**Sem2**

**Biochem all the questions Inshallah**

**MCQs & (Ture, False)**

Question N1 Glycolysis can only proceed in aerobic conditions

Answer: 0

Point: 0.25

Question N2 Reaction catalyazed by phosphofructokinase is reversible

Answer: 0

Point: 0.25

Question N3 Which of the following enzymes catalyzes the reaction in glycolysis, where NAD is reduced to NADH?

Answer: Glyceraldehyde-3-phosphate dehydrogenase

Point: 0.40000000000000002

Question N4 Which of following enzymes catalyzes the last step when ATP is produced during the glycolysis?

Answer: Pyruvate kinase

Point: 0.40000000000000002

Question N5 Which of the following enzymes catalyze the reaction which results in trapping the glucose inside of the cell?

Answer: Hexokinase

Point: 0.40000000000000002

Question N6 ATP is an allosteric inhibitor of which glycolytic enzyme?

Answer: Phosphofructokinase

Point: 0.40000000000000002

Question N8 Glycogen phosphorylase is activated by insulin

Answer: 0

Point: 0.25

Question N9 Glycogen synthesis is active during fed state

Answer: 1

Point: 0.25

Question N10 Which of the following tissues have thier own glycogen storage?

Answer: Muscle

Point: 0.40000000000000002

Question N11 Which nucleotide does glucose get attached to for glycogen synthesis?

Answer: UDP

Point: 0.40000000000000002

Question N12 Which of the following hormones stimulates glycogen synthesis?

Answer: Insulin

Point: 0.40000000000000002

Question N13 Which of the following is a coenzyme of glycogen phosphorylase?

Answer: Pyridoxal phosphate

Point: 0.40000000000000002

Question N15 Gluconeogenesis is a simple reverse of the glycolysis

Answer: 0

Point: 0.25

Question N16 Fructose 1,6-bisphosphatase bypasses the glycolytic reaction catalyzed by phosphofructokinase

Answer: 1

Point: 0.25

Question N17 Which enzyme catalyzes the transformation of pyruvate into oxaloacetate?

Answer: Pyruvate carboxilase

Point: 0.40000000000000002

Question N19 Which enzyme bypasses the glycolytic PFK-1 reaction, in gluconeogenesis?

Answer: Fructose 1,6-bisphosphatase

Point: 0.40000000000000002

Question N19 Which enzyme uses GTP as energy source during gluconeogenesis?

Answer: PEP carboxykinase

Point: 0.40000000000000002

Question N20 Which of the following can be used for gluconeogenesis?

Answer: All of them

Point: 0.40000000000000002

Question N22 NADH is one of the products of the pentose phosphate pathway

Answer: 0

Point: 0.25

Question N23 Pentose phosphate pathway can be divided into two phases: oxidative and nonoxidative

Answer: 1

Point: 0.25

Question N24 Which one is the product of the pentose phosphate pathway?

Answer: Ribose-5-phosphate

Point: 0.40000000000000002

Question N25 Which part of the cell does the pentose phosphate pathway take place?

Answer: Cytosol

Point: 0.40000000000000002

Question N26 Which biochemical reductant is produced by pentose phosphate pathway?

Answer: NADPH

Point: 0.40000000000000002

Question N27 Which of the following hormones stimulates the ativity of glucose 6-phosphate dehydrogenase

Answer: Insulin

Point: 0.40000000000000002

Question N29 Fatty acids, containing double bonds are considered unsaturated

Answer: 1

Point: 0.25

Question N30 Tryglycerides contain three fatty acid residues connected to alcohol sphingosine

Answer: 0

Point: 0.25

Question N31 Fatty acids that do not contain any double bonds are:

Answer: Saturated

Point: 0.40000000000000002

Question N32 Fatty acids are stored in adipose tissue, as:

Answer: Tryacylglycerols

Point: 0.40000000000000002

Question N33 How does level of unsaturation affect the melting point of even-numbered fatty acids?

Answer: The more unsaturated the fatty acids are, lower their melting point is

Point: 0.40000000000000002

Question N34 The terminal methyl carbon of fatty acid is called

Answer: Omega

Point: 0.40000000000000002

Question N35 Beta-oxidation of fatty acids takes place in mitochondria

Answer: 1

Point: 0.25

Question N36 Carnitine shuttle is used to transport long-chain fatty acids from cytosol to mitochondria

Answer: 1

Point: 0.25

Question N37 For fatty acid beta-oxidation acylcarnitine is transported through the mitochondrial membrane in exchange of:

Answer: Carnitine

Point: 0.40000000000000002

Question N38 How does malonyl coA affect the carnitine palmytoiltransferase-1 activity?

Answer: It inhibits it

Point: 0.40000000000000002

Question N39 Which hormone activates the hormone-sensitive lipase?

Answer: Epinephrin or both of them (some versions epinephrine and some both of them)

Point: 0.40000000000000002

Question N40 Which enzyme catalyzes the first oxidation reaction in beta-oxidation process?

