

Jawaharlal Nehru medical college, Sawangi (Meghe)

Department of Biochemistry

PO-CO mapping

Sr No.	Competency No.	Competencies	Clinician	Leader and member of health care team	Communicator	Lifelong learner	Professional	Critical Thinker	Researcher
1.	BI1.1	Describe the molecular and functional organization of a cell and its subcellular components.	2	1	1	3	2	2	3
2.	BI2.1	Explain fundamental concepts of enzyme, isoenzyme, alloenzyme, coenzyme & co-factors. Enumerate the main classes of IUBMB nomenclature.	3	1	1	3	2	3	3
3.	BI2.2	Observe the estimation of SGOT & SGPT	3	1	1	1	3	2	3
4.	BI2.3	Describe and explain the basic principles of enzyme activity	1	1	1	3	2	3	3
5.	BI2.4	Describe and discuss enzyme inhibitors as poisons and drugs and as therapeutic enzymes	3	1	1	2	2	2	3

6.	BI2.5	Describe and discuss the clinical utility of various serum enzymes as markers of pathological conditions.	3	1	1	2	3	3	3
7.	BI2.6	Discuss use of enzymes in laboratory investigations (Enzyme-based assays)	3	1	1	3	3	2	1
8.	BI2.7	Interpret laboratory results of enzyme activities & describe the clinical utility of various enzymes as markers of pathological conditions.	3	2	1	2	3	2	2
9.	BI3.1	Discuss and differentiate monosaccharides, di-saccharides and polysaccharides giving examples of main carbohydrates as energy fuel, structural element and storage in the human body	3	1	1	1	2	2	2
10.	BI3.2	Describe the processes involved in digestion and assimilation of carbohydrates and storage.	3	1	1	1	2	2	2
11.	BI3.3	Describe and discuss the digestion and assimilation of carbohydrates from food.	3	1	1	2	2	1	1
12.	BI3.4	Define and differentiate the pathways of carbohydrate metabolism, (glycolysis, gluconeogenesis, glycogen metabolism, HMP shunt).	3	1	1	2	3	1	1
13.	BI3.5	Describe and discuss the regulation, functions and integration of carbohydrate along with associated diseases/disorders.	3	1	1	2	3	1	1

14.	BI3.6	Describe and discuss the concept of TCA cycle as a amphibolic pathway and its regulation.	3	1	1	2	3	1	1
15.	BI3.7	Describe the common poisons that inhibit crucial enzymes of carbohydrate metabolism (eg; fluoride, arsenate)	3	1	1	2	3	1	1
16.	BI3.8	Discuss and interpret laboratory results of analytes associated with metabolism of carbohydrates.	3	1	1	2	3	2	2
17.	BI3.9	Discuss the mechanism and significance of blood glucose regulation in health and disease.	3	1	1	2	3	2	2
18.	BI3.10	Interpret the results of blood glucose levels and other laboratory investigations related to disorders of carbohydrate metabolism.	3	1	1	2	3	2	2
19.	BI4.1	Describe and discuss main classes of lipids (Essential/non-essential fatty acids, cholesterol and hormonal steroids, triglycerides, major phospholipids and sphingolipids) relevant to human system and their major functions.	3	1	1	2	3	1	1
20.	BI4.2	Describe the processes involved in digestion and absorption of dietary lipids and also the key features of their metabolism	3	1	2	2	3	1	1
21.	BI4.3	Explain the regulation of lipoprotein metabolism & associated disorders.	3	1	1	2	3	2	2

22.	BI4.4	Describe the structure and functions of lipoproteins, their functions, interrelations & relations with atherosclerosis	3	1	1	2	3	2	2
23.	BI4.5	Interpret laboratory results of analytes associated with metabolism of lipids	3	1	1	2	3	2	2
24.	BI4.6	Describe the therapeutic uses of prostaglandins and inhibitors of eicosanoid synthesis.	3	1	1	2	3	2	2
25.	BI4.7	Interpret laboratory results of analytes associated with metabolism of lipids.	3	1	1	2	3	2	2
26.	BI5.1	Describe and discuss structural organization of proteins.	3	1	1	2	3	1	2
27.	BI5.2	Describe and discuss functions of proteins and structure-function relationships in relevant areas eg, hemoglobin and selected hemoglobinopathies	3	2	1	2	3	2	2
28.	BI5.3	Describe the digestion and absorption of dietary proteins.	3	1	1	2	3	1	1
29.	BI5.4	Describe common disorders associated with protein metabolism.	3	1	1	2	3	2	2
30.	BI5.5	Interpret laboratory results of analytes associated with metabolism of proteins.	3	1	1	2	3	2	2

