Shahjalal University of Science & Technology, Sylhet
Department of Biochemistry and Molecular Biology
B. Sc. (Hons) 4th Year 2nd Semester Final Examination, 2014
Course No. : BMB427, Course Title: Applied Immunology
Credit: **4** Total marks: **70** Time: **3** hours

Instructions:

- *Number in the right side indicates the marks of the question.*
- *Answer any two (2) questions from each Part (A and B).*

Part –A

1.	a)	What is soluble mediator? Write down the functions of the following cytokines; i) IL-2 ii) IFN-γ iiii) TNF-α iv) IL-12 v) IL-6	5.5
	b)	Deduce a general pathway of signal transduction by most Class I and Class II cytokine receptors.	5.0
	c)	Give a comparative view of peptide binding features by class I and class II HMC molecules.	3.0
	d)	Explain and illustrate- cytokine exhibits the attributes of pleiotropy, redundancy, synergism and antagonism while regulating cellular activity.	4.0
2.	a)	What are haplotypes? Schematically represent class-I MHC genes, mRNA transcripts and protein molecules.	4.0 (1+3)
	b)	What are the types of grafts on the basis of source? Illustrate the grafts versus host reaction.	5.0 (3+2)
	c)	Justify " Role of T cells is crucial in both sensitization and effectors stage of graft rejection"	5.0
	d)	Outline the immunosuppressive therapies used as preventive in allograft rejection.	3.5
3.	a)	What is regulatory T cell (Treg)? Discuss the role of Treg.	3.5
	b)	"T cell undergoes positive and negative selection during maturation" Explain the statement.	5.0
	c)	Compare and contrast between T cell and B cell development.	5.0
	d)	Give an overview of B-cell development in the bone marrow micro environment.	4.0

Part-B

4.	a)	What are co-stimulatory signals? Explain " Three signals are required for the activation of T cells".	5.0 (2+3)
	b)	Illustrate the underlying mechanism of regulation of T_H1 and T_H2 subset differentiation.	3.5
	c)	Define superantigens. Discuss the *T-dependent* (TD) and *T-independent* (TI) response of B-cells.	4.5 (1.5+3)
	d)	How is the germinal centre formed? Outline the sequences of B-cell activation and differentiation in the germinal centre.	4.5
5.	a)	What does the term hypersensitivity mean? Compare and contrast the mechanism of four types of hypersensitivity.	5.0 (1+4)
	b)	What is atopy? Briefly describe the early and late allergic responses in type-I hypersensitivity.	4.0
	c)	"Type-II hypersensitive response against Rh antigens causes hemolytic disease of the newborn" Justify.	5.5
	d)	Explain the statement; The effector phase of type IV hypersensitivity is induced by second exposure to a sensitizing antigen.	4.5
6.	a)	Define somatic hypermutation. Write the functions of the followings; RAG-1/2, TDT.	3.5 (1+2.5)
	b)	Discuss the mechanism of V(D)J recombination.	5.0
	c)	Illustrate the production of monoclonal antibodies by using hybridoma techniques.	4.5
	d)	How the presence and concentration of antibody can be detected by Sandwich ELISA? Discuss with principle.	4.5