2NDMBBS/BDS METABOLISM 2ND SEMESTER REVISION/STUDY QUESTIONS

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STUDY TIPS;

1. The goal of this write up is to expose you on the various ways the metabolism essay question might come and for you to excel that day, you need to start on time to prepare yourself on how to organize your points at the same time to improve on your speed, accuracy, ability to remember what you have studied and time management. **Start writing essays now with this guide**!
2. Try and discuss with your classmates and don't joke with your lecture notes; The arrangements are as follows

A. INTRODUCTIONS; **Tick √ Yes or No if studied very well**

1. Outline the major functions of metabolism
2. Describe these terms; anabolism, catabolism, and amphibolism
3. In a tabular form, outline the differences between anabolic and catabolic pathways
4. Discuss the energy relationship between catabolism and anabolism
5. Describe the stages in metabolic reactions
6. Write exhaustively on compartmentation of metabolic reactions
7. Outline the roles of enzymes in metabolism

B. DIGESTIONS AND FOOD ABSORPTION

1. What do you understand by the term "digestion and absorption of food"?
2. Discuss the process of digestion of the following;
   i. Carbohydrate
   ii. Proteins
   iii. Lipids
   iv. Nucleic acids
3. Write exhaustively on the various processes of absorptions?
4. Write short notes on the following;
   i. Absorption of carbohydrate
   ii. Protein absorption
   iii. Lipids absorptions
   iv. Specificity of the carrier system
   v. Absorption of nucleic acids
   vi. Water absorption
5. Describe the following conditions?
   i. Lactose intolerance
   ii. Dissaccharidurıa
   iii. Sucrose deficiency
   iv. Monosaccharide malabsorption
   v. Cystinuria
   vi. Oxoprolinuria
   vii. Hartnup disease
   viii. Steatorrhea

ix. Chyluria
x. Cholesterol stones

C. CARBOHYDRATE METABOLISM

GLYCOLYSIS

1. Discuss in details the process of glycolysis
2. Compare and contrast in tabular form hexokinase and glucokinase?
3. Discuss in details the fate of pyruvate as the end product of glycolysis?
4. Write exhaustively on pyruvate dehydrogenase complex?
5. Describe the energy yield of glycolysis
6. Lists 4 important functions of glycolysis
7. How is glycolysis regulated?
8. Outline the difference between substrate level phosphorylation and oxidative phosphorylation?
9. Describe how a known mammalian cells produce its own ATP?
10. Write short notes on the following?
    i. Lactic acidosis
    ii. Hexokinase
    iii. Phosphofructokinase
    iv. Enolase
11. How can glucose be derived from the following?
    i. Mannose
    ii. Fructose
    iii. Galactose
12. Describe the following conditions?
    i. Essential fructosuria
    ii. Hereditary fructose intolerance
    iii. Galactosemia

TCA CYCLE

13. Write exhaustively on tricarboxylic acid pathway
14. In a tabular form, discuss the difference between TCA and glyoclysis
15. Describe the energy yield of TCA cycle?
16. Discuss the amphibolic nature of TCA cycle
17. How is TCA cycle regulated?
18. Outline the major functions of TCA cycle?
19. Write short notes on the following?
    i. acetylcoA
    ii. citrate synthase
    iii. malate dehydrogenase
    iv. succinate thiokinase
    v. α-ketoglutarate dehydrogenase
    vi. succinate dehydrogenase
    vii. isocitrate dehydrogenase

ETC CYCLE

20. Discuss the basic structure of mitochondrion as regards to ETC cycle?
21. List the components of ETC and briefly describe them
22. List the complexes of ETC and exhaustively describe them
23. Give explicitly the examples of substrate level phosphorylaton and oxidative phosphorylaton and in a tabular, outline their differences?
24. List the models/hypothesis/mechanism of oxidative phosphorylaton you know and briefly describe them?
25. In question 24 above, write exhaustively on the most important models of oxidative phosphorylaton?
26. Outline the difference in a tabular form between TCA cycle and ETC cycle?
27. What do you understand by the terms "inhibitors of ETC chain"?
28. Write short notes on the following;
    i. Uncoupling agents
    ii. Succinate dehydrogenase complex
    iii. Rotenone
    iv. 2-thenoyltrifluoroacetone
    v. Antimycin A
    vi. Hydrogen sulphide