Answer: Acyl-coA dehydrogenase

Point: 0.40000000000000002

Question N42 Vitamin B7 is a coenzyme for acetyl-coA carboxylase

Answer: 1

Point: 0.25

Question N43 Acetyl coA is the product of the reaction catalyzed by acetyl coA carboxilase

Answer: 0

Point: 0.25

Question N44 Citrate molecule, that leaves the mitochondria and goes to cytoplasm, gives rise to which molecule after cleavage, besides acetyl coA?

Answer: Oxaloacetate

Point: 0.40000000000000002

Question N45 Dephosphorylation activates enzyme Acetyl-coA carboxylase. According to this, which of the following hormones activate this enzyme?

Answer: Epinephrin

Point: 0.40000000000000002

Question N46 Which two vitamins are acting as cofactors at different levels of fatty acid synthesis?

Answer: Vitamins B5 and B7

Point: 0.40000000000000002

Question N47 How is acetyl coA transported from mitochondria to cytosol for fatty acid synthesis?

Answer: As citrate

Point: 0.40000000000000002

Question N49 Insulin activates triacylglycerol synthesis

Answer: 1

Point: 0.25

Question N50 Isocitrate dehydrogenase catalyzes the reaction that produces the frist NADH in TCA cycle

Answer: 1

Point: 0.25

Question N52 Which pathway can the glycerol get involved in after being released from TAGs?

Answer: Gluconeogenesis

Point: 0.40000000000000002

Question N52 Which enzyme catalyses the hydrolysis of TAGs form VLDL and chylomicrons?

Answer: Lipoprotein lipase

Point: 0.40000000000000002

Question N53 Which of the following hormones promotes lipogenesis?

Answer: Insulin

Point: 0.40000000000000002

Question N54 What is the product of acyl coA combining with glycerol 3-phosphate?

Answer: Phosphati date

Point: 0.40000000000000002

Question N56 Apo B-100 is a specific apolipoprotein for HDL

Answer: 0

Point: 0.25

Question N57 CoQ is a mobile career of electrons in electron transport chain

Answer: 1

Point: 0.25

Question N58 Which of the following is the cofactor for pyruvate dehydrogenase?

Answer: All of them

Point: 0.40000000000000002

Question N59 How many CO2-s are released during TCA cycle?

Answer: Two

Point: 0.40000000000000002

Question N60 Which TCA cycle enzyme can be inhibited by fluoroacetate?

Answer: Aconi tase

Point: 0.40000000000000002

Question N61 Which high energy phosphate is produced during TCA cycle itself?

Answer: GTP

Point: 0.40000000000000002

Question N62 Which of the following is the electron acceptor in complex I of ETC?

Answer: FMN

Point: 0.40000000000000002

Question N63 Which of the following is ubiquinon?

Answer: Coenzyme Q

Point: 0.40000000000000002

Question N65 HDL is the smallest lipoprotein

Answer: 1

Point: 0.25

Question N66 Which complex is refferred to as ATP synthase?

Answer: Complex V

Point: 0.40000000000000002

Question N67 Which ETC complex is NADH dehydrogenase?

Answer: Complex I

Point: 0.40000000000000002

Question N68 Which of the following are the mobile careers of the electrons?

Answer: Both of them

Point: 0.40000000000000002

Question N69 Which of the following lipoproteins has the smallest density?

Answer: Chylomicrons

Point: 0.40000000000000002

Question N70 Which of the following lipoproteins transport endogenously produced triacylglycerols?

Answer: VLDL

Point: 0.40000000000000002

Question N71 Which apolipoprotein activates lipoprotein lipase?

Answer: Apo C-II

Point: 0.40000000000000002

Question N73 HMG-coA reductase is a major regulatory enzyme in cholesterol metabolism

Answer: 1

Point: 0.25

Question N74 Which apoprotein is characteristic for VLDL?

Answer: Apo B-100

Point: 0.40000000000000002

Question N75 How does high level of sterols affect the activity of HMG-coA reductase?

Answer: Inhibits it

Point: 0.40000000000000002

Question N76 Which of the following is used as a reducing agent in the reaction catalyzed by HMG coA reductase?

Answer: NADPH

Point: 0.40000000000000002

Question N77 Statins are the drugs that are used for the treatment of high levels of cholesterol in blood, which enzyme do they inhibit in cholesterol synthesis?

Answer: HMG coA Reductase

Point: 0.40000000000000002

Question N80 What is the alternate fuel for brain, when the glucose supply is low?

Answer: Ketones

Point: 0.40000000000000002

Question N1 Brain cells completely depend of anaerobic glycolysis

Answer: 0

Point: 0.25

Question N2 Reaction catalyzed by hexokinase is the only irreversible reaction in glycolysis

Answer: 0

Point: 0.25

Question N3 Which part of a cell does beta-oxidation of fatty acids take place?

