

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FIFTH SEMESTER EXAMINATION, DECEMBER 2016

THIRD YEAR [BATCH 2014-17]

MICROBIOLOGY [Honours]

Paper : V (Gr. B)

Date : 19/12/2016

Time : 11 am – 1 pm

Full Marks : 45

Answer any five questions :

[5×9]

1. a) Write short notes on the following:– [2+2+2+1½+1½]
 - (i) Allotype
 - (ii) Isotype
 - (iii) Haplotype
 - (iv) Agreotype
 - (v) Paratope
2. a) Describe with an experiment the Scatchard equation of antigen-antibody interaction. [4]
 - b) What is the difference between Precipitation and Agglutination? [2]
 - c) What is haemagglutination? [1½]
 - d) What are mitogens? [1½]
3. a) How is adaptive immunity different from innate immunity? [2]
 - b) What are antigen-presenting cells? Give two examples. [1+1]
 - c) You have been given a radio labelled Hepatitis B antigen (HBsAg). How would you detect the infection of hepatitis in patients using the given antigen? [2]
 - d) What is haematopoiesis? [1]
 - e) What are cytokines? Give two examples of cytokines. [1+1]
4. a) Why heavy chain V_H segment can't join directly with the J_H segments in heavy chain gene arrangement? [2]
 - b) What are the basic functional differences between MHC class I and MHC class II? [2]
 - c) IgG functions more effectively than IgM in bacterial agglutination – Justify. [2]
 - d) Nucleated cell tends to be more resistant to complement mediated lysis – Justify. [2]
 - e) Name two autoimmune diseases which cause direct cellular damage. [1]
5. a) State whether the following statements are true or false with proper justification:–
 - (i) IL-4 decreases IgE production by B cells. [2]
 - (ii) Most T_{DTH} cells belong to the T_H 1 subset. [2]
 - b) A young girl who had never being immunised to tetanus stepped on the rusty nail and got a deep punctured wound. The doctor cleaned out the wound and gave the child an injection of tetanus antitoxin.
 - (i) Why was antitoxin given instead of a booster shot of tetanus toxoid?
 - (ii) If the girl receives no further treatment and steps on a rusty nail again 3 years later, will she be immune to tetanus? Justify your answer with proper explanation. [3]
 - c) Describe the complement activation step by the lectin pathway. [2]

6.
 - a) What do you mean by normal flora? Give an example of protozoan normal flora. [2+1]
 - b) What is the difference between mutualism and commensalism? [2]
 - c) Why is the skin usually not a favourable microenvironment for colonisation of bacteria? [2]
 - d) Briefly describe a cytotoxin. [2]

7.
 - a) Outline the effects of estrogen on the vaginal normal flora. [2½]
 - b) How do dental plaques form? [2½]
 - c) Why is the large intestine resemble a chemostat? [2½]
 - d) What do you mean by nosocomial infection? [1½]

8.
 - a) Write down the role of Type IV pili in bacterial pathogenesis. [3]
 - b) Give examples of tissue specificity and species specificity during bacterial adhesion to host tissue. [3]
 - c) What is the role of collagenase in bacterial pathogenesis? [3]

9.
 - a) Explain the terms:– (i) Septic shock, (ii) Toxigenesis. [1+1]
 - b) Write the salient features of an endotoxin. [3]
 - c) What do you mean by serum-resistant bacteria? Cite an example. [2+1]
 - d) What do you mean by quorum-sensing? [1]

10.
 - a) Discuss the different stages of biofilm formation. [4]
 - b) How does homoserine lactone help in quorum sensing? [3]
 - c) What are primary pathogens and opportunistic pathogens? [2]

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