



CHEMISTRY 260 BIOCHEMISTRY
Exam 4 PRACTICE QUESTIONS
Answers

- 2) anaerobic means without oxygen, products are lactate (our muscle cells) or ethanol and CO₂ (fermentation, yeast cells)
 citric acid cycle molecules directly - acetyl CoA (to finish metab. of glucose)
 oxaloacetate (needed to metab. acetyl CoA from fats)
- 3) oxidative decarboxylations, α -ketoacids - pyruvate deHase complex, α -ketoglutarate deHase cplx.
 oxidative decarboxylations, α -ketoacids - isocitrate deHase
- 4) a)

Net ATP Production (NADH converted to 2.5 ATP per and FADH ₂ converted to 1.5 per)					
		Glycolysis	Pyruvate deHase	CAC & OxP	Net ATP
glucose		-2 +4 +5 = +7	2 (2.5)	2 (10)	32
fructose		-2 +4 +5 = +7	2 (2.5)	2 (10)	32
sucrose (=glucose + fructose)		+14	+10	+40	64
pyruvate			+2.5	+10	12.5
glycerol	convert to glyceraldehyde3-P = -1 +2.5	+2 + 2.5	+2.5	+10	18.5

Net ATP Production (NADH converted to 2.5 ATP per and FADH ₂ converted to 1.5 per)				
	activation	α -oxidation	CAC & OxP	Net ATP
myristic acid (C14:0)	-2	6 cycles = 24	7 cycles = 70	92
palmitic acid (C16:0)	-2	7 cycles = 28	8 cycles = 80	106
stearic acid(C18:0)	-2	8 cycles = 32	9 cycles = 90	120

- 5) sequence of three reactions = dehydrogenase (FAD), hydratase, dehydrogenase (NAD⁺)
 What pathways? citric acid cycle, α -oxidation
 first and second reactions? first get enoyl group, second get α -hydroxyacyl group
- 6) NADH/H⁺ 2 electrons (as 2 H•) \square CoQ (complex 1) \square cytochrome c (complex 3) \square O₂ (cmlpx 4)
 FADH₂ 2 electrons (as 2 H•) \square CoQ (complex 2) \square cytochrome c (complex 3) \square O₂ (cmlpx 4)
- 7) pairs of α -ketoacid/amino acid with 3, 4 or 5 carbons that are linked by aminotransferase reactions (pyruvate/alanine oxaloacetate/aspartate α -ketoglutarate/glutamate)
 coenzyme for amino acid reactions? PLP, pyridoxal phosphate (from vitamin B₆)
 two reactions to "remove" an amino group? glutamate aminotransferase + glutamate deHase