2014

M.Sc.

4th Semester Examination

BOTANY

PAPER—BOT-402

Full Marks : 40

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

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

Illustrate the answers wherever necessary.

Special Paper

Set—I

(*Advanced Plant Taxonomy*)

Answer *all* questions.

1. Answer any *five* of the following : 5×2

(a) What are the full form of ICN and IPNI ?

(b) Name one mangrove plant which have 'Knee' like pneumatophore and mention its family.

(c) What do you mean by 'salt resistance'? Give an example.

(d) What is 'sporopollenin'? Mention its function.

(e) What is the difference between 'Journal' and 'News Letter'? Give example from each.

(f) Write the scientific name one roof parasitic angiosperm belongs to an endangered category. Mention its family name.

(g) Name two key characters of the subclass 'Rosidae'.

(h) Define 'Craddle of Angiosperms'.

(i) Name one primitive living angiosperm and mention its family name.

(j) Define 'toximetrix'. Who has coined the term?

2. Write short notes on any *two* : 5×2

(a) Index Kewensis.

(b) Eudicots.

(c) Megadiversity Centre.

(d) Lilüdae .

(e) Monographs and Revisions.

3. Answer any *two* of the following : 10×2

(a) What are the basic differences between holo and hemiparasites? Mention four such parasitic plants , their families distribution, adaptive features and phylogeny. 2+6+2

(b) Define taxonomic literature. Mention with examples the different kinds of taxonomic literature. 2+8

(c) Define 'Mangrove'. Mention the general characteristics of 'mangal' and its adaptive features. How does the zonations occur in a Mangrove ecosystem ? Discuss its phylogeny. 1+4+2+3

(d) What is biodiversity ? Mention the importance of biological diversity for human race. Discuss in detail the levels of biodiversity. How do we mathematically measure biodiversity ? 1+1+5+3

Set—2

(Ecology and Biodiversity)

Answer Q. No. *1* and any *three* from the rest.

1. Comment on the following (any *five*): 2×5

(a) Wetlands.

(b) Global Warming

(c) Pesticide.

(d) *Minamata* disaster.

(e) Growth curves.

(f) Green house gases.

(g) CITES.

(h) Cultural Eutrophication.

2. Define stress. Classify the commonly prevalent environmental stresses. Comment on the adaptive strategies of mangroves to excess salinity. 2+4+4

3. What is an Alien Invasive Species (IAS) ? Discuss the harmful affects of the invasive species in continuation of biodiversity. 2+8

4. What is Phytoremediation ? Discuss the different steps of phytoremediation process. 2+8

5. Define population. Enumerate the different attributes of a population. Comment on r-strategy and k-strategy in expansion of populations. 2+4+(2+2)

6. Write short notes (any two) on : 2×5

   (a) National Park.

   (b) Ramsar Site.

   (c) *El Nino.*

   (d) traditional conservation of biodiversity.

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Set—3

(*Microbiology*)

Answer Q. No. *1* and any *three* from the rest.

1. Answer any *five* questions : 2×5

(a) Write down two important characters of Rickettsia.

(b) Write down the mode of action of ethanol and phenol on micro organism.

(c) What is BLAST ? Which BLAST programme will you run for 16s rDNA sequences ?

(d) Give example each of a green sulfur and purple sulfur bacteria.

(e) Write an application of glutamic acid. Write the scientific name the microorganism used in its industrial production.

(f) What are memory cells ?

(g) What is allosteric enzyme inhibition ?

(h) Name a microorganism used in recovery of gold from its ore.

2. (a) Explain the means by which an individual generates the great diversity of antibodies produced in a normal life time.

(b) What are useful properties of hybridomas ? How are they developed ? 5+(1+4)

3. Compare the following (any *four*) : $2\frac{1}{2} \times 4$

   (a) Acidophilous milk and Kefir.

   (b) Nitrification and nitrogen fixation.

   (c) Gram staining and acid fast staining.

   (d) Prior and viroid.

   (e) Salk and Sabin vaccine.

   (f) Aglutinin and precipitin reaction.

   (g) Magnetosome and chlorosome.

4. (a) Write down the structure of nitrogenase. Schematically present how does *Rhizobium* penetrate a plant root and forma nodule.

   (b) What is secondary sewage treatment ? Elaborate any one of such treatment process. (2+4)+(1+3)

5. Write short notes (any *four*) on : $2\frac{1}{2} \times 4$

   (a) Leg-haemoglobin.

   (b) Topoisomerase.

   (c) Industrial production of citric acid.

   (d) Methylase.

   (e) Mycoplase.

   (f) Bacterial chlorophyll.

   (g) Desulfurization of coal.

6. (a) Write down at least four properties of a cancerous cell.

   (b) Explain the function of the following in genetic engineering with suitable example :

   (i) Restriction endonuclease.

   (ii) Cloning vector.

   (iii) Expression vector. 4+(2+2+2)

Set—4

(*Mycorrhizal Biology*)

Answer Q. No. *1* and any *four* from the rest.

1. Answer any *four* questions : 4×2

   (a) What is the function of Hartigret ?

   (b) Why is VAM said to be obligate symbiont ?

