PG Even Semester (CBCS) Exam., May—2017

LIFE SCIENCE AND BIOINFORMATICS

(4th Semester)

Course No. : LSBCC–402

Full Marks : 70
Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

Botany Students will answer from LSBCC–402 (B) and Zoology Students will answer from LSBCC–402 (Z)

Course No. : LSBCC–402 (B)

(MOLECULAR GENETICS AND PLANT BREEDING)

1. *(a)* Compare the structure and organization of prokaryotic gene and eukaryotic gene. 10

(b) Add a note on pseudogenes. 4

OR

2. Discuss the post-transcriptional modification of genes prevalent in eukaryotes. 14

3. Define gene mapping. What is three-point test cross? Describe the three-point test cross method used for gene mapping. 2+2+10=14

OR

4. Write an elaborate account on microsatellite markers and marker-assisted breeding in plants. 6+8=14

5. *(a)* What do you mean by extranuclear inheritance? Add a note on plastidial inheritance. 3+6=9

(b) With a suitable model, describe RNAi pathway. 5

OR

6. *(a)* Briefly describe the structural components of plant gene. 8

(b) Write a note on plant gene expression. 6

7. *(a)* What are the prerequisites for Hardy-Weinberg law? 8

(b) In a plant species, the ability to grow in soil contaminated with nickel is determined by dominant allele.

(i) If 60% of the seeds in a randomly mating population are able to germinate in contaminated soil, what is the frequency of the resistant allele?

(ii) Among the germinated plants, what is the proportion of homozygotes? 3+3=6

OR

8. *(a)* What are the components of phenotypic variation?

(b) With suitable mathematical model, explain how phenotypic variation is measured. 7+7=14

9. What is heterosis? Describe different types of heterosis. Write a note on various theories associated with phenomenon of heterosis. 2+5+7=14

OR

10. Define self-incompatibility. Discuss the mechanism of single-locus self-incompatibility in plants. 2+12=14

Course No. : LSBCC–402 (Z)

(ANIMAL PHYSIOLOGY)

1. *(a)* Describe the structure and function of hemoglobin. 7

(b) Write in detail on hemopoiesis. 7

OR

2. Write a note on the factors involved in blood clotting. Write in detail on the mechanism of blood coagulation. 4+10=14

3. Write notes on the following : 7×2=14

(a) Pulmonary volume and capacities

(b) Alveoli

OR

4. Describe the neural and chemical regulation of respiration. 14

5. What are the functions of mammalian kidney? Describe the structure of nephron. Briefly elaborate the role of juxtaglomerular apparatus in regulating kidney functions. 4+4+6=14

OR

6. Describe in detail the process of tubular reabsorption in nephron. Add a note on glomerular filtration rate. 9+5=14

7. What are glial cells? Describe the structure and functions of glial cells with suitable diagrams. 2+12=14

OR

8. Write notes on the following : 7×2=14

(a) Mechanism of muscle contraction

(b) Acetylcholine and GABA

9. Describe the cellular response to toxic agents with special reference to antioxidant defence system. 14

OR

10. Write notes on the following : 7×2=14

(a) Basic mechanism of action of toxic agents

(b) Role of free radicals in cellular metabolism

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