Answer: Mitochondria

Point: 0.40000000000000002

Question N4 How many ATP molecules are used up during glycolysis?

Answer: Two

Point: 0.40000000000000002

Question N5 Which enzyme catalyzes the reaction that provides acetyl-coA?

Answer: Pyruvate dehydrogenase

Point: 0.40000000000000002

Question N6 Which of the following enzymes works as a sensor for high blood glucose concentration, in pancreas beta cells?

Answer: Glucokinase

Point: 0.40000000000000002

Question N10 Which enzyme catalyzes the creation of glycosidic α (1->4) bonds?

Answer: Glycogen synthase

Point: 0.40000000000000002

Question N11 Phosphorylation:

Answer: Inactivates glycogen synthase

Point: 0.40000000000000002

Question N12 Which bonds are broken by glycogen phosphorylase?

Answer: alpha 1->4 glycosydic bonds

Point: 0.40000000000000002

Question N13 Which of the following cells have glucose-6-phosphatase activity?

Answer: Liver

Point: 0.40000000000000002

Question N19 Which of the following enzymes catalyzes the reaction in gluconeogenesis when GTP is used as a phosphate donor?

Answer: PEP carboxykinase

Point: 0.40000000000000002

Question N20 How does fructose 2,6-bisphosphate affect the gluconeogenesis?

Answer: It inhibits it

Point: 0.40000000000000002

Question N22 Two molecules of ATP is synthesized during pentose phosphate pathway

Answer: 0

Point: 0.25

Question N23 In pentose phosphate pathway 5-phosphogluconolactone is aproduct of a reaction catalysed by glucose 6-phosphate dehydrogenase

Answer: 1

Point: 0.25

Question N24 Which of the following products of PPP is needed for normal glutathion antioxidant activity?

Answer: NADPH

Point: 0.40000000000000002

Question N25 Which of the following is a final product of oxidative phase of PPP?

Answer: Ribulose 5-phosphate

Point: 0.40000000000000002

Question N26 Which enzyme is a regulated site in PPP?

Answer: Glucose 6-phosphate dehydrogenase

Point: 0.40000000000000002

Question N27 Which phase is irreversible in PPP?

Answer: Oxidative

Point: 0.40000000000000002

Question N29 Increasing the chain length of a fatty acid decreases the melting temperature of that fatty acid

Answer: 0

Point: 0.25

Question N30 Double bonds of most of the unsaturated fatty acids are in cis configuration

Answer: 1

Point: 0.25

Question N31 Which of the following lipids is stored as fat in adipose tissue?

Answer: Triacylglycerols

Point: 0.40000000000000002

Question N32 Monounsaturated fatty acids:

Answer: Contain one double bond

Point: 0.40000000000000002

Question N33 In most of the unsaturated fatty acids, double bond has:

Answer: Cis configuration

Point: 0.40000000000000002

Question N34 What if the name of the following structure: Glycerol 2 fatty acids Phosphate

Answer: Phosphatidic acid

Point: 0.40000000000000002

Question N35 Release of FFA-s from adipose tissue is catalysed by lipoprotein lipase

Answer: 0

Point: 0.25

Question N36 Long chain fatty acids are transported into the mitochondria by carnitine shuttle

Answer: 1

Point: 0.25

Question N40 Which enzyme catalyzes the activation of fatty acids?

Answer: Acyl coA synthetase

Point: 0.40000000000000002

Question N43 Acetyl coA carboxilase is allosterically activated by citrate

Answer: 1

Point: 0.25

Question N46 What is the coenzyme for acetyl coA carboxylase?

Answer: Biotin

Point: 0.40000000000000002

Question N47 Which of the following activates acetyl coA carboxylase?

Answer: Citrate

Point: 0.40000000000000002

Question N50 Reaction calatyzed by succinate dehydrogenase is an example of substrate-level phosphorilation

Answer: 0

Point: 0.25

Question N53 Which enzyme transforms glycerol into an activated form?

Answer: Glycerol kinase

Point: 0.40000000000000002

Question N54 High amount of glucagon:

Answer: Inhibits the lipogenesis

Point: 0.40000000000000002

Question N57 Apo B-100 is a specific apoprotein for chylomicrons

Answer: 0

Point: 0.25

Question N58 Fatty acid synthesis is active:

Answer: During fed state

Point: 0.40000000000000002

Question N59 Acetyl coA can not leave mitochondria, which compound goes to cytoplasm from mitochondria to give rise to acetyl coA?

Answer: Citrate

Point: 0.40000000000000002

Question N60 High energy state in the cells is a signal for:

Answer: Fatty acid synthesis

Point: 0.40000000000000002

Question N61 Which of the following is used as a reducing agent in reduction reactions during fatty acid synthesis?

Answer: NADPh

Point: 0.40000000000000002

Question N58 Which pathway can provide glycerol for acylglycerol synthesis?

