



**NOTE:** Part-I is compulsory. Part-I will be collected after one hour. Please mention your roll number on this page.

PART I

- Q.1** Fill in the blanks with appropriate words. (7)
- a. The division of cytoplasm resulting in two cells from one original cell is termed as -----  
-----.
  - b. In Cannabis the treatment with ----- promotes the production of female flower.
  - c. An allele is one of the several form of a -----
  - d. In male honey bee (Drones) the number of chromosome is only half -----  
----- as compared to the female honey bee.
  - e. ----- is a diploid cell missing a single chromosome.
  - f. ----- is a statistical test commonly used to compare observed data with data we would expect to obtain according to a specific hypothesis
  - g. ----- is a mapping technique in which bacterial conjugation is disrupted after specified time intervals.
- Q.2** Write (T) in front of true statement and (F) in front of false statement. And if some statement is false then correct it. (7)
- a) Translation is the transfer of chromosome parts between non-homologous chromosome.
  - b) The period of cell division during which the genetic material is replicated is called S phase.
  - c) The genetic disorder sickle cell anemia is an example of pleiotropy.
  - d) Hypostasis is the interaction between non-allelic genes in which one gene inhibits or suppresses the expression of the other gene.
  - e) The chromosomes which determine the somatic characters of the individuals are known as sex chromosomes.
  - f) Mendel believes in continuous variation, where offspring were a blend of their parents's phenotypes.
  - g) The tendency of genes to stay together during inheritance and to retain their parental combination is called crossing over.



# UNIVERSITY OF THE PUNJAB

**B.A. / B.Sc. Part – I**  
**Supplementary Examination - 2017**

Roll No. ....

**Subject: Genetics-I**  
**PAPER: A (Principles of Genetics)**

**TIME ALLOWED: 2 hrs.**  
**MAX. MARKS: 21**

## PART II

Attempt any three questions from part II. Time allocated for Part II is two hours. All questions carry equal marks.

- Q.3 a) Define Multiple alleles. Explain it with example of human blood group. 4  
b) What are the impacts of light on the gene expression? 3
- Q.4 a) Define Epistasis. Explain recessive epistasis with example. 4  
b) Differentiate between the X-linked recessive inheritance. 3
- Q.5 a) Define and explain Mendel Law of Segregation with example. 4  
b) Differentiate between metacentric and telocentric chromosome. 3
- Q.6 a) Explain the phenomenon of tetrad analysis in Neurospora. 5  
b) How you can differentiate interference with coefficient of coincidence. 2
- Q.7 a) Briefly explain the phenomenon of co-dominance. 4  
b) Write brief note on Down syndrome. 3



B.A. / B.Sc. Part - I  
Supplementary Examination - 2017

Subject: Genetics-I  
PAPER: B (Biometry and Quantitative Genetics)

TIME ALLOWED: 1 hr.  
MAX. MARKS: 14

USE SEPARATE ANSWER SHEET FOR PART-I AND PART-II

INSTRUCTIONS: Question.1. & 2 of Part-I are compulsory for all students. Time for Part - I(Q 1 & Q 2) will be of one hour. Attempt any THREE questions from Part - II. Time allowed for Part - II is 2 hrs. All questions carry equal marks. Provide Chi Square table to students.

