MBBS FIRST PROFESSIONAL (PART-I)
MODEL PAPER FOR ANNUAL 2009
Biochemistry
(Short Essay Questions)

Max. Marks 32.5                                      Time Allowed 2 hours

1.  a) What are the intracellular events following the activation of Gq protein? 2
    b) Define osmotic pressure. What is the importance of osmotic pressure exerted
       by plasma proteins? 2

2.  a) A young lady presents to the clinic with complaints of alternating diarrhea and
    constipation. She complains of abdominal discomfort and bloating that is
    relieved with her bowel movement. She states that her episodes are worse in
    times of stress. She denies any blood in her diarrheal stools. Her physical
    examination is all within normal range. She has been prescribed a cellulose
    containing dietary supplement, which her doctor says will increase the bulk of
    her stool. She was diagnosed as a case of irritable bowl syndrome:
    i) What is the biochemical mechanism of this dietary supplement’s effect on
       the intestines? 1
    ii) What is the structure of cellulose? 0.5
    iii) What is hemicellulose? 0.5
    b) What do you understand by omega-3 fatty acids? What are the principal
       biologic functions of prostacyclin and leukotriene B4? 2

3.  a) What is the role of amino acid side chain (R group) in protein folding? Briefly
    describe the relationship of protein structure to its function. Give at least one
    example. 2
    b) What are different types of immunoglobulins? Give clinical significance of IgG
       and IgE. 1,1

4.  a) Define nucleosides and nucleotides. Write down important functions of
    nucleotides in human body. 2
    b) Write down the role of Selenium as an antioxidant. 2

5.  a) How can you differentiate competitive inhibition from the non-competitive
    inhibition of enzyme activity? 2
    b) Enumerate two clinically important enzyme inhibitors along with examples of
       enzymes inhibited by them. 2

6.  a) What is the mechanism of action of retinol in extraocular tissue? 2
    b) A woman who suffers from chronic peptic ulcer undergoes gastrectomy. After
       some years she starts suffering from lethargy, tiredness and ‘pins and needles’
       sensation in her lower limbs. The doctor on examination finds her to be
       anaemic and diagnoses PERIPHERAL NEUROPATHY. Her blood test reveals low
       Hb, 8.1 g/dl (normal 12-16 g/dl). Peripheral smear shows macrocytosis. The
       serum B12 level is 8ng/dl (normal 10-70 ng/dl):
       i) Which vitamin is likely to be deficient and why? 0.5
       ii) Write down two reactions in the body in which this vitamin is required as
           coenzyme. 0.5
       iii) What is folate trap hypothesis? 1
       iv) What is the biochemical defect underlying neuropathy? 0.5

7.   a) Define the terms: Body Mass Index (BMI), Basal Metabolic Rate (BMR), Waist
       to Hip Ratio (WHR), Resting Metabolic Rate (RMR), Thermogenic Effect of
       Food. 2.5
    b) What is glycemic index of food? 1.5

8.   What are thalassemias? Describe various types of alpha thalassemias? 1,3