Answer: Glycolysis

Point: 0.40000000000000002

Question N59 Which enzyme transforms fatty acids into an activated form?

Answer: Fatty acyl coA synthetase

Point: 0.40000000000000002

Question N65 Cholesteryl esters are more hydrophobic than free cholesterol

Answer: 1

Point: 0.25

Question N73 Alpha-ketoglutarate dehydrogenase catalyzes the substrate-level phosphorylation in TCA cycle

Answer: 0

Point: 0.25

Question N74 Which of the following is the precursor of bile acids?

Answer: Cholesterol

Point: 0.40000000000000002

Question N75 What is the common product of the metabolism of all food products?

Answer: Acetyl-coA

Point: 0.40000000000000002

Question N76 Which of the following hormones is anabolic?

Answer: Insulin

Point: 0.40000000000000002

Question N77 When are ketones used as fuel?

Answer: During prolonged fasting and starvation

Point: 0.40000000000000002

Question N79 Which of the following processes takes place in mitochondria?

Answer: Beta-oxidation of fatty acids

Point: 0.40000000000000002

Question N6 What is the net production of NADH during anaerobic glycolysis?

Answer: zero

Point: 0.40000000000000002

Question N18 Which of the following compounds is not glucogenic?

Answer: Even chain fatty acids

Point: 0.40000000000000002

Question N17 What is the major site of gluconeogenesis?

Answer: Liver

Point: 0.40000000000000002

Question N37 Which of the following cells can not use fatty acids as alternative fuel?

Answer: None of them can

Point: 0.40000000000000002

Question N45 Where does fatty acid elongation take place?

Answer: Both of them

Point: 0.40000000000000002

Question N47 How many CO2s does one acetyl-coA give rise to?

Answer: Two

Point: 0.40000000000000002

Question N49 Diacylglycerol acyltransferase is a rate-limiting enzyme in triacylglycerol synthesis

Answer: 1

Point: 0.25

Question N52 Which enzyme catalyzes breakdown of dietary lipids?

Answer: Pancreatic lipase

Point: 0.40000000000000002

Question N54 Which of the ETC complexes is also a part of TCA cycle?

Answer: Complex II

Point: 0.40000000000000002

Question N56 Lipoprotein lipase breaks down the triacylglycerols in chylomicrons

Answer: 1

Point: 0.25

Question N60 High amount of insulin:

Answer: Promotes the lipogenesis

Point: 0.40000000000000002

Question N61 Phosphatidic acid contains:

Answer: Two acyl groups

Point: 0.40000000000000002

Question N62 What’s the product of a reaction catalyzed by succinate thiokinase in TCA cycle?

Answer: Succinate

Point: 0.40000000000000002

Question N63 How many molecules of FADH2 is produced during TCA cycle (meaning per acetyl coA) ?

Answer: One

Point: 0.40000000000000002

Question N66 Which of the following inhibits HMG coA?

Answer: All of them

Point: 0.40000000000000002

Question N67 What is the source of bile acids?

Answer: Cholesterol

Point: 0.40000000000000002

Question N68 Which of the following is a steroid hormone?

Answer: Cortisol

Point: 0.40000000000000002

Question N69 Which of the following lipoproteins is the biggest in size?

Answer: Chylomicrons

Point: 0.40000000000000002

Question N70 Which of the following lipoproteins is responsible for transporting dietary lipids?

Answer: Chylomicrons

Point: 0.40000000000000002

Question N71 Which of the following lipoproteins has the lowest concentration of TAGs in it?

Answer: HDL

Point: 0.40000000000000002

Question N1 Glucokinase has a higher affinity to glucose than hexokinase

Answer: 0

Point: 0.25

Question N2 Reaction catalyzed by Phosphoglucose isomerase is the rate-limiting step in glycolysis

Answer: 0

Point: 0.25

Question N10 Which enzyme transforms glucose 6-phosphate into glucose 1-phosphate?

Answer: Phosphoglucomutase

Point: 0.40000000000000002

Question N11 To which nucleotide is glucose attached to in order to go into glycogenesis?

Answer: UDP

Point: 0.40000000000000002

Question N12 cAMP pathway provides:

Answer: Activation of glycogen phosphorylase

Point: 0.40000000000000002

Question N13 Which of the following statements is correct?

Answer: Glycogen synthase is inactivated by phosphorylation and Glycogen phosphorylase is activated by it

Point: 0.40000000000000002

Question N18 Which of the following an be used as a substrate for gluconeogenesis?

Answer: Glycerol

Point: 0.40000000000000002

Question N19 Which enzyme bypasses the glycolytic hexokinase step in gluconeogenesis?

Answer: Glucose-6 phosphatase

Point: 0.40000000000000002

Question N20 What is the product of pyruvate carboxilase reaction?