HEXOSE MONOPHOSPHATE SHUNT PATHWAY (HMP)

29. List the functions of HMP
30. Outline the major difference the glycolysis and HMP cycle?
31. Discuss in details HMP cycle?
32. Briefly describe the role of glucose-6-phosphate dehydrogenase?
33. Write short notes on the following;
    i. 6-phosphogluconate dehydrogenase
    ii. Reactions of HMP
    iii. Roles of non-oxidative phase of HMP
    iv. Trans-aldolase

GLUCONEOGENESIS

34. Outline the metabolic functions of gluconeogenesis
35. Describe cori- cycle?
36. Describe in details how carbon is gotten from the following sources for gluconeogenesis?
    i. Glycerol
    ii. Lactate
    iii. Propionate
    iv. Glucogenic amino acids
37. Discuss the unique (bypass) reactions?
38. How is gluconeogenesis regulated?
39. Write short notes on the following;
    i. Insulin
    ii. Acetyl-coA
    iii. Phosphofructokinase reaction
    iv. Glucagon

GLYCOGENESIS

40. Discuss in details how glycogen is synthesized?

41. Write explicitly on regulation of glycogen metabolism?
42. Write short notes on the following;
    i. Von Gierke disease
    ii. Pompe disease
    iii. Cori disease
    iv. Anderson disease
    v. McArdles disease
    vi. Hers disease
    vii. Tarui disease
    viii. Phosphorylase kinase deficiency
    ix. Diabetes Mellitus

D. LIPIDS METABOLISM

1. Comment on interrelationship between other pathways and fatty acid metabolism
2. What do you understand by lipoproteins and list the classes of lipo-proteins
3. What is apolipoproteins
4. Outline the functions of specific functions of the following;
    i. Apo A_1
    ii. Apo B_{48}
    iii. ApoB_{100}
    iv. Apo C_{11}
    v. Apo D
    vi. Apo E
5. Discuss briefly the various classes of lipo-proteins?
6. How can triacyglycerol be synthesized from a known compound glycerol phosphate?
7. What do you understand by triacylglycerol hydrolysis and discuss the roles of the following;
    i. Pancreatic lipase
    ii. Lipoproteins lipase
    iii. Hormone- sensitive lipase
8. Write exhaustively on β-oxidation of a known fatty acid especially palmitic acid
9. Discuss the beta oxidation of odd-chain fatty acids that is propionate
10. Discuss the beta-oxidation of a known saturated fatty acids
11. Describe in details the oxidation of a known unsaturated fatty acids
12. Discuss completely the oxidation of linoleic acid
13. Discuss the energy yield of beta oxidation of fatty acid
14. Discuss in details the energy yield of β-oxidation of palmitic acid
15. How is fatty acid metabolism regulated?
16. In a tabular form, discuss the difference between TCA cycle and beta oxidation of fatty acid
17. In a tabular form, compare the energy yields of TCA cycle and fatty acid beta oxidation?
18. What do you understand by citrate shuttle?
19. Discuss the steps in fatty acid synthesis?
20. Discuss in details the citrate shuttle?
21. How is fatty acid synthesis regulated?
22. In a tabular form, differentiate between fatty acid synthesis and β-oxidation of fats?
23. Differentiate between citrate shuttle and carnittine shuttle?
24. State explicitly the functions of CAT 1 and CAT 2 respectively?
25. What is ketosis? Describe exhaustively the synthesis of a named ketone body?

