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BOTANY

(Major)

Paper : 5.1

(Microbiology and Immunology)

Full Marks : 60

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Fill in the blanks :   1×7=7

    (a) The word 'bacteria' was coined by ____.

    (b) The plant growth promoting Rhizobacteria have been discovered by ____.

    (c) The immunoglobulin responsible for allergic symptoms is ____.

    (d) Genetical change of bacteria by taking cell-free naked DNA is called ____.

    (e) 'Kuru' disease of human being is caused by ____.

(Turn Over)

(f) Ribosomal RNA extensively used for microbial taxonomy is ____.

(g) The infectious circular single-stranded RNA dependent on other virus is ____.

2. Write in brief on any *four* of the following : 2×4=8

(a) Interferon

(b) Acquired immunity

(c) Bacterial binary fission

(d) Viroids and disease caused by them

(e) Mycoplasma

(f) Germ theory of disease

3. Answer any *three* of the following : 5×3=15

(a) Describe the major nutritional groups of microorganisms citing suitable examples.

(b) Describe the molecular trends of bacterial taxonomy.

(c) Describe the methods of isolation of soil microorganisms.

(d) Write in brief about the lytic multiplication cycle of bacteriophage.

(Continued)

(e) Write in brief about the application of microbiology in soil.

(f) Write a note on cell-mediated immunity.

(g) Write the mechanisms of transmission of plant viruses.

4. Answer the following questions : 10×3=30

(a) What is biogeochemical cycle? Give a detailed account of cycling of elemental nitrogen in nature and role played by microorganisms. 1+9=10

Or

What is water microbiology? How potability of water can be determined? 2+8=10

(b) What are the chemical compositions of bacterial cell wall? Give a detailed structure of Gram-positive and Gram-negative bacterial cell wall. 3+7=10

Or

Write the general characteristics of Rickettsiae and Chlamydiae. Also mention diseases caused by them. 10

(Turn Over)

(c) What are antibodies? Describe the structure of a typical antibody molecule. Mention the important classes of antibodies.　　　　　2+6+2=10

Or

What is meant by non-specific resistance? Describe the role of skin and mucous membrane in defending pathogenic microorganisms.　　1+9=10

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BOTANY

(Major)

Paper : 5.2

(Plant Pathology and Lichen)

Full Marks : 60

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

1. Answer the following questions :   1×7=7

   (a) Which penetrating structures are formed by fungal pathogens?

   (b) What is chlorosis?

   (c) Who discovered Bordeaux mixture?

   (d) What are necrotrophs?

   (e) Which disease was responsible for Irish famine?

(2)

(f) What is the most destructive disease of sugarcane?

(g) Write the name of a reindeer moss.

2. Write brief notes on the following :   2×4=8

   (a) Systemic infection

   (b) Primary inoculum and secondary inoculum

   (c) Crop rotation

   (d) Disease forecasting

3. Write briefly on any *three* of the following :
   5×3=15

   (a) Koch's postulates

   (b) Pathotoxin and vivotoxin

   (c) Anthropochory

   (d) Hypersensitive response

   (e) Soil fumigation

   (f) Classification of lichen

(3)

4. Give an account of dissemination and transmission of plant pathogens.   10

   Or

   Write notes on the following :   5×2=10

   (a) Yellow mosaic of bhindi

   (b) Leaf spot disease of cabbage

5. What is an epidemic? Discuss the factors related to the development of an epidemic.
   2+8=10

   Or

   Give an account of the symptoms, causal organism, disease cycle and control measures of black stem rust of wheat.
   2+2+3+3=10

6. Discuss the symptoms, causal organism, disease cycle and control measures of grey blight of tea.   10

   Or

   Give an illustrated account of methods of reproduction in lichens.   10

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2018

BOTANY

(Major)

Paper : 5.3

(Cytogenetics, Plant Breeding and Biometrics)

Full Marks : 60

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Fill in the blanks/Choose the correct answer :   1×7=7

   (a) One important type of gene interaction in which one locus masks/ inhibits the expression of a non-allele or genotype at a distant locus; such interaction is called _____.