Answer: Oxaloacetate

Point: 0.40000000000000002

Question N22 NAD is a coenzyme in redox reactions in Pentose phosphate pathway

Answer: 0

Point: 0.25

Question N23 Ribulose-5-phosphate is a product of oxidative part of pentose phosphate pathway

Answer: 1

Point: 0.25

Question N24 Which of the following enzymes catalyzes the reversible step in pentose phosphate pathway?

Answer: Trans ketolase

Point: 0.40000000000000002

Question N25 Which enzyme catalyzes the reaction where a ketopentose is produced in pentose phosphate pathway?

Answer: Phosphogluconate dehydrogenase

Point: 0.40000000000000002

Question N26 Which of the following is the cofactor of glutathion reductase?

Answer: NADPH

Point: 0.40000000000000002

Question N27 Which enzyme catalyzes the commited step of pentose phosphate pathway?

Answer: Glucose 6-phosphate dehydrogenase

Point: 0.40000000000000002

Question N29 Fatty acids are amphipathic molecules

Answer: 1

Point: 0.25

Question N30 Saturated fatty acids contain one or more double bond

Answer: 0

Point: 0.25

Question N31 Fatty acids with more than one doeble bonds are called:

Answer: Polyunsaturated

Point: 0.40000000000000002

Question N32 How many carbons do eicosanoids contain?

Answer: 20

Point: 0.40000000000000002

Question N33 Which alcohol backbone do glycolipids contain?

Answer: Sphingosine

Point: 0.40000000000000002

Question N34 Cholesteryl esters contain cholesterol and:

Answer: Fatty acid

Point: 0.40000000000000002

Question N35 Fatty acid thiokinase provides the activation of fatty acids before beta-oxidation

Answer: 1

Point: 0.25

Question N36 Acetone is the first one out of the ketone bodies to be synthesized

Answer: 0

Point: 0.25

Question N45 Which enzyme catalyzes the reaction that provides acetyl-coA for TCA cycle?

Answer: Pyruvate dehydrogenase

Point: 0.40000000000000002

Question N46 Which enzyme catalyzes isomerization of citrate to isocitrate?

Answer: Aconi tase

Point: 0.40000000000000002

Question N47 Glucagon and epinephrin:

Answer: Inibits fatty acid synthesis

Point: 0.40000000000000002

Question N52 Which coenzyme does complex I use as electron acceptor?

Answer: FMN

Point: 0.40000000000000002

Question N53 What pumps the protons from mitochondrial matrix to intermembrane space?

Answer: All of them

Point: 0.40000000000000002

Question N65 Low sterol levels promote HMG-coA reductase activity

Answer: 1

Point: 0.25

Question N69 Which tissues contain the biggest amount of lipoprotein lipase?

Answer: Cardiac muscles

Point: 0.40000000000000002

Question N70 Which lipoprotein acts as a donor of Apo C-II?

Answer: HDL

Point: 0.40000000000000002

Question N71 Which of the following promotes HMG coA reductase high activity?

Answer: Low levels of sterols

Point: 0.40000000000000002

Question N73 Reaction catalyzed by Malate dehydrogenase is the last step where NADH is produced in TCA cycle

Answer: 1

Point: 0.25

Question N8 Hexokinase is an enzyme that catalyzes the first reaction in gluconeogenesis

Answer: 0

Point: 0.25

Question N9 In gluconeogenesis, Pyruvate carboxylase and PEP carboxykinase bypass the glycolytic pyruvate kinase reaction

Answer: 1

Point: 0.25

Question N15 in gluconeogenesis pyruvate is transformed into oxaloacetate by pyruvate carboxilase

Answer: 1

Point: 0.25

Question N16 Pyruvate carboxylase is allosterically inhibited by acetyl coA

Answer: 0

Point: 0.25

Question N65 Insulin downregulates the expression of the gene for HMG-coA reductase

Answer: 0

Point: 0.25

Question N76 Which of the following lipoproteins is responsible for reverse cholesterol transport?

Answer: HDL

Point: 0.40000000000000002

Question N3 Which of the following enzymes catalyzes phosphorylation of the glucose in the cell?

Answer: Hexokinase

Point: 0.40000000000000002

Question N4 Which of the following enzymes catalyzes the irreversible step of glycolysis?

Answer: Pyruvate kinase

Point: 0.40000000000000002

Question N5 In anaerobic conditions pyruvate is transformed to:

Answer: Lactate

Point: 0.40000000000000002

Question N8 Glicogenin initiates the glycogen synthesis by self-glucosylating

Answer: 1

Point: 0.25

Question N9 At branch points there are a 1->4 glycosydic bonds in glycogen structure

Answer: 0

Point: 0.25

Question N8 Glycogenin is a dimer protein that inititates glycogen breakdown

Answer: 0

Point: 0.25

Question N9 Glycogen branching enzyme trasfers 7 glucose residues to make 1->6 glycosydic linkages

Answer: 1

Point: 0.25

Question N37 Which of the following is a coenzyme for Acyl coA dehydrogenase?