PART I		
Q1 and Q2 are compulsory		
Q1:	<p>1. A qualitative characteristics like religion , nationality, sex is called -----</p> <ol style="list-style-type: none"> <li>variable</li> <li>attributes</li> <li>frequency</li> <li>none of these</li> </ol> <p>2. The null hypothesis in the chi-square test states that</p> <ol style="list-style-type: none"> <li>The rows and columns in the table are associated</li> <li>The rows and columns in the table are not associated</li> <li>Neither of the two</li> </ol> <p>3. What is the range of the data below? 40, 35, 35, 25, 45</p> <ol style="list-style-type: none"> <li>20</li> <li>25</li> <li>35</li> <li>40</li> </ol> <p>4. Median, mode, deciles and percentiles are all considered as measures of</p> <ol style="list-style-type: none"> <li>mathematical averages</li> <li>population averages</li> <li>sample averages</li> <li>averages of position</li> </ol>	07 marks
	<p>5. Given below the four sets of observations. Which set has the minimum variation?</p> <ol style="list-style-type: none"> <li>46, 48, 50, 52, 54</li> <li>30, 40, 50, 60, 70</li> <li>40, 50, 60, 70, 80</li> <li>48, 49, 50, 51, 52</li> </ol> <p>6. For a population in Hardy-Weinberg equilibrium, the frequency of the recessive allele</p> <ol style="list-style-type: none"> <li>increases with each generation until it reaches 50%</li> <li>decreases with each generation until it reaches 25%</li> <li>remains the same in every generation</li> <li>decreases due to negative selection pressure on homozygous recessive individuals</li> <li>increases due to the occurrence of new mutations</li> </ol> <p>7. Two unbiased coins are tossed. What is probability of getting at most one tail ?</p> <ol style="list-style-type: none"> <li>1/2</li> <li>1/3</li> <li>3/2</li> <li>3/4</li> </ol>	
Q2: a):	<p>Define the following</p> <ol style="list-style-type: none"> <li>Probability tree diagram</li> <li>Surveys</li> <li>Class limits</li> <li>Pie charts</li> <li>Genotypic frequency</li> </ol>	05 marks
b):	<p>A ball is drawn at random from a box containing 6 red balls, 4 white balls, 5 blue balls. Determine the probability that it is a) red, b) white, c) blue d) not red , e) red or white</p>	02 Marks



# UNIVERSITY OF THE PUNJAB

**B.A. / B.Sc. Part - I**  
**Supplementary Examination - 2017**

Roll No. ....

**Subject: Genetics-I**  
**PAPER: B (Biometry and Quantitative Genetics)**

**TIME ALLOWED: 2 hrs.**  
**MAX. MARKS: 21**

<b>PART II</b>																
Attempt any three questions																
Q3 a):	What are the sources of raw data collection?	01 marks														
b):	Given is the following grouped frequency distribution 90-99 80-89 70-79 What is the class interval and class boundaries for the interval 80-89.	02 marks														
c):	The following table shows the frequency distribution of the diameters of 50 bottles. (Lengths have been measured to the nearest millimeter) Find the mean of the data by mid point method <table border="1" style="width: 100%; text-align: center;"> <tr> <td>Diameter</td> <td>35-39</td> <td>40-44</td> <td>45-49</td> <td>50-54</td> <td>55-60</td> </tr> <tr> <td>frequency</td> <td>6</td> <td>12</td> <td>15</td> <td>10</td> <td>07</td> </tr> </table>	Diameter	35-39	40-44	45-49	50-54	55-60	frequency	6	12	15	10	07	04 marks		
Diameter	35-39	40-44	45-49	50-54	55-60											
frequency	6	12	15	10	07											
Q4. a).	List some practical uses of standard deviation	02 marks														
b)	In certain industry, the number of employees in year 2000 were as below, by age group <table border="1" style="width: 100%; text-align: center;"> <tr> <td>Age</td> <td>15-19</td> <td>20-24</td> <td>25-29</td> <td>30-34</td> <td>35-39</td> <td>40-44</td> </tr> <tr> <td>Number</td> <td>66</td> <td>65</td> <td>56</td> <td>50</td> <td>42</td> <td>37</td> </tr> </table>	Age	15-19	20-24	25-29	30-34	35-39	40-44	Number	66	65	56	50	42	37	05 marks
Age	15-19	20-24	25-29	30-34	35-39	40-44										
Number	66	65	56	50	42	37										
Q5. a)	Calculate the standard deviation and standard error of the data How one can calculate expected frequency in chi square test. Give limitations in the use of chi square	02marks														
b).	In a study the relationship and association between coffee consumption and pancreatic cancer was determine The data is shown in table <table border="1" style="width: 100%; text-align: center;"> <tr> <td rowspan="2">Coffee drinking Cup per day</td> <td colspan="2">Pancreatic cancer</td> </tr> <tr> <td>Present</td> <td>absent</td> </tr> <tr> <td>5</td> <td>60</td> <td>82</td> </tr> <tr> <td>0</td> <td>9</td> <td>32</td> </tr> </table>	Coffee drinking Cup per day	Pancreatic cancer		Present	absent	5	60	82	0	9	32	05 marks			
Coffee drinking Cup per day	Pancreatic cancer															
	Present	absent														
5	60	82														
0	9	32														
Q6 a).	Estimate is there is any association between coffee drinking and pancreatic cancer at $p= 0.05$	02 marks														
b)	How the gene frequencies are affected by the mutations In the population of fruit flies, the allele for the red eye is dominant to the allele for white eyes. If 50% the population is heterozygous and 29% is homozygous for white eyes. What is the frequency of the allele for red eyes according to Hardy Weinberg equilibrium	05marks														
Q7. a).	Write notes on I. Stratified sampling II. Qualitative variate III. Median	06 marks														
b).	How one can check whether a population is in genetic equilibrium or not	01 marks														

