

**PG CBCS**  
**M.Sc. Semester-III Examination, 2020**  
**ZOOLOGY**  
 PAPER: ZOO 303  
**Special Paper: Genetics and Molecular Biology**

**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.*

**Group-A**  
**(Marks: 20)**  
**(Genetics)**

**1. Answer two questions of the following: **2x10=20****

- a. What are the roles of tra, sxl and dsx gene in sex determination in Drosophila?
- b. Describe briefly the process of apoptosome formation and its binding with caspase 9 leading to apoptosis with diagram.
- c. Enumerate the function of sry gene and sox 9 gene in human sex determination. 5+5
- d. What do you mean by chromatin remodelling? How can you differentiate centromere from telomere as per their DNA sequence? What is mean by satellite DNA? What is difference between repetitive DNA and satellite DNA? 2+3+2+3
- e.
  - i. Outline the mechanism of two step lariat model of splicing with appropriate diagram.
  - ii. Mention the proapoptotic function of BH-3 only protein. 5+5

**Group-B**  
**(Marks: 20)**  
**(Molecular Biology)**

**2. Answer two questions of the following: **2x10=20****

- a. What happens to mRNA before it leaves the nucleus? What are the three steps in processing a eukaryotic pre mRNA? What happens in the processing of the pre mRNA? Why does eukaryotic mRNA need processing? 2+3+3+2

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- b. What are the main steps of a signal transduction pathway? How do toll-like receptors work? Use pictures and diagrams where possible to describe their function. Identify which groups organisms contain TLRs, and describe as many cellular processes as you can in which TLRs play a role. 2+2+3+3
- c. What features are found in all transposable elements? Do transposable elements reduce genome size? How transposons are duplicated inside a genome? What are the characteristics of the LTR retro elements present in human genome? 2+2+3+3
- d. Write two basic characteristics of cancer cells. How it is differ from normal cell? How does oncogene cause cancer? What do tumour suppressors do? How does p53 prevent cancer cells from cancer forming? 2+2+3+3
- e. What is gene therapy? What are the types of gene therapy? What risks are associated with gene therapy? How are genes delivered? 2+3+2+3

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