Answer: FAD

Point: 0.40000000000000002

Question N38 Which of the ketone bodies is first synthesized from HMG-coA?

Answer: Aceto acetate

Point: 0.40000000000000002

Question N42 Formation of malonyl coA from acetyl coA is a carboxylation reaction

Answer: 1

Point: 0.25

Question N43 In order to transport acetyl-coA from mitochondria to cytosool it needs to condensate with oxaloacetate to produce citrate which will be transported to cytosol

Answer: 1

Point: 0.25

Question N49 Glucagon promotes triacylglycerol synthesis

Answer: 0

Point: 0.25

Question N56 LDL is involved in reverse cholesterol transport

Answer: 0

Point: 0.25

Question N62 Which of the following is the example of a anaplerotic reaction?

Answer: Formation of oxaloacetate from pyruvate

Point: 0.40000000000000002

Question N63 Which of the following is produced at the substrate level phosphorylation step during TCA cycle?

Answer: GTP

Point: 0.40000000000000002

Question N69 Which apoprotein is characteristic for chylomicrons? And for VLDL it is (APO B-100)

Answer: APO B-48

Point: 0.40000000000000002

Question N70 How many carbon units does cholesterol molecule consist of?

Answer: 27

Point: 0.40000000000000002f

Question N71 How many molecules of NADPH are used during reduction of HMG-coA to mevalonate?

Answer: Two

Point: 0.40000000000000002

Question N65 NADH is used as the reducing agent in cholesterol synthesis

Answer: 0

Point: 0.25

Question N51 ATP synthesis is driven by:

Answer: Transfer of protons from matrix to intermembrane space

Point: 0.40000000000000002

Question N65 LDL is produced in liver

Answer: 0

Point: 0.25

Question N5 Which of the following cell use only anaerobic glycolysis?

Answer: Red blood cells

Point: 0.40000000000000002

Question N60 Which of the following create the ,,proton leak'' mitochondria during ETC?

Answer: Uncoupling proteins

Question N61 Which of the following prevents the reentry of the protons in mitochondrial matrix through H channel?

Answer: Oligomycin

Point: 0.40000000000000002

**Open ended questions :**

Question N7 Which enzyme catalyzes the reaction that Produces 1,3 bisphosphoglycerate in glycolysis? Explain your answer

Answer: glyceraldehyde 3 phosphate dehydrogenase it helps in conversion of glyceraldehyde 3 phosphate into 1,3 bisphosphoglycerate

Question N14 Which one of the ETC components of the electron transport chain only accepts electrons, and does not donate them? Explain your answer

Answer: Oxygen is the final electron acceptor in the ETC. It accepts electrons at Complex IV and combines with protons to form water (H₂O). Oxygen does not donate electrons any further the chain ends there.

Question N21 Explain Reciprocal regulation of Gluconeogenesis

Answer: Reciprocal regulation of gluconeogenesis means that gluconeogenesis and glycolysis are regulated in opposite directions to avoid wasting energy. When the body needs to produce glucose (e.g., during fasting), gluconeogenesis is activated and glycolysis is suppressed. This regulation involves key enzymes (like PFK-1 and FBPase-1), allosteric signals (like ATP and AMP), and hormones (like glucagon and insulin).

Question N28 Which glycolytic intermediates can be produced During PPP?

Answer: During the pentose phosphate pathway (PPP), fructose-6-phosphate (F6P), and glyceraldehyde-3-phosphate (G3P) can be produced as glycolytic intermediates.

Question N41 Which coenzymes are being reduced during the oxidative phases of FFA beta-oxidation?

Answer: two coenzymes, NAD+ and FAD, They become NADH and FADH2

Question N48 Write down the function of palmitoyl thioesterase. Explain your answer

Answer: helps control the length of fatty acids by breaking down palmitoyl-CoA into palmitate and CoA.

Question N55 What is the fate of glycerol after it is released from TAG due to lipolysis?

Answer: After glycerol is released from TAGs during lipolysis, it is taken up by the liver, where it is converted to dihydroxyacetone phosphate (DHAP). DHAP can either enter gluconeogenesis to form glucose, or enter glycolysis to be used for energy production.

Question N64 Describe the process of absorption and transport of dietary lipids

Answer: After eating, dietary lipids are broken down into smaller molecules in the intestine. These smaller molecules are then absorbed by the intestinal cells and reassembled into larger molecules called chylomicrons. Chylomicrons are transported through the lymphatic system and then into the bloodstream, where they deliver lipids to cells throughout the body for energy or storage.

Question N72 Which vitamins are important for TCA cycle and why?

