Total No. of Questions: 6 *Total No. of Printed Pages:2*

Enrollment No.....

Faculty of Agriculture

End Sem (Odd) Examination Dec-2018

AG3CO03 Fundamentals of Genetics

Programme: B.Sc. (Ag.) Branch/Specialisation: Agriculture

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. Who coined the term genetics? **1**
(a) Mendal (b) Hugo de veries (c) Weismann (d) Bateson

ii. Phenomenon of crossing over occurs during which of the following? **1**
(a) Laptotene (b) Zygotene (c) Pachytene (d) Diplotene

iii. In case of complementary gene action, F_2 generation shows which of the following phenotypic ratios? **1**
(a) 9:6:1 (b) 9:7 (c) 12:3:1 (d) 15:1

iv. Chi square test can be applied when which of the following conditions is fulfilled? **1**
(a) The data pertain to qualitative traits.
(b) The expected ratio is known or can be readily known.
(c) The actual observed data are available.
(d) All of the above.

v. In 1912, the term crossing over was first time used by which of the following? **1**
(a) Haldane (b) Bateson
(c) Belling (d) Morgan and cattell

vi. Serum of blood group AB has which of the following antibodies? **1**
(a) Anti-A (b) Anti-B
(c) Both anti–A or anti-B (d) Neither anti-A nor anti-B

vii. In animals, sex hormones are involved in which of the following? **1**
(a) Primary sex character (b) Secondary sex character
(c) Gamete function (d) Gametogenesis

viii. In which of the following mechanism is involved in sex determination? **1**
(a) Chromosomal (b) Environmental
(c) Genic (d) All of these

P.T.O.

ix. DNA polymerase I enzyme was discovered by which of the following? **1**
(a) Kornberg (b) Taylor (c) Okazaki (d) Cairns

x. Which of the following activity describe the synthesis of messenger RNA? **1**
(a) Replication (b) Translation
(c) Transcription (d) Transition

Q.2 i. Write mendels principal of inheritance and describe law of purity of gametes? **2**

ii. Write the difference between mitosis and meiosis? **3**

iii. Describe chromosome structure along with diagram and mention different types of chromosomes? **5**

OR iv. Describe different phases of meiosis with diagram? **5**

Q.3 i. Describe chi square test and its importance? **2**

ii. Write complementary gene action along with example? **8**

OR iii. Explain complete and incomplete dominance along with examples? **8**

Q.4 i. Define linkage and types of linkage? **3**

ii. Write types of crossing over and factors affecting crossing over? **7**

OR iii. Explain multiple factor hypothesis with an example? **7**

Q.5 i. Write cytoplasmic inheritance along with an example? **4**

ii. Write genic balance theory of sex determination along with an example? **6**

OR iii. Write different mechanism of sex determination mention chromosome theory of sex determination? **6**

Q.6 Attempt any two:

i. Explain the structure of double helix DNA along with diagram? **5**

ii. Write the mode of DNA replication. Mention semi conservative method of replication? **5**

iii. What is mutation? Mention types of induction of mutation, explain physical and chemical mutagen? **5**

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Marking Scheme

AG3CO03 Fundamentals of Genetics

Q.1	I.	Who coined the term genetics? (d) Bateson	**1**
	II.	Phenomenon of crossing over occurs during which of the following? (c) Pachytene	**1**
	III.	In case of complementary gene action, F_2 generation shows which of the following phenotypic ratios? (b) 9:7	**1**
	IV.	Chi square test can be applied when which of the following conditions is fulfilled?. (d) All of these	**1**
	V.	In 1912, the term crossing over was first time used by which of the following? (d) Morgan and cattell	**1**
	VI.	Serum of blood group AB has which of the following antibodies? (d) Neither anti-A nor anti-B	**1**
	VII.	In animals, sex hormones are involved in which of the following? (b) Secondary sex character	**1**
	VIII.	In which of the following mechanism is involved in sex determination? (d) All of these	**1**
	IX.	DNA polymerase I enzyme was discovered by which of the following? (a) Kornberg	**1**
	X.	Which of the following activity describe the synthesis of messenger RNA? (c) Transcription	**1**

Q.2	i.	Mendels principal of inheritance	1 mark	**2**
		Law of purity of gametes	1 mark	
	ii.	Difference b/w mitosis and meiosis		**3**
		Any three differences 1 mark for each	(1 mark * 3)	
	iii.	Description of chromosome structure	2 marks	**5**
		Diagram	1 mark	
		Types of chromosomes	2 marks	
OR	iv.	Description of Phases of meiosis	3.5 marks	**5**
		Diagram	1.5 marks	

Q.3	i.	Definition of chi square test	1 mark	**2**
		Its importance	1 mark	
	ii.	Gene interactions	3 marks	**8**
		Example and explanation	5 marks	
OR	iii.	Definition of complete and incomplete dominance	4 marks	**8**
		Examples	4 marks	

Q.4	i.	Definition of linkage	1 mark	**3**
		Types of linkage	2 marks	
	ii.	Types of crossing over	3 marks	**7**
		Factors affecting crossing over	4 marks	
OR	iii.	Multiple factor hypotheses with an example		**7**
		Explanation	3 marks	
		Example	4 marks	

Q.5	i.	Cytoplasmic inheritance explanation	1 mark	**4**
		Example	3 marks	
	ii.	Genic balance theory of sex determination	4 marks	**6**
		Example	2 marks	
OR	iii.	Mechanism of sex determination	2 marks	**6**
		Chromosome theory of sex determination	4 marks	

Q.6		Attempt any two:		
	i.	Structure of double helix DNA along with diagram		**5**
		Explanation	3 marks	
		Diagram	2 marks	
	ii.	Mode of DNA replication	2 marks	**5**
		Semi conservative method of replication	3 marks	
	iii.	Definition of mutation	1 mark	**5**
		Types of induction of mutation	2 marks	
		Physical and chemical mutagen	2 marks	

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