   (b) Garden pea (*Pisum sativum*) contains _____ pairs of chromosomes.

   (c) Polytene chromosome found in _____.

(*Turn Over*)

(d) Down's syndrome is resulted from trisomy of chromosome number _____.

(e) When both alleles of a pair are fully expressed in a heterozygote, they are called _____ alleles.

(f) The cross of an F_1 hybrid to recessive parent is known as _____.

(g) Male sterility is controlled by

   (i) nuclear genes only

   (ii) cytoplasmic factors only

   (iii) both nuclear genes and cytoplasmic factors

   (iv) None of the above

2. Answer the following briefly :   2×4=8

(a) Differentiate between dominance and co-dominance.

(b) Mention the processes by which polyploids might occur in nature.

(c) How does colchicine treatment result in chromosome doubling?

(d) A colour-blind child is born to a normal couple. Work out a cross to show how it is possible.

     (Continued)

3. Answer any *three* of the following questions :   5×3=15

(a) Define extra-chromosomal inheritance. Which cell organelles are involved in extra-chromosomal inheritance? Differentiate between maternal effect and extra-chromosomal inheritance.   1+2+2=5

(b) How euploids differ from aneuploids? Give some examples of commercially successful polyploids.   2+3=5

(c) Discuss the significance of chromosome inversions and translocations in evolution.   5

(d) Define linked genes. Distinguish between complete linkage and incomplete linkage.   2+3=5

(e) Discuss the importance of backcross method in plant breeding.   5

4. Answer any *three* of the following questions :   10×3=30

(a) Define crossing-over. Write about the importance of crossing-over. In which stage of meiosis crossing-over takes place? Discuss in brief, the cytological basis of crossing-over.   2+2+1+5=10

(Turn Over)

(b) What is hybridization? Describe in brief various steps involved in hybridization. Mention the difficulties associated with distant hybridization. 2+6+2=10

(c) Define heterosis and inbreeding depression. Mention some important manifestations of heterosis. Discuss about the application of heterosis in crop improvement with suitable examples. 2+2+6=10

(d) Which agency in India functions as central agency for introduction of economically important germplasms? Why is quarantine necessary for plant introduction? Discuss in brief the objectives and procedure of plant introduction. 2+2+6=10

(e) Write explanatory notes on any *two* of the following : 5×2=10

(i) Hardy-Weinberg equilibrium

(ii) Non-Mendelian inheritance

(iii) Chi-square test for goodness of fit

(iv) Standard deviation

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BOTANY

(Major)

Paper : 5.4

(Applied Botany)

Full Marks : 60

Time : 3 hours

The figures in the margin indicate full marks
for the questions

1. Fill in the blanks/Answer the following : 1×7=7

   (a) Name the microbe which is responsible for production of commercial ethyl alcohol.

   (b) Write the name of first genetically modified crop introduced in India.

   (c) Name the person who was behind the green revolution concept in India.

   (d) VAM stands for _____.

(Turn Over)

(e) Which State of India has the highest area under shifting cultivation?

(f) The agar was first extracted from _____.

(g) Name one growth hormone present in root tips.

2. Answer the following questions :   2×4=8

(a) Define allergens.

(b) What is the meaning of polyploidy?

(c) Write the scientific names of two edible fungi.

(d) What do you mean by bioremediation?

3. Write on / Answer any *three* of the following :
    5×3=15

(a) Role of lichen as pollution indicator

(b) Write a note on algal-based medicines.

(c) Elucidate the importance of mycorrhiza in germination.

(d) Write a note on positive impacts of indoor gardening.

(e) Is mutation a natural phenomenon? Justify your answer.

4. Answer any *three* of the following questions :
    10×3=30

(a) What do you mean by 'soil fertility'? Write a note on the role of algae in improving of soil fertility citing suitable examples.

(b) Note down the different reasons of deforestation. Write about its impact on the climate of North-East India.

(c) "Breeding can be a useful tool for disease resistance in crops." Justify your answer.

(d) Define mycotoxins. Give a few suitable examples of organisms producing mycotoxins. How does it affect human health?

(e) Discuss the importance of plant growth regulators in agriculture.

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