2021
(JUNE)

BOTANY
HONOURS
BOT-309
NINTH PAPER
(Cell Biology, Genetics, Biotechnology & Plant Breeding, Biostatistics, Computer Applications & Bioinformatics)
Theory

Full Marks: 50

The figures in the margin indicates full marks for the questions
Be precise and concise. Unnecessarily long answer will lead to getting less marks
Answer all the questions

1. Describe the mechanism of transport of sodium ions and glucose via Na^+-glucose symporter. How is it different from transport of glucose via glucose transporter (GLUT)? 8+2=10

Or

State the sequence of events that occur at M phase checkpoint along with a diagram. Why will a cell not cross this checkpoint if all the kinetochores are not bound to spindle fibres in syntelic arrangement? 8+2=10

2. a) Describe Hardy-Weinberg equilibrium

   b) In a human population in Hardy-Weinberg equilibrium, 8% of men are affected with red-green X-linked colour blindness.
   Then, work out the frequency of women, (i) who are carriers of this disease, (ii) who have the disease. 6+2+2=10

Or

   a) Along with a suitable diagram, describe the mechanisms of crossing over (double strand break model only)

   b) A and B genes are linked with a recombination frequency of 12%. An AABB individual was crossed to an aabb individual to produce AaBb offspring. The AaBb offspring so obtained were then test crossed to aabb individuals. If this cross produced 1000 offspring, what are the predicted numbers of offspring of the four genotypes: AaBb, Aabb, aaBb and aabb? 6+4=10

3. Describe electroporation. State its advantages and disadvantages. 5+3+2=10

Or

Explain 'dominance hypothesis' of heterosis. Discuss its difference from 'overdominance hypothesis. 5+5=10

4. Describe 'stratified random sampling' method. How does it differ from 'Cluster sampling'? 6+4=10

Or

For a random sample of 10 chickens fed on diet A for a certain period of time, the increase in weight in grams were 100, 110, 60, 150, 170, 135, 120, 90, 150, 95. For another random sample of 12 chickens of the same breed of the same age fed on diet B for the same duration, the increase in weight were 230, 130, 220, 150, 120, 140, 180, 120, 210, 100, 160, 200.
Test whether the diets A and B differ significantly as regard the effect on increase in weight.
(Given, $t_{0.05}$ at 20 υ is 2.09) 10

5. Differentiate between SSD (Solid State Drive and HDD (Hard Disk Drive) with 8 points. Why do power users use both SSD and HDD in their computer systems? 8+2=10

Or

   a) Discuss the advantages and limitations of using Microsoft excel as a statistical tool

   b) Write the steps for conducting 'paired t-test' in excel. 4+2+4=10

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