

2021

**BIOCHEMISTRY — HONOURS**

**Paper : DSE-A-4**

**(Molecular basis of Non-infectious diseases)**

**Full Marks : 50**

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words*

*as far as practicable.*

1. Answer **any five** questions: 2×5
- (a) What is the molecular difference between normal haemoglobin, HbA and sickle cell haemoglobin, HbS?
  - (b) Can hypothyroidism affect blood sugar level?— Justify.
  - (c) What are beta(+) and beta(0) thalassemiias?
  - (d) Name the tumor viruses (for each) that cause liver cancer and cervical cancer in humans.
  - (e) What is the basis of Maillard reaction?
  - (f) Why are drugs like Simvastatin effective in reducing cholesterol level?
  - (g) Discuss the cause of Hashimoto's thyroiditis.
  - (h) Mention two main causes which contribute to the development of hypertension.
  - (i) Give two examples of chaperones.
  - (j) What are oncosuppressor genes?
2. Answer **any two** questions:
- (a) (i) What is ubiquitin? How are misfolded proteins degraded in the cell?  
(ii) Discuss the cause of Alzheimer's disease. 3+2
  - (b) (i) What is the underlying mechanism behind why gene mutations that lead to Huntington's disease act as dominant mutations?  
(ii) What are the key characteristics of this disease? 3+2
  - (c) (i) Write three main factors that cause obesity.  
(ii) What is the scale for obesity? 3+2
  - (d) (i) Define the terms: (I) Fasting plasma glucose (II) Random plasma glucose  
(ii) How is primary hypothyroidism different from secondary hypothyroidism? 3+2

**Please Turn Over**

3. (a) What is the cause of sickling of RBCs in sickle-cell disease?  
(b) How is blood glucose level regulated during fasting state?  
(c) What are Lewy bodies? Name an important protein found in these bodies. 3+3+4

*Or,*

4. (a) What is irritable bowel syndrome (IBS)? Mention its symptoms.  
(b) What food should people with IBS avoid?  
(c) Mental health problems are common in people with IBS—State true or false.  
(d) What are the main possible reasons of IBS? (2+2) +2+2+2

5. (a) Discuss the effects of hormones on glucose level in blood.  
(b) What are the different types of stress that increase cortisol release?  
(c) How is a benign tumor different from malignant tumor? 4+4+2

*Or,*

6. (a) What is the reason behind the occurrence of an extensive atherosclerotic cardiovascular disease in patients with uncontrolled diabetes?  
(b) What is a primary characteristic of atherosclerosis?  
(c) How does stress affect hypothyroidism? 4+2+4

7. (a) What are proto-oncogenes? Give example. What is the function of it?  
(b) What biomolecules does regulate the expression of proto-oncogenes?  
(c) What is the normal range for an AFP tumor marker?  
(d) Can stress cause tumor markers to rise? (2+2) +2+2+2

*Or,*

8. (a) Briefly discuss the different stages of cancer. Is cancer a genetic disease?  
(b) What are the characteristics of cancerous cells? (4+3)+3
-