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| **ST. JOSEPH’S COLLEGE (AUTONOMOUS), BANGALORE-27** | | | | | | |
| **B.Sc. Biotechnology - VI SEMESTER** | | | | | | |
| **SEMESTER EXAMINATION: APRIL-2022**  **(Examination conducted in July 2022)** | | | | | | |
| **BT 6215 – Biostatistics and Plant Biotechnology** | | | | | | |
|  |  |  |  |  |  |  |
| **Time- 2 1/2 hrs** | |  | **Max Marks-70** | | |  |
|  |  |  |  |  |  |  |
| **This paper contains TWO printed pages and THREE parts** | | | | | | |

**I. Answer any TEN of the following 2x10=20**

1. What is the best measure of central tendency? Why
2. Calculate the range and its coefficient from the following data: 6,4,5,6,8, 10, 4, 7
3. What is Cluster sampling? When is it followed?
4. What are the assumptions of binomial distribution?
5. What is α error? What are the conventionally accepted levels?
6. What is regression? Where is it useful?
7. Depict the following using an appropriate diagram/ graph

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Days to maturity | 55-60 | 60-65 | 65-70 | 70-75 | 75-80 |
| No. of varieties | 10 | 20 | 25 | 18 | 12 |

1. What is totipotency? What is it’s implications in plant tissue culture?
2. What is somatic hybridization? When is it used?
3. What is a selectable marker? Give an example
4. State 2 principles used to engineer abiotic stress resistance in plants.
5. What is RFLP? Is it a co-dominant or a dominant marker?

**II. Write short notes on any FIVE of the following 6x5=30**

1. Calculate the mode from the following data.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Class Interval | 61-65 | 66-70 | 71-75 | 76-80 | 81-85 |
| Frequency (f) | 12 | 25 | 45 | 30 | 8 |

1. What do the areas under the normal curve give? In a standard normal curve, areas are correlated to probabilities. Explain.
2. In a large city the average number of rats per quarter block is 5. Assuming that the occurrence of number of rats follows Poisson distribution, find out the probability that in a randomly selected quarter block there are exactly 5 rats.
3. The correlation coefficient of an association studies between heights and weights among 20 individuals is r= 0.85. Conduct the t test and give your inference about the correlation coefficient. (t tab  18df, α 0.05 = 2.101)
4. In a F2 population derived between red and white flower coloured anthuriums the following data was obtained: 25 red: 54 pink: 21 white plants. Test for incomplete dominance (1:2:1). (**χ2**tab 2df, α 0.05 =5.991)
5. Outline a process for engineering glyphosate tolerance in crop plants.
6. Describe molecular farming with a suitable example.

**III. Answer the following 10x2=20**

1. Explain in detail engineering Bt genes in cotton. Add a note on why Bt technology has met resistance in food crops.

**OR**

b. With a neat labelled diagram, explain Agrobacterium mediated transformation.

1. a. The data pertaining to a drug treatment on 2 sets of patients is given below.

Which set of patients show more consistent response to treatment?

|  |  |
| --- | --- |
| **Set A** | **Set B** |
| 1.71 | 0.13 |
| 1.25 | 0.88 |
| 2.13 | 1.38 |
| 1.29 | 0.13 |
| 1.58 | 0.25 |
| 4.00 | 2.63 |
| 1.42 | 1.38 |
| 1.08 | 0.50 |
| 1.83 | 1.25 |
| 0.67 | 0.75 |
| 1.13 | 0.00 |
| 2.71 | 2.38 |
| 1.96 | 1.13 |

**OR**

b. The following data pertains to IQ levels in 2 sets of individuals. Are there differences between the 2 sets?(t tab= 2.048, 2.763)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IQ-PKU | 89 | 98 | 116 | 67 | 128 | 81 | 96 | 116 | 110 | 90 | 76 | 71 | 100 | 108 | 74 |
| IQ-Normal | 77 | 110 | 94 | 91 | 122 | 94 | 121 | 114 | 88 | 91 | 99 | 93 | 104 | 102 | 82 |

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