26. Define fatty liver diseases? How is it formed? What are the likely causes? Outine the clinical relevance?
27. Write exhaustively on fatty liver disease
28. Write short notes on the following?
    i. Omega 3 fatty acids
    ii. Vitamin E and selenium
    iii. Lecithin, choline and methonine
    iv. Phospholipids and its synthesis
    v. Sphingolipids synthesis
    vi. Glycolipids synthesis
    vii. Regulation of cholesterol synthesis
    viii. Farbers diease
    ix. Zellweger syndrome
    x. Niemann pick's disease

E. PROTEIN AND AMINO ACID

1. What do you understand by Essential and Non-essential amino acid? List the examples if possible
2. Define the following terms?
    i. Nitrogen balance
    ii. The amino acid pool
    iii. Amino acid degradation
    iv. Transamination reaction
    v. Oxidative deamination
    vi. Non-oxidative deamination
3. Write exhaustively on Urea cycle? How is it regulated?
4. What is the fate of urea after during urea cycle?
5. Write short notes on the following;
    i. Coarse regulation
    ii. Fine regulation
    iii. Compartmentation
6. Discuss Ammonia source and its synthesis?
7. Using suitable diagram alone, discuss the conversion of amino acid to the following;
    i. C3 family
    ii. C4 family
    iii. C5 family
8. How is branched chain amino acid catabolized? Discuss
9. Discuss the synthesis of the following named non-essential amino acids?
    i. Alanine
    ii. Aspartate
    iii. Asparagine
    iv. Cysteine
    v. Glutamate
    vi. Glutamine
    vii. Glycine
    viii. Serine
    ix. Tyrosine
    x. Histamine
    xi. Gama-aminobutyric acid (GABA)

xii. Serotonin
xiii. Melatonin
xiv. Melanin
xv. Catecholamine
xvi. Thyroxine
xvii. Creatine

10. Discuss succinctly the following conditions?
    i. Porphyrias
    ii. Homocystinuriatyrosnemia I and II
    iii. Phenylketonuria
    iv. Alkaptonuria
    v. Hartnup diseases
11. Discuss the inborn errors of metabolism, pointing out clearly different disease conditions associated with each class

F. NUCLEIC ACID METABOLISM

1. Discuss the basic structure of DNA according to Watson - Crick Model?
2. Differentiate between DNA structure and RNA structure?
3. Outline the components of RNA structure?
4. Lists the functions of rRNA
5. Write short notes on the following;
    i. rRNA
    ii. mRNA
    iii. tRNA
6. In a tabular form, outline the difference between DNA and RNA?
7. How is DNA synthesized? Outline the steps in DNA replication
8. Write short notes on the following?
    i. DNA repair
    ii. Inhibitors of DNA replication
9. Discuss protein synthesis and the steps involved?
10. What do you understand by RNA Polymerase Enzyme?
11. What are the inhibitors of RNA synthesis?
12. Explain these terms;
    i. Post transcriptional modifications
    ii. Reverse transcription
    iii. Translation as regard to Protein synthesis
    iv. Genetic code
    v. Nonsense codons
    vi. Wobble effect
    vii. Mutations
    viii. Frameshift mutation
13. State one difference between transitional and transversional mutations?
14. Outline the various steps involve in mutations?
15. Highlights the characteristics of the Genetic code
16. Discuss post translational modifications and protein folding?
17. Discuss exhaustively the inhibitors of protein Synthesis?

G. NUCLEOTIDE

1. Discuss the de novo synthesis of purine nucleotides?
2. Discuss the salvage pathway of purine synthesis?
3. Explain the process of conversion of inosine monophosphate to AMP?
4. In a tabular form, differentiate between de novo syntheses and salvage pathway of purine synthesis?
5. Discuss the synthesis of pyrimidine nucleotide?
6. Discuss the synthesis of the following;
   i. Thymidine
   ii. TMP
7. Discuss the purine catabolism?
8. Discuss degradation of pyrimidine?
9. Explain the salvage pathways of pyrimidine?
10. Differentiate in a tabular form the purine and pyrimidine metabolism?
11. How is purine synthesis regulated?
12. Discuss the regulation of pyrimidine metabolism?
13. Write short note on the following:
    i. Gout
    ii. Lesch Nyhan Syndrome
    iii. Orotic Aciduria type 1
    iv. Orotic Aciduria type 2

H. For Xenobiotics and Molecular biochemistry.....see your lecturer's notes.

GOD BLESS U AND ALWAYS HAVE TRUST IN HIM BECAUSE WITH HIM, YOUR SUCCESS IS GUARANTEED!

GOODLUCK AND GODS GRACE

FROM,

AKWUE ANTHONY ON BEHALF OF THE ACADEMIC TEAM OF FECAMDS ACADEMIC BOARD 2014/15 SESSION