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University of Mumbai

54108

Model Answer Key S.Y.B.Sc Zoology P-I Semester-III (CBCSGC)

Q.P.Code: 5

Time: 03 Hours

Marks: 100

- Q.1 A) Fill in the blanks by choosing the correct options given below** **05**
- i) Dihybrid 01
 - ii) Polygenic 01
 - iii) Green 01
 - iv) Frank Lillie 01
 - v) Meselson and Stahl 01
- B) Match the columns I and II and rewrite** **05**
- | Column I | : | Column II | |
|------------------------------|---|----------------------------------|----|
| i) Double dominant epistasis | : | 15:1 phenotypic ratio | 01 |
| ii) Peptide bonds | : | Protein | 01 |
| iii) XX-XO mechanism | : | Grasshopper | 01 |
| iv) Barr body | : | Klinefelter syndrome individuals | 01 |
| v) Phosphodiester linkages | : | Polynucleotide | 01 |
- C) State whether True or False** **05**
- i) False 01
 - ii) False 01
 - iii) True 01
 - iv) False 01
 - v) True 01
- D) Define the following.** **05**
- i) **Genome** – Sum total of all the genes present in one complete haploid set of chromosomes in eukaryotes, 01
 - ii) **Heterozygous** – An individual having two different alleles, one dominant and the other recessive for a gene at a specific location is called heterozygous. 01
 - iii) **Endomitosis** – The process of duplication of chromosomes without division of the cell is called endomitosis. 01
 - iv) **Why is the lac operon considered to be an inducible operon?** 01
Lactose “turns on,” or *induces*, the transcription of the *lac* operon. An inducible gene is not transcribed unless a specific inducer inactivates its repressor. A repressor usually controls an inducible gene or operon by keeping it “turned off.” The presence of an inducer (allolactose) inactivates the repressor-it detaches from operator, permitting the *lac* gene to be transcribed.
 - v) **What is the function of helicase?** 01
Helicase opens the DNA double helix at replication forks by disrupting the

hydrogen bonds that hold the two strands together.

Q.2 A)	Answer any one of the following:	10
	i) ABO blood group in man	10
	1 Introduction	02
	2 Explanation ABO blood group	04
	3 Inheritance pattern of ABO blood group	04
	ii) Define epistasis. Inheritance of double recessive epistasis with illustration	10
	1 Definition	02
	2 Illustration on double recessive epistasis	04
	3 Explanation on double recessive epistasis	04
B)	Answer any two of the following:	10
	i) Monohybrid cross	05
	1 Introduction	1.5
	2 Explanation with Illustration	3.5
	ii) Dominant epistasis.	05
	1 Introduction	1.5
	2 Explanation with Illustration	3.5
	iii) Pedigree analysis of X linked recessive inheritance.	05
	1 Introduction	1.5
	2 Pedigree chart explanation with illustration	3.5
	iv) Crossing over and factors affecting it.	05
	1 Introduction	01
	2 Explanation of Crossing over	01
	3 Factors affecting crossing over	03
Q.3 A)	Answer any one of the following	10
	i) Explain the role of environmental factors in sex determination.	10
	1 Introduction	02
	2 Sex determination in <i>Bonellia</i>	04
	3 Sex determination in crocodile	04
	ii) Structure of eukaryotic chromosome	10
	1 Introduction	01
	2 Description of chromonema, centromere, secondary constriction II, nucleolar organizer (Secondary constriction I), telomeres	06
	3 Diagram	03

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B)	Answer any two of the following:	10
i)	X Chromosome (human)	05
	1. Description	04
	2. Diagram	01
ii)	Gynandromorph	05
	1. Definition	01
	2. Description with examples	04
iii)	Euchromatin and heterochromatin	05
	1. Definition	02
	2. Explanation	03
iv)	Classification of chromosomes based on position	05
	1. Brief description of metacentric, sub-metacentric, acrocentric and telocentric chromosomes	04
	2. Diagram	01
Q.4 A)	Answer any one of the following:	10
i)	Hershey and Chase experiment	10
	1. Introduction	01
	2. Description	
	i. What are Bacteriophages?	02
	ii. Steps of the experiment	03
	iii. Conclusions	01
	3. Diagrammatic representation	03
ii)	Packaging of DNA in a eukaryotic cell	10
	1. Introduction, Role of histone proteins	04
	2. Description	04
	3. Diagrams	02
B)	Answer any two of the following:	10
i)	Process of aminoacylation of tRNA	05
	1. Definition, reaction catalyzed by aminoacyl-tRNA synthetase, steps	04
	2. Diagram	01
ii)	Discovery of RNA as the genetic material	05
	1. 1. Introduction- Conrat and Singer experiment on TMV	01
	2. 2. Description of steps, results and conclusion	04
iii)	Genetic code-Degenerate and virtually Universal	05
	1. Definition of genetic code	01
	2. Description of properties of Degeneracy and Universality	04

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iv)	Structure and functions of tRNA	05
1	Description of structure and functions	03
2	Diagram	02
Q.5	Write short notes on any four:	20
i)	Classical and Modern Concept of Gene	
1	Explanation of Classical concept of gene	2.5
2	Explanation of Modern concept of gene	2.5
ii)	Rh blood group system	
1	Introduction	01
2	Explanation	04
iii)	Sex influenced genes	05
1	Definition	01
2	Description with example(s)	04
iv)	Holandric genes	05
1	Definition & Description	03
2	Example	02
v)	DNA Polymerases	05
1	Introduction-The enzymes that catalyze the linking of successive nucleotide subunits are called DNA polymerases. They add nucleotides only to the 3' end of a growing polynucleotide strand.	01
2	DNA polymerase in eukaryotes and their functions	02
3	DNA polymerase in prokaryotes and their functions	02
vi)	One gene-one enzyme hypothesis	05
1	Introduction- Definition,	01
2	Description of Beadle and Tatum's experiment on <i>Neurospora crassa</i>	03
3	Diagram	01