   (c) What is Ericoid mycorrhizal ?

   (d) What is the function and life span of arbuscle ?

   (e) How do mycorrhizal interact with rhizobia.

   (f) What is Auxillary cell ?

   (g) Morphologically how does the *Glomus* species differ from *Sclerocystis* species.

   (h) Name two ectomycorrhizal fungal genera which prefer to form association with conifers.

2. Answer any *two* : 4×2

(a) What are the reasons of depletion of mycorrhizal propagules in soil ?

(b) How is the soil phosphorus made available to plant by Mycorrhiza.

(c) How is VAM applied of field level.

3. What is PSM ? How does it affect VAM and the mycorrhizal plants. 2+6

4. Explain with examples the role of fungicides in mycorrhizal development. 8

5. Inoculation of plant with ectomy corrhizal fungi is easier than VAM fungi. Why ? How is the VAM icoculum prepared ? 2+6

6. Write briefly about the role of mycorrhiza in Phytore mediation with special reference to heavy metals. 8

7. Write short notes on any *two* : 4×2

(i) Role of Mycorrhizal in disease control.

(ii) Non nutritional role of mycorrhizae.

(iii) Soil pH and Mycorrhiza.

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Set—5

(*Palacobotany and Palynology*)

1. Answer any *five* of the following : 2×5

(a) What is meant by a 'conglomerate'?

(b) Define 'dip' and 'strike' of a bedded sequence.

(c) What is the emended version of ICBN. In which International Botanical Congress meeting did the name change occur?

(d) What is meant by the 'Organic sapropel'?

(e) Mention two important megafloral elements known from the Parsora Formation.

(f) What is the 'asthenosphere'?

(g) Define the half-life of a 'radioelement'.

(h) What are 'source rocks' and 'reservoir rocks' in a petroliferous basin?

2. Answer any *two* of the following : 5×2

(a) Explain briefly the 'Principle of priority' of plant names. Mention the starting point date and relevant publication of validly published names of fossil plants. 3+2

(b) State the theory of 'continental drift' as stated by Wegener. Mention the constituents of ancient 'Gondwana Land' and 'Laurasia'. 3+1+1

(c) Describe the processes through which peat becomes transform into coal. Mention the various ranks of coal.

3+2

(d) Briefly describe the megafloristics of 'Tiki' and 'Hartala' Formations.

$2\frac{1}{2}+2\frac{1}{2}$

3. Answer any *two* of the following : 10×2

(a) What do you understand by 'Indian Gondwana Sequence" ? Describe briefly the miofloristics of Lower Gondwana in Damodar Valley Basin as per the two-fold classification of the sequence. 2+8

(b) What is the age of 'Karewas Formation'? Give an account of the pleistocene vegitational history of Kashmir Valley as revealed from pollen analyses. 1+9

(c) Explain briefly the theory of 'Plate Tectonics'. Discuss the different types of plate margins involved inplate motion. Name the 'major' and 'minor' plates of the earth. 2+5+3

(d) Name the formal subdivisions of the Precombrian sequence. Describe the different life-forms met with through the sequence. 2+8

Set—6

(*Plant Genetics and Biotechnology*)

Answer Q. No. *1* & *5* and *three* questions from the rest, taking at least one from each unit.

Unit—I

1. Answer any *five* of the following : 1×5

(a) What is cryptopolyploidy ?

(b) What is allopolyploidy ?

(c) What is Robertsonian translocation ?

(d) Give an example of a genus with diffuse centromere.

(e) How does B chromosome differ from A chromosome ?

(f) What features make a karyotype asymmetric ?

(g) What is meant by C-value of DNA ?

(h) What is meant by apomyxis ?

2. What basic changes in genome are brought in plants to cope up with environment ? Explain it with respect to gymnosperm and xerophytes. Comment on the significance of synteny. 2+3+5

3. What is meant by proto X and proto Y chromosome ? Name a plant species with clear heteromorphocity of sex chromosomes. Illustrate the six based chromosomal diversity in angiosperm with respect to two species. 2+1+7

4. Define karyotype. Elucidate with suitable examples the trends of evolution of karyotype in plants. 2+8

Unit—II

5. Answer any *five* of the following : 1×5

(a) Which gene of Tiplasmid gets incited by the presence of plant phenolic substance — acetosyringone ?

(b) What is marker gene ?

(c) name a protein, along with its source, that may impart insect resistance to plants.

(d) What is meristemoid ?

(e) How does Evan's blue help detect living and dead protoplasts ?

(f) What does 18 : $1\Delta^{9c}$ mean for a fat molecule ?

(g) What is microinjection technique ?

(h) Give an example of the chemical used as Osmoticum in protoplast culture.

6. Distinguish between IEDC and PEDC in relation with somatic embryo. What is cleavage polyembryony ? Which plant group does show it ? Critically discuss the rule of different factors that influence somatic ambryo genesis. 2+1+1+6

7. Write brief notes on the following : 5×2

(a) gene gun;

(a) herbicide resistance in plants.

8. What is molecular farming ? Why is it also called "pharming" ? Give a brief account of molecular farming of carbohydrate. 1+1+8

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