[This question paper contains 6 printed pages.]

(11) Your Roll No. 2022

Sr. No. of Question Paper : 1083 C

Unique Paper Code : 32497901

Name of the Paper : NUTRITIONAL BIOCHEMISTRY

Name of the Course : **B.Sc. (Hons.) Biochemistry**

Semester : V (LOCF)

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **five** questions in all, including Question No. **1** which is compulsory.
3. **All** questions carry equal marks.

1. (a) Discuss the following terms from a nutritional point of view :

   (i) RDA

   (ii) Nitrogen balance

P.T.O.

(iii) Lipotropic factors

(iv) BMI

(v) Prebiotics

(b) Comment on the following **(any five)** :

(i) Patients with liver cirrhosis often present with night blindness

(ii) Thiamine deficiency results in lactic acidosis.

(iii) Plant products aren't good quality protein

(iv) Alcohol is not a nutrient

(v) Selenium has antioxidant function.

(vi) Deficiency of manganese leads to impaired skeletal growth

(vii) Ascorbic acid is required for Iron absorption. (5,10)

2. (a) 38-year-old vegetarian female presented to her doctor with fatigue and tingling/numbness in her extremities. Her blood smear showed large immature red blood cells. Suggest biochemical tests to accurately diagnose her condition.

(b) In a study on experimental diets a group of rats was given only maize, which was found to hamper their growth. What amino acids should be supplemented in their diet to increase the body weight and why?

(c) Why does Vitamin B6 requirement increases with protein intake? Compare BV and NPU as an index of protein quality. (5,4,6)

3. Give the biochemical basis, symptoms and nutritional management if any, for the following disorders:

(i) Hemochromatosis

(ii) Keshan Disease

(iii) Wilson's disease

(iv) Familial Hypercholesterolemia

(v) Fluorosis (15)

4. (a) Why is consumption of hydrogenated and reheated oils considered harmful? What are the recommended proportions of different fatty acids in the diet?

(b) Discuss the factors affecting the bio-availability and absorption of calcium in the gastrointestinal tract. What would be the effects of having excess calcium in the diet?

(c) Intravenous administration of glucose does not cause the same insulin release as oral glucose administration. Explain. (6,5,4)

5. (a) How is resting metabolic rate different from basal metabolic rate? Discuss the various factors which affect the resting energy expenditure.

(b) How do nonessential amino acids become conditionally essential? Explain with example.

(c) Watermelon has a glycemic index of 78 and it contains about 7gm carbohydrate in a serving whereas pasta has a glycemic index of 45 and the carbohydrate content in a helping is 54gm. Calculate and compare the glycemic loads of the two food items. Also discuss the utility of GI and GL in dietary management of diabetics. (5,4,6)

6. (a) Discuss the role of liver in regulation of iron metabolism.

(b) A drug can prevent nutrient absorption by changing the gastrointestinal environment; Explain, giving two examples.

(c) What is the role of dietary fiber in :

(i) Lipid metabolism

(ii) Colon function

(iii) Gastric emptying

(iv) Gut Microbiota (6,5,4)

7. (a) What is PEM? Differentiate between the 2 types of PEM.

(b) 56-year-old male following a sedentary lifestyle (weight 94 Kilos, height 170 cm) had the following lab findings: fasting blood sugar-114mg/dl, total cholesterol- 240mg/dl, Triacylglycerol 165 mg/dl, VLDL 31 mg/dl, LDL 122mg/dl and HDL 39mg/dl. Dietary analysis indicated that the total caloric intake was 2300 Kcal/day where carbohydrate, fat and protein provided 78%, 12% and 9% of the calories respectively. Fibre intake was 5gm/day. What is your assessment of his risk of lifestyle disorders? What dietary changes could be recommended to reduce his risk?

P.T.O.

(c) What do you mean by thermogenic effect of food? Can a meal composition influence the TEF, if yes how? (5,6,4)

8. (a) What is a nutraceutical? Mention the health benefits of the following foods :

(i) Fenugreek

(ii) Turmeric

(iii) Cloves

(b) Discuss the salient features of Vitamin-D toxicity. Can overexposure to sun cause vitamin-D toxicity? Give reason for your answer.

(c) Discuss the parameters to assess the oxidative stress. (6,5,4)

[This question paper contains 8 printed pages.]

(12) **Your Roll No.** 2022

Sr. No. of Question Paper : 1093

Unique Paper Code : 32177902

Name of the Paper : DSE- Inorganic Materials of Industrial Importance

Name of the Course : **B.Sc. (Hons)**

Semester : V

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **SIX** questions in all.
3. Question **1** is compulsory.
4. Attempt any **five** other questions.

1. (a) Give one word for the following / Fill in the blanks as required :

P.T.O.

(i) A device which converts fuel directly into electricity without combustion.

(ii) The process of applying a protective zinc coating to iron.

(iii) Notation on a bag of fertilizer signifying that it contains 12% N, 10% P (P_2O_5), and 10% K (K_2O).

(iv) Presence of the compound in urea fertilizer that can result in toxicity to plants.

(v) Low refractive index materials, generally white in color, which are added to a paint formulation to increase its volume.

(vi) The protecting power of a surface coating increases with _____ in porosity.

(vii) Borosilicate glasses are known for having _____ coefficient of thermal expansion.

(b) Distinguish between the following :

(i) Silicate and non-silicate glass

(ii) Oil based and Water based paints

(c) Write short notes on :

(i) Potassium fertilizers

(ii) Heat resistant paints (7,4,4)

2. (a) Explain the working of lithium-ion battery. Describe the intercalation and deintercalation process taking place in this battery.

(b) How does a hydrogen fuel cell works? Give the reactions involved.

(c) What do you mean by a solid-state battery? What are the advantages of a solid- state electrolyte battery over the liquid electrolyte battery? (4,4,4)

3. (a) What is a fertilizer? What are the requisites for a compound to be a good fertilizer?

(b) Explain the manufacture, properties, and applications of Urea as a fertilizer.

(c) Discuss the importance of super alloys giving at least two examples. (4,4,4)

4. (a) What are ceramics? Why is glazing done for ceramic articles?

(b) What is Portland cement? What makes the cement, a quick setting cement?

(c) Discuss the characteristics and applications of the following :

(i) Photochromic glass

(ii) Safety glass (4,4,4)

5. (a) Describe the formation, and applications of the following forms of carbon :

(i) Fullerenes

(ii) Carbon fibers

(b) What are semiconducting oxides? Explain giving examples.

(c) How are nanomaterials different from their bulk counterparts? Explain with reference to the changes in properties shown by the naomaterials? (4,4,4)

6. (a) Define Pigment Volume Concentration (PVC) and Critical Pigment Volume Concentration (CPVC). Mention the functions of the following additives in a paint formulation (**Any Two**) :

(i) Thinner

(ii) Plasticizer

(iii) Fillers

(b) What is the principle of electroplating? Discuss the process and utility of electroplating for metallic coatings.

(c) Discuss the technique by which coatings employing metal spraying are applied on a surface.

(4,4,4)

7. (a) What are emulsion paints? What is their drying mechanism?

(b) Why is it necessary to add a retardant to cement? Give an example of a retardant and explain with chemical reactions how it functions in retarding the setting of cement.

(c) What are alloys? Discuss the alloys of aluminium and copper. (4,4,4)

8. (a) What are thermosets and thermoplastics? Explain giving example in each case.

(b) What are optical fibres? How do signals travel through them?

(c) What are primary and secondary batteries? What are the characteristics of an ideal battery?

(4,4,4)