2007

BOTANY

PAPER-X

Full Marks : 100

Time : 4 hours

The figures in the right-hand margin indicate marks

Candidates are required to give their answers in their own words as *far as practicable*

Illustrate the answers whenevernecessary

Write **the answers** to Question of each Group **in separate books**

(Environmental Botany Special)

GROUP -A

[Marks : 201

Answer any *two* questions of the following

1. Answer briefly the following questions *(any five)* 2x5

   (a) What do you mean by systemic acquired **resistance** (SAR)? Name one compound that imparts SAR to **plants.**

(b) Name two heavy matals whose concentration when exceeds trace level become toxic to plants.

(c) What is the full form of TTC, and indicate one of **its use.**

(d) What are TEOPOB (TP) genes?

(e) What is meant by floral evocation ?

(f) Name one stress hormone.

(g) What is Osmotic adjustment of cells?

2. Justify the statement that `environmental stress is regulated by alteration of gene expression in plants.' Name four abiotic stresses that are often been encountered in plants. Which plant pigment acts as a defence against ultraviolet radiation stress'? 5+4+1

3. How viability or nonviability maybe detected in some seed samples ? Discuss briefly some methods to retain viability of seeds. 2+8

4. (i) Discuss in brief the physical properties of soil.

(ii) Mention in brief the effects of environmental stress on flowing of plants. 5+5

GROUP-B

(Marks : 20)

***[Environmental** Microbiology]*

Answer any *two* questions

5. (i) What are the different strategies adopted by micro-**organisms** for antibiotic resistance.

(ii) **Discuss the roles of** BGA and Azotobacter as **biofertilizer.** **5+5**

6. (i) Discuss the possibility of using microbes for **bioremediation** of oil **spills in ocean.**

(ii) **Illustrate** the role of different microbes in the sulphur cycle in nature. 5+5

7. What do you **mean** by biopesticide? Mention the different biopesticides used in agriculture. 2+8

8. **(i) Discuss** the different beneficial applications of cloning technology.

(ii) Outline the process of wastewater treatment which is followed in large cities. 6+4

GROUP-C

(Marks : 20)

Answer any *two* questions

9. (1) What are the causes of deforestation?

(d) **What is the present status of forests in India?** **6+4**

10. Discuss the management of 'Biosphere Reserves' with special reference to Sunderban. **10**

11. Write short notes on any *two* of the **following:** **S x 2**

(i) Intengible benefits of forest

(ii) Project Elephant

(iii) Role of mycorrhiza in waste land development.

GROUP-D

(Marks : 40)

Answer Q. No. 12 and any *two* from the rest

12. Write short notes on the following (any *five) :* 2x5

(i) Earth summit

(ir) Bio-monitoring

(iii) Biogeochemical cycle

(iv) Neurotoxic pollutants

(v) Ramsar convention

***(vi)* Montreal protocol**

***(vii)* El Nino**

(***viii***) **Soil-building** property of **mangroves.**

13. Define greenhouse effect. **Mention three major greenhouse gases**. Write briefly **the impact of this phenomenon on agriculture** forestry. 2+3+(S+5)

14. Define biodiversity. **Enumerate the reasons of biodiversity loss. Discuss** briefly the **major conservation strategies** for checking biodiversity loss. 2+5+8

15. What is Acid **rain** ? Discuss the harmful effects of acid precipitation on ecosystems. 3+12

(Ecology and Taxonomy Special)

Answer Q. No. l and 6 and any *four* **taking** *two* from each Group

GROUP.

(Ecology)

1. (a) Define any *four* of the following : x4

(i) Edge effect

(ii) Biological invasion

(iii) Eutrophication

(iv) Biomonitoring

(v) Phytoremediation

(vi) Hot-spots

(vii) Global warming.

(b) Comment on the following (any *four) :* 3×4

(i) Deep ecology

(ii) Grassland

***(iii)* Biopesticide**

(iv) Gauge's principle

(v) ElNiflo

(vi) Bhopal tragedy

(vii) CFCs.

2. Mention the different sources of water pollution. Discuss the harmful effects of **any two water pollutants on ecosystems.** 5+(5+5)

3. Classify environmental stresses. Discuss the various biochemical adaptations of aquatic plants. 5+10

4. Define biodiversity. Write briefly the economic and ecological roles of biodiversity. Comment on the *in-sits* conservation of Indian biodiversity. 3+(3+3)+6

S. **Define** Wetland. **Enumerate** the environmental and **economic** values of wetlands. 3+(6+6)

GROUP-B

(Taxonomy ofAngiosperms)

6. (a) Write on any *six* of the following : 2x6

(i) What is `Index Kewensis'?