Answer:

1. **Thiamine (Vitamin B1):** Helps turn pyruvate into acetyl-CoA, which starts the cycle.
2. **Riboflavin (Vitamin B2):** Makes coenzymes that help in energy transfer.
3. **Niacin (Vitamin B3):** Forms a coenzyme that moves electrons around in the cycle.
4. **Pantothenic Acid (Vitamin B5):** Part of a molecule that carries acetyl groups into the cycle.
5. **Biotin (Vitamin B7):** Helps an enzyme turn pyruvate into a cycle starting compound.
6. **Folate (Vitamin B9):** Supports overall cell metabolism, indirectly helping the cycle run smoothly as it is not directly involved in TCA cycle.

These vitamins act like helpers for the enzymes in the TCA cycle, making sure everything works as it should for producing energy.

Question N78 What are the main sites for cholesterol synthesis?

Answer: liver and **Intestinal Mucosal Cells**

Question N79 When does glycogenolysis take place?

Answer: when blood sugar levels are low.

Question N7 Write down the three irreversible steps of glycolysis

Answer:

The three irreversible steps of glycolysis are:

1. Phosphorylation of glucose to glucose-6-phosphate catalyzed by hexokinase (or glucokinase in the liver)
2. Phosphorylation of fructose-6-phosphate to fructose-1,6-bisphosphate catalyzed by phosphofructokinase-1 (PFK-1)
3. Conversion of phosphoenolpyruvate (PEP) to pyruvate catalyzed by pyruvate kinase

Question N64 Where and how is VLDL transformed into LDL?

Answer: VLDL turns into LDL mainly in the bloodstream with the help of an enzyme called lipoprotein lipase. As VLDL travels through the blood vessels, lipoprotein lipase breaks down the triglycerides inside VLDL into free fatty acids. This process happens in capillaries found in fat tissue and muscles. After this breakdown, VLDL changes into a form called IDL and then further into LDL. LDL carries cholesterol to cells throughout the body, where it's used for various functions.

Question N14 Discuss the double action of debranching enzyme in glycogen breakdown, Explain your answer

Answer: 1. Transferase activity:

It transfers a small oligosaccharide near the branch point to a nearby linear chain.

2. Glucosidase activity:

It hydrolyzes the α-1,6 glycosidic bond at the branch point, releasing free glucose.

Together, these actions help fully break down glycogen branches so glycogen phosphorylase can continue degrading linear chains.

Question N21 Which enzyme in PPP uses TPP as a coenzyme? Explain your answer

Answer: Transketolase in the PPP uses TPP to help move 2 carbon units between sugar phosphates, creating sugars necessary for nucleotide synthesis and other cell functions.

Question N48 Write down the fates of the products of the beta-oxidation, Explain your answer

Answer: Beta-oxidation breaks down fatty acids into acetyl-CoA, which enters the TCA cycle to produce energy. The coenzymes NADH and FADH2 generated in beta-oxidation donate electrons to the electron transport chain, leading to ATP synthesis

Question N64 Define biochemical mechanism of cholelithiasis.

Answer: cholelithiasis occurs when bile components like cholesterol or bilirubin become supersaturated , forming solid stones in the gallbladder or bile ducts.

Question N72 What is the rate-limiting step for cholesterol synthesis explain it's regulation

Answer: The rate-limiting step in cholesterol synthesis is catalyzed by HMG-CoA reductase, which converts HMG-CoA to mevalonate. This enzyme is regulated by feedback inhibition from cellular cholesterol levels, which reduce its activity to maintain cholesterol balance.

Question N14 Explain the function of glycogenin

Answer: Glycogenin acts as a primer for glycogen synthesis by catalyzing the attachment of glucose residues to itself, forming a short glucose chain that serves as a foundation for glycogen synthase to elongate.

Question N21 How does glucagon affect the gluconeogenesis, Explain your answer

Answer: Glucagon increases gluconeogenesis by activating enzymes like PEPCK and fructose-1,6-bisphosphatase. It works via cAMP signaling, which enhances glucose production in the liver during fasting.

Question N48 What is the role of ACP and cys-SH domains of fatty acid synthase in process of fatty acid synthesis?

Answer: ACP (acyl carrier protein) holds the growing fatty acid chain, while cys-SH (a cysteine residue) temporarily stores intermediates. These domains help shuttle the chain between active sites for elongation

Question N54 ATP synthesis is driven by:

Answer: A proton gradient across the mitochondrial membrane (chemiosmosis) via ATP synthase.

Question N7 How does high concentration of ATP affect the activity of phosphofructokinase? Explain your answer

Answer: High ATP allosterically inhibits PFK-1, slowing glycolysis. This prevents unnecessary glucose breakdown when energy is abundant.

Question N14 Why cannot human use muscle glycogen to maintain blood glucose level?

Answer: Muscle lacks the enzyme glucose-6-phosphatase, which is needed to convert glucose-6-phosphate into free glucose that can enter the bloodstream.

Question N21 Why acetyl CoA can not be a precursos of Gluconeogenesis, Explain your answer

Answer: Acetyl-CoA enters the TCA cycle and is fully oxidized to CO₂. Its carbon atoms cannot be converted into pyruvate or glucose precursors, so it can’t contribute to net glucose synthesis.