**Percentage Points of the Chi-Square Distribution**

Degrees of Freedom	Probability of a larger value of $\chi^2$								
	0.99	0.95	0.90	0.75	0.50	0.25	0.10	0.05	0.01
1	0.000	0.004	0.016	0.102	0.455	1.32	2.71	3.84	5.63
2	0.020	0.103	0.211	0.575	1.386	2.77	4.61	5.99	9.21
3	0.115	0.352	0.584	1.212	2.366	4.11	6.25	7.81	11.34
4	0.297	0.711	1.064	1.923	3.357	5.39	7.78	9.49	13.28
5	0.554	1.145	1.610	2.675	4.351	6.63	9.24	11.07	15.09
6	0.872	1.635	2.204	3.455	5.348	7.84	10.64	12.59	16.81
7	1.239	2.167	2.833	4.255	6.346	9.04	12.02	14.07	18.48
8	1.647	2.733	3.490	5.071	7.344	10.22	13.36	15.51	20.09
9	2.088	3.325	4.168	5.899	8.343	11.39	14.68	16.92	21.67
10	2.558	3.940	4.865	6.737	9.342	12.55	15.99	18.31	23.21
11	3.053	4.575	5.578	7.584	10.341	13.70	17.28	19.68	24.72
12	3.571	5.226	6.304	8.438	11.340	14.85	18.55	21.03	26.22
13	4.107	5.892	7.042	9.299	12.340	15.98	19.81	22.36	27.69
14	4.660	6.571	7.790	10.165	13.339	17.12	21.06	23.68	29.14
15	5.229	7.261	8.547	11.037	14.339	18.25	22.31	25.00	30.58
16	5.812	7.962	9.312	11.912	15.338	19.37	23.54	26.30	32.00
17	6.408	8.672	10.085	12.792	16.338	20.49	24.77	27.59	33.41
18	7.015	9.390	10.865	13.675	17.338	21.60	25.99	28.87	34.80
19	7.633	10.117	11.651	14.562	18.338	22.72	27.20	30.14	36.19
20	8.260	10.851	12.443	15.452	19.337	23.83	28.41	31.41	37.57
22	9.542	12.338	14.041	17.240	21.337	26.04	30.81	33.92	40.29
24	10.856	13.848	15.659	19.037	23.337	28.24	33.20	36.42	42.98
26	12.198	15.379	17.292	20.843	25.336	30.43	35.56	38.89	45.64
28	13.565	16.928	18.939	22.657	27.336	32.62	37.92	41.34	48.28
30	14.953	18.493	20.599	24.478	29.336	34.80	40.26	43.77	50.89
40	22.164	26.509	29.051	33.660	39.335	45.62	51.80	55.76	63.69
50	27.707	34.764	37.689	42.942	49.335	56.33	63.17	67.50	76.15
60	37.485	43.188	46.459	52.294	59.335	66.98	74.40	79.08	88.38