2023

(May/June)

BIOTECHNOLOGY

(Honours)

(Molecular Biology and Immunology)

Marks : 56

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer Question No. **1**, which is compulsory and *any* **four** from the rest

1. Explain the following in brief : 3×4=12

(a) The replicon model

(b) Wobble hypothesis

(c) The skin as a barrier for the innate system

(d) Attenuation

2. *(a)* Explain the Hershey-Chase experiment with the help of appropriate figures. 6

(b) What are the features of a secondary immune response that distinguishes it from a primary response? 3

(c) What is the difference between active immunity and passive immunity? 2

3. (a) Discuss the roles of elongation factors in translation in prokaryotes. 6

(b) Write a short note on the process of transformation. 3

(c) What are the primary roles of thymus as a lymphoid organ? 2

4. (a) How are Okazaki fragments processed in prokaryotes? 5

(b) Write briefly about the professional antigen presenting cells of the immune system. 6

5. (a) Discuss the important applications of reverse transcriptase. 6

(b) Compare and contrast the salient features of a prokaryotic and a eukaryotic genome. 5

(Continued)

6. (a) What happens to the lac operon—

(i) in the absence of lactose;

(ii) in the presence of lactose? 3+3=6

(b) "Some operons are also subjected to positive control, such as catabolite activator protein (CAP)." Explain with appropriate figures. 5

7. (a) Explain with figures how endogenous antigens are processed and presented. 5

(b) "All antigens are also immunogens." Justify your answer. 2

(c) How does tRNA function as an adaptor in translation? 4

8. (a) Discuss the event during the 5′-capping of the RNA in eukaryotes and its function. 3+1=4

(b) What do you understand by splicing? 4

(c) "IgM functions more effectively in activating the classical complement pathway." Justify the statement. 3

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