31.	BI6.1	Discuss the metabolic processes that take place in specific organs in the body in the fed and fasting states.	3	1	1	2	3	3	2
32.	BI6.2	Describe and discuss the metabolic processes in which nucleotides are involved.	3	1	1	2	3	1	1
33.	BI6.3	Describe the common disorders associated with nucleotide metabolism.	3	1	1	2	3	2	2
34.	BI6.4	Discuss the laboratory results of analytes associated with gout & Lesch Nyhan syndrome.	3	1	1	2	3	2	2
35.	BI6.5	Describe the biochemical role of vitamins in the body and explain the manifestations of their deficiency	3	1	1	2	3	2	2
36.	BI6.6	Describe the biochemical processes involved in generation of energy in cells.	3	1	1	2	3	2	3
37.	BI6.7	Describe the processes involved in maintenance of normal pH, water & electrolyte balance of body fluids and the derangements associated with these.	3	1	1	2	3	2	2
38.	BI6.8	Discuss and interpret results of Arterial Blood Gas (ABG) analysis in various disorders.	3	1	1	2	3	2	2

39.	BI6.9	Describe the functions of various minerals in the body, their metabolism and homeostasis.	3	1	1	2	3	2	2
40.	BI6.10	Enumerate and describe the disorders associated with mineral metabolism.	3	1	1	2	3	2	2
41.	BI6.11	Describe the functions of haem in the body and describe the processes involved in its metabolism and describe porphyrin metabolism.	3	1	1	2	3	1	1
42.	BI6.12	Describe the major types of haemoglobin and its derivatives found in the body and their physiological/ pathological relevance.	3	1	1	2	3	2	2
43.	BI6.13	Describe the functions of the kidney, liver, thyroid and adrenal glands.	3	1	1	2	3	2	2
44.	BI6.14	Describe the tests that are commonly done in clinical practice to assess the functions of these organs (kidney, liver, thyroid and adrenal glands).	3	1	1	2	3	3	3
45.	BI6.15	Describe the abnormalities of kidney, liver, thyroid and adrenal glands.	3	1	1	2	3	2	2
46.	BI7.1	Describe the structure and functions of DNA and RNA and outline the cell cycle.	3	1	1	2	3	1	1
47.	BI7.2	Describe the processes involved in replication & repair of DNA and the	3	1	1	2	3	2	2

		transcription & translation mechanisms.							
48.	BI7.3	Describe gene mutations and basic mechanism of regulation of gene expression.	3	1	1	2	3	2	3
49.	BI7.4	Describe applications of molecular technologies like recombinant DNA technology, PCR in the diagnosis and treatment of diseases with genetic basis.	3	1	1	2	3	3	3
50.	BI7.5	Describe the role of xenobiotics in disease	3	1	1	2	3	2	2
51.	BI7.6	Describe the anti-oxidant defence systems in the body.	3	1	1	2	3	2	2
52.	BI7.7	Describe the role of oxidative stress in the pathogenesis of conditions such as cancer, complications of diabetes mellitus and atherosclerosis.	3	1	1	2	3	2	2
53.	BI8.1	Discuss the importance of various dietary components and explain importance of dietary fibre.	3	1	1	2	3	2	2
54.	BI8.2	Describe the types and causes of protein energy malnutrition and its effects.	3	1	1	2	3	2	2
55.	BI8.3	Provide dietary advice for optimal health in childhood and adult, in disease conditions like diabetes mellitus, coronary artery disease and in	3	1	1	2	3	2	2

