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**6-06-2017**

**ST. JOSEPH’S COLLEGE (AUTONOMOUS), BANGALORE-27**

**B.Sc. BIOTECHNOLOGY– VI SEMESTER**

**SPECIAL SUPPLEMENTARY EXAMINATION: MAY 2017**

**BT 6212: Biostatistics and Plant Biotechnology**

**Time- 3 hrs Max Marks-100**

ATTACH THE QUESTION PAPER WITH THE ANSWER SCRIPT

**This paper contains THREE printed pages and THREE parts**

1. **Answer any FIFTEEN of the following 15 X 3 =45**
2. What are the different plant growth regulators? Name the phytohormones involved in the response to biotic stresses in plants.
3. Compare the merits and demerits of pollen culture versus anther culture.
4. With a diagram, describe how a transgenic cassette for plant transformation would look like.
5. What are reporter genes? Give examples.
6. Describe the main strategy employed to engineer phosphinothricin tolerance in crop plants.
7. What is Osmotic Adjustment in plants? How is this useful in engineering transgenic crops tolerant to abiotic stresses?
8. Give an outline of the steps involved in Molecular Farming.
9. Comment on the mode of action of the Bt protein.
10. Differentiate between a statistic and a parameter. Give examples
11. Why is arithmetic mean the preferred measure of central tendency?
12. Calculate the range and its coefficient from the following data.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Plant fresh weight (g)** | 100-110 | 110-120 | 120-130 | 130-140 | 140-150 |
| **No of plants** | 100 | 114 | 124 | 117 | 113 |

1. What is random sampling? Explain sampling using lottery method.
2. Depict the following using a suitable graph/ diagram

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **No of Pods** | 130-134 | 135-139 | 140-144 | 145-149 | 150-154 | 155-159 | 160-164 |
| **No of Plants** | 3 | 12 | 21 | 28 | 19 | 12 | 5 |

BT-6212-B-17

1. State addition rule of probability. When would this rule be applicable?
2. What are degrees of freedom? What is the effect of an increase in df in a *Χ2* distribution?
3. What are the assumptions of a Poisson distribution?
4. What is regression? State the quantities represented by a) the slope and b) the Y intercept on a regression line.

1. **Answer any FIVE of the following 5 X 5 =25**
2. What are molecular markers? Contrast Morphological and DNA based markers.
3. Describe with examples, molecular farming of commercially important products in plants.
4. What are the broad approaches possible to engineer herbicide tolerant plants?
5. What are the steps involved in the generation of transgenic plants?
6. Arrive at the median age graphically from the following data.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Age** | 20-25 | 25-30 | 30-35 | 35-40 | 40-45 | 45-50 | 50-55 | 55-60 |
| **F** | 50 | 70 | 100 | 180 | 150 | 120 | 70 | 60 |

1. Prices of a particular commodity in 5 years in 2 cities are given below. Which of the 2 cities has more stable pricing?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **City A** | 20 | 22 | 19 | 23 | 16 |
| **City B** | 10 | 20 | 18 | 12 | 15 |

1. Five 100rupee notes were dropped 1000 times and each time, the number of heads was noted, which is as follows:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **No. of heads** | 0 | 1 | 2 | 3 | 4 | 5 |
| **F** | 38 | 144 | 342 | 287 | 164 | 25 |

Test whether the distribution is binomial.

1. **Answer the following 3 X 10 =30**
2. Describe with illustrations, the process of *Agrobacterium* mediated plant transformation.

**OR**

1. “GM crops have benefits for sustainable farming”. Debate.
2. From the data recorded on four F1 plants of *Pisum sativum* segregating for round and wrinkled seed shapes, test the homogeneity of the four plants for 3:1 ratio.

|  |  |  |
| --- | --- | --- |
| Plants | Round seeds | Wrinkled seeds |
| 1 | 25 | 11 |
| 2 | 35 | 7 |
| 3 | 16 | 6 |
| 4 | 70 | 27 |

**OR**

1. 4 different drugs have been developed for the cure of a certain disease. These drugs are tried on patients of 3 different hospitals. The number of cases of recovering from the disease per 100 people is given below. Carry out the analysis of variance and interpret your results.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Hospitals** | **Drugs** | | | |
| **A** | **B** | **C** | **D** |
| **H1** | 24 | 20 | 24 | 17 |
| **H2** | 20 | 25 | 30 | 9 |
| **H3** | 13 | 18 | 31 | 13 |

1. Calculate the Karl Pearson’s coefficient of skewness from the following data on spike length (cm) of wheat.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Spike length (c)** | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 |
| **No. of Plants** | 35 | 40 | 48 | 100 | 125 | 87 | 43 | 22 |

**OR**

1. Data recorded on the primary and secondary branches of a pulse variety are given below. Calculate the correlation coefficient and test its significance.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **No. of primary branches** | 10 | 8 | 10 | 9 | 10 | 10 | 9 | 11 | 13 | 9 |
| **No. of secondary branches** | 11 | 16 | 18 | 19 | 16 | 11 | 17 | 18 | 25 | 19 |