex: i) Forelimbs of Whale, Bats, Cheetah etc. ii) Thorns Bougainvillea & Tendrils of cucurbits	Eyes of Octopus and mammals Potato-Stem, Sweet potato- Root.	3	131
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24	<p><b>What are single cell proteins? Write their significance in nutrition.</b></p> <p>Alternative source of proteins for animals and human nutrition is single cell proteins.</p> <p>Significances</p> <ul style="list-style-type: none"> <li>To get more proteins microorganisms are cultured (Methylophilus methylotrophus) because of its high rate of biomass production and growth.</li> </ul> <p>Mushrooms are eaten by many people. So it is believable that microbes would become acceptable as food.</p> <p>Meaning 1mark and each significance 1 mark</p>	1 1 1	176								
25	<p><b>What is gene therapy? Write any two applications of gene therapy.</b></p> <p>The correction of genetic defect involves a delivery of normal gene into individual or an embryo to take over the function and compensate for the nonfunctional gene.</p> <p>Applications:</p> <ul style="list-style-type: none"> <li>The SCID disease is cured by insertion of ADA gene.</li> <li>Cystic fibrosis is cured by gene therapy.</li> </ul> <p><b>Definition 1 Mark. Two applications – 1 Mark each.</b></p>	1 2	211								
26	<b>Define biodiversity. Mention its types.</b>		259								



	<p>F2 generation</p> <table border="1" data-bbox="667 226 980 443"> <tr> <td></td> <td>R</td> <td>r</td> </tr> <tr> <td>R</td> <td>RR Red</td> <td>Rr Pink</td> </tr> <tr> <td>r</td> <td>Rr Pink</td> <td>rr White</td> </tr> </table> <p>Phenotypic ratio : Red: Pink : White 1 : 2: :1</p> <p>Genotypic ratio RR : Rr : rr 1: 2: 1</p>		R	r	R	RR Red	Rr Pink	r	Rr Pink	rr White		
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<p><b>29</b></p>	<p><b>Describe the structure of double helix model of DNA.</b> Structure of DNA</p> <ul style="list-style-type: none"> <li>• The DNA consists two poly nucleotide chain</li> <li>• They are running antiparallel to one another 5' → 3'; the other 3' → 5'</li> <li>• Sugar and Phosphates acts as back of DNA.</li> <li>• The bases of two strands are paired through hydrogen bonds forming base pairs.</li> <li>• Purines always pairs with Pyrimidines. This generate approximately uniform distance between the two strands of the helix.</li> <li>• The two chains are coiled in a right handed fashion.</li> <li>• The pitch of the helix is 3.4 nm.</li> <li>• There are roughly 10 base pairs in each turn.</li> <li>• The distance between base pair in a helix is approximately 0.34 nm</li> </ul>	<p>1 1 1 1 1</p>	<p><b>97</b></p> <p>→</p>									
<p><b>30</b></p>	<p><b>Draw a neat labeled diagram of human sperm</b></p>  <p>Diagram 1</p> <p>mark; each labeling 1/2 X 8 = 4</p>	<p>5</p>	<p><b>48</b></p>									
<p><b>31</b></p>	<p><b>Explain the steps involved in rDNA technology.</b> Steps: 1) Isolation of genetic (Gene) material. 2) Cutting of DNA at specific locations. 3) Insertion of Recombinant DNA into Host cell/ organism. 3) Obtaining the foreign gene product.</p>	<p>1 1 1 1 1</p>	<p><b>197</b></p>									

	5) Downstream processing. Five steps – 1 Mark each.		
32	<b>Draw a neat labeled diagram of retro virus (HIV) life cycle.</b> 	5	155
	<i>Section -II</i>		
	<b>Answer any THREE of the following questions in 200 – 250 words each, wherever applicable:      3 x 5 = 15</b>		
33	<b>Discuss the steps involved in plant breeding technique.</b> i) Collection of variability. ii) Evaluation and selection parents. iii) Cross hybridization among the selected parents. iv) Selection and testing of superior recombinants. v) Testing, release and commercialization of new cultivars. Five steps- 1 Mark each.	1 1 1 1 1	171
34	<b>Write the role of microbe's in house hold food products.</b> <ol style="list-style-type: none"> <li>1. Micro organism Lacto bacilli grow in milk converted it into curd.</li> <li>2. Lacto bacilli bacteria increase nutrient value by producing Vit B12</li> <li>3. The dough is fermented by bacteria for making food dosa and Idli.</li> <li>4. Saccharomyces cerviciae is used to ferment dough for making bread.</li> <li>5. Toddy is a traditional drink prepared by fermentation.</li> </ol>	1 1 1 1 1	181



	<p><b>What is mutualism? Explain any four examples of mutualism.</b></p> <p>Interaction between two species in which both get benefited is known as mutualism.</p> <ol style="list-style-type: none"> <li>1. Lichens - Fungus and algae ,</li> <li>2. Mycorrhiza - Fungi with higher plant root</li> <li>3. Insects and pollinating plants</li> <li>4. Wasps pollinate fig inflorescence.</li> <li>5. Pollination in ophrys</li> </ol>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>221</p>
36	<p><b>Justify the phosphorus cycle is an incomplete cycle.</b></p> <p>i) Phosphorus is a major constituent in biological membrane found in bones, teeth and shell of animals.</p> <p>ii) The naturally phosphorus is available in phosphorus rocks, in the form of phosphates.</p> <p>iii) By weathering phosphate dissolved in the form of solution and are absorbed by plants, is used. Then it is transferred to animals through food chain.</p> <p>iv) The phosphate present in dead organism body is decomposed by bacteria in soil.</p> <p>v) The huge amount of phosphate is sediment in the water bodies and not exchanged between organisms and environment, hence is incomplete cycle.</p> <p>Five points – 1 Mark each.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>254</p>
37	<p><b>. (a) Write a note on e-wastes.</b></p> <p>a) 1. E- wastes are irreparable computers and other electronic goods.</p> <p>2. These are landfills or incinerated over half of the e-waste generated in the developed world are exported to developing countries mainly China, India etc.</p> <p>3. Recycling is the only solution for the treatment of e-wastes.</p> <p><b>(b) Write any two preventive measures of air pollution.</b></p> <ol style="list-style-type: none"> <li>1. Use of electrostatic precipitator.</li> <li>2. use of air pollution scrubbers.</li> <li>3. Spraying water.</li> <li>4. Wearing of mask.</li> </ol>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>279</p> <p>271</p>