2021
(JUNE)

## BOTANY

HONOURS BOT-308

## EIGHT PAPER

## (Natural Resources, Ecology, Plant Physiology, Biochemistry and Molecular Biology) Theory

## Full Marks: 50

## The figures in the margin indicates full marks for the questions Answer all the questions

1. Dams are built for flood control, generation of hydroelectricity and irrigation but they have their ownecological backlashes. Discuss the negative impacts of dam construction on the environment andmankind.10
Or
Define 'Forest' according to FAO. Describe the major forest types found in India. ..... 10
2. Give an account on the structural and functional components of an ecosystem. ..... 10
OrDefine Primary and Secondary air pollutants by giving examples? Discuss the effects of air pollutionon the environment and human health. 4+6=10
3. What are micronutrients? Discuss the roles of Copper, Molybdenum, Boron and Zinc in plants.

$$
2+8=10
$$

Or
List the three stages of Calvin Cycle. Describe the reaction steps in these stages in the form of word diagram by citing the enzyme involved.
4. Discuss the role of water as:
a) a universal solvent
b) a medium of life.

## Or

Describe briefly enzyme kinetics. Derive Michaelis-Menten equation for an enzyme catalysed reaction.
5. Describe the various steps of DNA Replication in Prokaryotes with suitable diagrams.

Or
Differentiate between inducible and repressible operons. Explain how concentration of tryptophan regulates 'Tryptophan Operon' in E. coli.

# (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 $\mathrm{Na}^{+}$-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: $\mathrm{AaBb}, \mathrm{Aabb}, \mathrm{aaBb}$ and aabb? $\quad 6+4=10$
3. Describe electroporation. State its advantages and disadvantages.

Or
Explain 'dominance hypothesis' of heterosis. Discuss its difference from 'overdominance hypothesis.
4. Describe 'stratified random sampling' method. How does it differ from 'Cluster sampling'? $\quad 6+4=10$

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, $\mathrm{t}_{0.05}$ at 20 v is 2.09)
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.

