B.Sc. Part—II Semester—III Examination

BIOCHEMISTRY

(Intermediary Metabolism)

Time : Three Hours] [Maximum Marks : 80

Note :—(1) All questions are compulsory and carry equal marks except Q. No. 1 which carries 8 marks.

(2) Draw a well labelled diagram wherever necessary.

1. (A) Fill in the blanks :—

(i) The intermediate of citric acid cycle involved in heme synthesis is _____. ½

(ii) Number of carbon atoms in cholesterol is _____. ½

(iii) Acylcarrier protein (ACP) is involved in the biosynthesis of _____. ½

(iv) Formation of glucose from non-carbohydrate precursor is called as _____. ½

(B) Choose the correct alternative :—

(i) HMP shunt (Pentose phosphate pathway) is located in : ½

(A) Endoplasmic reticulum (B) Cytosol

(C) Mitochondria (D) Nucleus

(ii) The nitrogen atom of pyrimidine nucleus are provided by : ½

(A) Glutamate (B) Glutamate and Aspartate

(C) Glutamine (D) Glutamine and Aspartate

(iii) Ketone bodies are synthesised in : ½

(A) Adipose tissue (B) Liver

(C) Muscle (D) Brain

(iv) β-oxidation of fatty acid requires all the following coenzymes except : ½

(A) COA (B) FAD

(C) NAD (D) NADP

(C) Answer in one sentence :—

(i) Define Glycolysis. 1

(ii) Define Ketogenesis. 1

(iii) What is transamination ? 1

(iv) Define hypercholesterolemia. 1

2. Describe in detail reactions of glycolysis and add a note on its regulation. 12

OR

Describe in detail oxidative and non-oxidative phase of pentose phosphate pathway with its significance. 12

3. Describe in detail hydrolysis of triacylglycerol, β-oxidation of fatty acid and transport of fatty acid into mitochondrial matrix. 12

OR

Describe biosynthesis of Triacylglycerol, ketone bodies and explain ATP yield from palmitate. 12

4.	(a)	Describe biosynthesis of Lecithin.	4
	(b)	Explain biosynthesis of sphingomyelin.	4
	(c)	Describe biosynthesis of phosphatidyl inositol.	4
		OR	
	(p)	Describe biosynthesis of Mevalonate from Acetyl CoA.	4
	(q)	Describe biosynthesis of Cholesterol from Farnesyl Pyrophosphate.	4
	(r)	Explain regulation of cholesterol biosynthesis.	4
5.	(a)	Explain oxidative deamination and decarboxylation of amino acids.	4
	(b)	Explain the reactions of Urea cycle.	4
	(c)	Describe anabolism of Cysteine.	4
		OR	
	(p)	Explain regulation of Urea cycle.	4
	(q)	Describe biosynthesis of tyrosine.	4
	(r)	Describe catabolism of glycine.	4
6.	(a)	Describe regulation of purine nucleotide biosynthesis.	4
	(b)	Explain how uric acid is produced from Purine nucleotide.	4
	(c)	Describe biosynthesis of UMP from carbamoyl phosphate and asparatate.	4
		OR	
	(p)	Explain biosynthesis of AMP and GMP from IMP.	4
	(q)	Describe biosynthesis of IMP from 5-aminoimidazole ribonucleotide.	4
	(r)	Explain sources of various atoms in purine and pyrimidine ring.	4
7.	(a)	Describe regulation of Heme synthesis.	4
	(b)	Explain the reactions catalyzed by heme oxygenase and biliverdin reductase.	4
	(c)	Describe formation of Porphobilinogen from glycine and succinyl CoA.	4
		OR	
	(p)	Describe in brief biochemical aspect of jaundice.	4
	(q)	Describe biosynthesis of Heme from uroporphyrinogen-III.	4
	(r)	Explain formation of urobilin and stercobilin from Biliverdin.	4