(ii) What is phylocode?

(iv') What is endicot? Give an example.

(iv) What is basal angiosperms? Give an example.

(v) What is the full form of TEM and SEM?

(vi) What do you mean by megadiversity centre?

(vii) What is 'hotspot'? Give two examples.

(viii) What is the full form of 'ELISA'?

(ix) What is 'NPC' system? Who proposed this terminology?

(x) What do you **mean** by Coastal and Estuarine vegetation ?

(*b)* Differences between (any *two*) of the following: 4 x 2

(i) Synonym and Tautonym

(ii) Nomenclature of cultivated and hybrid plants

(iii) Epitope and Paratope

(iv) Parasite and Hemiparasite

(v) Macromolecules and Micromolecules in taxonomic study.

7. What are Insectivorous plants? Describe the adaptive features, distribution and their phylogenetic relationships with other group of plants. Name two endemic parasitic angiosperm from Eastern Himalayan region. Name two root parasites. 2+(3+3+3)+2+2

8. Write the salient features of the subclass coryophyllidae. Mention the putative relationships among its orders. Why this group is also called centrospermae? 7+5+3

9. What is Chemotaxonomy? What are the steps involved in chemotaxonomical studies? Discuss the major phytochemical characters of taxonomic relevance. Give two important phytochemical characters in solving taxonomic problems. 2+5+5+3

10. Discuss the aims of studying taxonomic literature. Describe the different taxonomic literatures pertaining to teaching and research. 5+(5+5)

(Cytogenetics and Molecular Biology]

Answer Q. No. I and any *five* from the rest

1. Answer any *ten* of the following : 2x10

(a) What is meant by C-value paradox?

(b) What is a binary vector?

(c) Name the important gene located within the T-DNA of Ti plasmid.

(d) What is the significance of NOR ? Why does it behave like heterochromatin?

(e) Contrast penetrance and expressivity in the **inheritance** of a character.

(f) How does trans splicing differ from cis splicing?

(g) What is telomerase ? How does it act?

(h) Define allopatric speciation.

(i) What kind of DNA library is to be constructed to facilitate evolutionary study and why?

(j) What is a spliceosome?

(k) Define genome imprinting with example.

(1) How are the defective elements of transpon mobilized in a cell in presence of the normal ones?

(m) What is genetic drift?

(n) What is the shine dalgarno sequence? State its significance.

(o) Mention the utility of polylinker in a vector for genetic engineering. How is the incorporation of a desirable gene in the vector ensured ?

(p) What is founder effect in speciation? How would it **influence** the genetic make up of population?

2. What are the major chemical constituents of eukaryotic **chromosomes** ? With suitable diagram discuss the higher **order structure** of eukaryotic chromosome organization giving emphasis on DNA packaging. Elucidate the ultra-**structural** features of polytene chromosomes. What is the significance of `chromosome puffing'? 2+8+4+2

3. What are the major check points of cell cycle? Critically **discuss** the molecular aspects of regulation of cell cycle **in yeast**. What would be the meiotic chromosomal configuration of an allohexaploid with 2n = 48 chromosomes at meiotic metaphase I stage? 3+10+3

4. Comment on the basic differences in gene regulation beween prokaryotes and eukaryotes. Describe the regulation of gene expression in eukaryotes at the level of processing of primary transcripts and transcription. What is meant by N-end rule of protein in gene regulation 2+12+2

5. How does population genetics differ from the Mendelian genetics? Explain Hardy Weinberg Law. Illustrate the roles of different factors influencing allele frequency. 2+4+10

6. Write short notes on any *two* of the following: 8x2

(a) Sanger's method of DNA sequencing

(b) DNA libraries

(c) Synthetic seeds

(d) Allopatric and sympatric speciation.

7. What is transgenesis ? Which method would you prefer to send a foreign gene in a plant cell in absence of a biological vector and why? Give an account of transgenic plants with reference to herbicide and insecticide resistance. 2+2+12

8. How would you produce a hybrid plant by passing the sexual method ? Describe the detail procedure of it. Enlist the indices by which the hybrid nature of the produced plants can be confirmed. 2+12+2

9. What are the characteristics of restriction **endonucleases?** Why are these **enzymes useful in genetic engineering?** Critically **discuss the essential** steps adopted in DNA **fingerprinting technique**. Mention two applications of PCR? 2+2+8+4