# All India Institute of Medical Sciences, Kalyani
## 1st Professional MBBS Examination 2020

**Time: 3 Hrs.** **Biochemistry (Paper–I)** **Marks: 100**

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**INSTRUCTIONS:**

- Answer all questions and draw well labelled diagrams wherever necessary.
- Answer Sections A and B in separate answer booklets.
- Write answers in sequence and strike off all blank pages

**SECTION A (50 marks)**

**1. Study the clinical features of the case that is narrated below and answer the following questions related to the case:** **(1+6+2+1=10)**

1. A 58-year-old female with a 10-year history of severe chronic lower backache and morning stiffness visited the hospital OPD. She had no symptoms of nerve root compression but had a history of large joint pain in her hips, knees, and shoulders. A physical examination revealed bluish pigmentation over the forehead, cheeks, nose, fingertips, nails, hands, and ear cartilage. In addition, the sclera of both eyes showed dark brown pigment deposits, and there was dark brown pigmentation of the skin, teeth, and gums. When the patient's urine was left standing for a few hours at room temperature, it turned dark.

   a) Diagnose the condition the patient is suffering from
   b) Describe the metabolic pathway responsible for the above condition
   c) Why does the patient have bluish/dark brown pigmentation over her body parts?
   d) Name one confirmatory test to identify the condition

**2. Write short notes on the following (the aspects to be addressed are given in bracket): (4 × 2.5=10)**

a) Cardiac marker (Name four with diagram showing its temporal pattern)
b) One-carbon metabolism (Name of 4 compounds and their importance in body)
c) Glycosaminoglycans (name the types, function of 3 with site of occurrence).
d) Calcium metabolism (Name the two most important factors which maintain the level with their mechanism)

**3.** **(2×5=10)**

a) Describe ATP synthase. How ATP is synthesized
b) Draw a labelled diagram of Cori cycle with its importance

**4. Compare and contrast:** **(2×5=10)**

a) Type 1 and Type 2 Diabetic mellitus
b) Lyase and ligase

**5. Explain why/how:** **(4×2.5=10)**

a) Ammonia is toxic to brain
b) Lactic acidosis may occur in Thiamine deficiency
c) HMP shunt is highly active in lactating mammary glands
d) Cancer there is increase in uric acid level

## SECTION B (50 marks)

**6. Study the clinical features of the case that is narrated below and answer the following questions related to the case:**

A 30-year-old man comes to the clinic with complaints of constipation and severe abdominal pain. He is employed at battery assembly factory since the last two months. Since the past few days, he had developed weakness of his hands. He mentioned that he ate well, also he took vitamins along with iron supplements. There were no other neurological symptoms. Laboratory report revealed:
Haemoglobin - low; Serum iron and ferritin – high **(2+4+2+2)**

a) What is the most probable diagnosis?
b) Which enzyme deficiency is responsible for this condition, describe the metabolic pathway?
c) What other test should be performed to confirm the diagnosis?
d) What is the cause of low haemoglobin levels?

**7. Write short notes on the following (the aspects to be addressed are given in brackets): (2 ×5=10)**

a) Role of lipotropic factors in fatty liver (name five and their role)
b) Glycine derivatives (Name four and their significance)

**8. (2×5=10)**

a) Draw and explain factors affecting oxygen dissociation curve
b) Draw a labelled diagram showing the metabolism of high-density lipoprotein (HDL) and its role in reverse cholesterol transport

**9. Compare and contrast: (2×5=10)**

a) Dextran and Dextrin
b) Active transport and passive transport

**10. Explain why/how: (4 ×2.5=10)**

a) Hyperlipidemia in Nephrotic syndrome
b) Acetyl CoA is not a substrate for gluconeogenesis
c) Chromium is known as glucose tolerance factor
d) High altitude travel may affect patients with Sickle cell disease