Question N28 Compare PPP and glycolysis to each other. Write similarities

Answer: Both start from glucose-6-phosphate, occur in cytoplasm, and involve sugar-phosphate intermediates.

Question N41 Which peripheral tissues use ketone bodies , define why

Answer: Brain, muscle, heart use ketones for energy during fasting because they can convert ketones to acetyl-CoA.

Question N48 What is the main difference between two isoenzymes of HMG CoA synthase

Answer: Mitochondrial form is for ketone synthesis; cytosolic form is for cholesterol synthesis.

Question N55 Which metabolic pathway, in glucose metabolism, provides the building blocks for TAGs? Explain your answer

Answer: Glycolysis provides glycerol-3-phosphate for the TAG backbone and acetyl-CoA for fatty acid synthesis. Glucose is broken down to DHAP (→ glycerol-3-phosphate) and pyruvate (→ acetyl-CoA), which are used to build TAGs.

Question N7 Write down the enzymes that catalyze the reactions where ATP is being used up (not produced)

Answer: Hexokinase/glucokinase and phosphofructokinase-1 (PFK-1).

Question N28 Why does fructose undergo more rapid glycolysis in the liver than does glucose, Explain your answer

Answer: Fructose bypasses the regulatory step catalyzed by PFK-1. It enters glycolysis downstream, so it’s metabolized faster and uncontrolled.

Question N41 What are the main differences between HDl and LDL

Answer: HDL (High-Density Lipoprotein) removes cholesterol from tissues and returns it to the liver (“good” cholesterol). LDL (Low-Density Lipoprotein) delivers cholesterol to tissues (“bad” cholesterol). HDL is dense and small, LDL is less dense and larger. HDL helps prevent atherosclerosis, while high LDL levels promote it.

Question N55 How is glycerol utilized after being released form TAGs?

Answer: In the liver, glycerol is converted to glycerol-3-phosphate, then to DHAP, which enters gluconeogenesis or glycolysis for energy or glucose production.

Question N7 In which case do we have Glycolysis without forming ATP? explain your answer

Answer: In arsenate poisoning, arsenate replaces phosphate in glycolysis, forming unstable intermediates that don’t produce ATP, even though glycolysis continues.

Question N14 Describe the glycogen branching process

Answer: The branching enzyme transfers a short glucose chain from the end of a glycogen molecule to a nearby site, forming an α-1,6 bond. This increases solubility and allows faster synthesis/degradation.

Question N21 What is glycerol transformed to in liver during the gluconeogenesis?

Answer: Glycerol → glycerol-3-phosphate → DHAP → glucose. These steps allow the liver to turn glycerol into glucose when needed.

Question N28 Write down the step of the oxidative phase in pentose phosphate pathway that results in production of pentose sugar phosphate

Answer: Glucose-6-phosphate dehydrogenase catalyzes the first step, producing NADPH and ribulose-5-phosphate, which is then converted into ribose-5-phosphate for nucleotide synthesis.

Question N41 Explain the function and mechanism of carnitine shuttle

Answer: The carnitine shuttle transports long-chain fatty acids into the mitochondrial matrix for β-oxidation. Fatty acids are converted to acyl-carnitine, transported across membranes, and converted back to acyl-CoA.

Question N48 What are the major suppliers of reducing equivalents for fatty acid synthesis?

Answer: NADPH from PPP and malic enzyme.

Question N55 Which hormones activate lipolysis?

Answer: Glucagon, epinephrine, cortisol.

Question N64 Explain reverse cholesterol transport

Answer: HDL picks up excess cholesterol from tissues and returns it to the liver for excretion in bile. This prevents cholesterol buildup in blood vessels.

Question N72 What are other uses of acetyl-coA besides going into TCA cycle?

Answer: Used in fatty acid, ketone body, and cholesterol synthesis.

Question N7 Explain difference between glucokinase and hexokinase (at least 3)

Answer:

1. Glucokinase in liver; hexokinase in most tissues
2. Glucokinase has high Km (low affinity); hexokinase has low Km
3. Glucokinase not inhibited by G6P; hexokinase is inhibited by G6P

Question N64 Describe the action of statin drugs

Answer: Statins inhibit HMG-CoA reductase, the key enzyme in cholesterol synthesis, lowering blood cholesterol levels.

Question N72 Which tissues require the most amount of cholesterol? Explain your answer

Answer: Liver (bile acids), adrenal glands (steroid hormones), and reproductive organs (sex hormones) use the most cholesterol because they need it for hormone and bile production.

Question N7 What's the reason of Lactic acidosis? Explain your answer

Answer: Lactic acidosis happens when oxygen is low or mitochondrial function is impaired, forcing cells to rely on anaerobic glycolysis and accumulate lactate.

Question N72 Which enzyme of TCA cycle can be inhibited by fluoroacetate?

Answer: Aconitase