		pregnancy.							
56.	BI8.4	Describe the causes (including dietary habits), effects and health risks associated with being overweight/ obesity.	3	1	1	2	3	2	2
57.	BI8.5	Summarize the nutritional importance of commonly used items of food including fruits and vegetables.(macro-molecules & its importance)	3	1	1	2	3	2	2
58.	BI9.1	List the functions and components of the extracellular matrix (ECM).	3	1	1	2	3	1	1
59.	BI9.2	Discuss the involvement of ECM components in health and disease.	3	1	1	2	3	2	2
60.	BI9.3	Describe protein targeting & sorting along with its associated disorders.	3	1	1	2	3	3	3
61.	BI10.1	Describe the cancer initiation, promotion oncogenes & oncogene activation. Also focus on p53 & apoptosis	3	1	1	2	3	3	3
62.	BI10.2	Describe various biochemical tumor markers and the biochemical basis of cancer therapy.	3	1	1	2	3	2	2
63.	BI10.3	Describe the cellular and humoral components of the immune system & describe the types and structure of antibody	3	1	1	2	3	2	2
64.	BI10.4	Describe & discuss innate and adaptive immune responses, self/non-	3	1	1	2	3	2	2

		self recognition and the central role of T-helper cells in immune responses.							
65.	BI10.5	Describe antigens and concepts involved in vaccine development.	3	1	1	2	3	3	3
66.	BI11.1	Describe commonly used laboratory apparatus and equipments, good safe laboratory practice and waste disposal.	3	1	1	2	3	2	3
67.	BI11.2	Describe the preparation of buffers and estimation of pH.	3	1	1	2	3	2	3
68.	BI11.3	Describe the chemical components of normal urine.	3	1	1	2	3	1	1
69.	BI11.4	Perform urine analysis to estimate and determine normal and abnormal constituents	3	1	1	2	3	2	2
70.	BI11.5	Describe screening of urine for inborn errors & describe the use of paper chromatography	3	2	1	2	3	2	2
71.	BI11.6	Describe the principles of colorimetry	3	2	1	2	3	2	2
72.	BI11.7	Demonstrate the estimation of serum creatinine and creatinine clearance	3	2	1	2	3	2	2
73.	BI11.8	Demonstrate estimation of serum proteins, albumin and A:G ratio	3	2	1	2	3	2	2

74.	BI11.9	Demonstrate the estimation of serum total cholesterol and HDL-cholesterol	3	2	1	2	3	2	2
75.	BI11.10	Demonstrate the estimation of triglycerides	3	2	1	2	3	2	2
76.	BI11.11	Demonstrate estimation of calcium and phosphorous	3	2	1	2	3	2	2
77.	BI11.12	Demonstrate the estimation of serum bilirubin	3	2	1	2	3	2	2
78.	BI11.13	Demonstrate the estimation of SGOT/ SGPT	3	2	1	2	3	2	2
79.	BI11.14	Demonstrate the estimation of alkaline phosphatase	3	2	1	2	3	2	2
80.	BI11.15	Describe & discuss the composition of CSF	3	2	1	2	3	2	2
81.	BI11.16	Observe use of commonly used equipments/techniques in biochemistry laboratory including: <ul style="list-style-type: none"> •pH meter •Paper chromatography of amino acid •Protein electrophoresis •TLC, PAGE •Electrolyte analysis by ISE 	3	2	1	2	3	2	2

		<ul style="list-style-type: none"> •ABG analyzer •ELISA •Immunodiffusion •Autoanalyser •Quality control •DNA isolation from blood/ tissue 							
82.	BI11.17	<p>Explain the basis and rationale of biochemical tests done in the following conditions:</p> <ul style="list-style-type: none"> - diabetes mellitus, - dyslipidemia, - myocardial infarction, - renal failure, gout, - proteinuria, - nephrotic syndrome, - edema, - jaundice, - liver diseases, pancreatitis, disorders of acid- base balance, 	3	2	1	2	3	2	2
83.	BI11.18	Discuss the principles of spectrophotometry.	3	2	1	2	3	2	3

84.	BI11.19	Outline the basic principles involved in the functioning of instruments commonly used in a biochemistry laboratory and their applications.	3	2	1	2	3	2	3
85.	BI11.20	Identify abnormal constituents in urine, interpret the findings and correlate these with pathological states.	3	2	1	2	3	2	2
86.	BI11.21	Demonstrate estimation of glucose, creatinine, urea and total protein in serum.	3	2	1	2	3	2	2
87.	BI11.22	Calculate albumin: globulin (AG) ratio and creatinine clearance	3	2	1	2	3	2	2
88.	BI11.23	Calculate energy content of different food items, identify food items with high and low glycemic index and explain the importance of these in the diet	3	3	1	2	3	1	1
89.	BI11.24	Enumerate advantages and/or disadvantages of use of unsaturated, saturated and trans fats in food.	3	3	1	2	3	1	1