



Benha University
Faculty of Science
Department of Zoology

Biochemistry 1 (303 Z)

Semester: First Term

Date: 3/1/2017

Level: Third level

Sepec: Biotechnology

Exam time: 2:00 hours

Answer the following questions:-

1- Write on the following:- (18 marks)

a) Function and regulation of glycolysis. (4 marks)

GLYCOLYSIS FUNCTION

Aerobic: To convert *glucose* to pyruvate and ATP. Pyruvate can be burned for energy (TCA) or converted to fat (fatty acid synthesis).

Anaerobic: ATP production. Recycle NADH by making lactate.

GLYCOLYSIS REGULATION

Primary signals: *Insulin* turns on.
Glucagon turns off.
Epinephrine turns on in muscle, off in liver.
Phosphorylation turns off in liver, on in muscle.

Secondary signals: Glucose signals activate (fructose 2,6-bisphosphate activates phosphofructokinase).
Low-glucose signals inhibit.
High-energy signals inhibit.
Low-energy signals activate.



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b) Gluconeogenesis location, function and its regulation. (5 marks)

GLUCONEOGENESIS FUNCTION

Gluconeogenesis makes *glucose* from pyruvate to help maintain blood glucose levels.

GLUCONEOGENESIS LOCATION

Liver and kidney—*not muscle*.

GLUCONEOGENESIS REGULATION

Primary signals: Insulin turns *off*.
Glucagon turns *on*.
Acetyl-CoA turns *on*.
Phosphorylation turns *on* in liver.

Secondary signals: Glucose signals turn *off*.
(Fructose 2,6-bisphosphate inhibits fructose 1,6-bisphosphatase.)
Low-glucose signals activate.
High-energy signals activate.
Low-energy signals inhibit.



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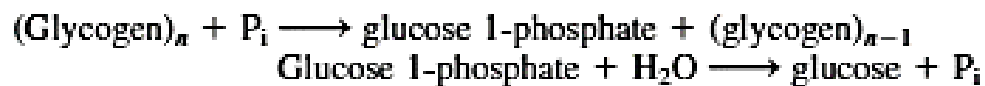
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c) ATP cost for glycogen biosynthesis. (3 marks)

ATP YIELD

No ATP is required to remove glucose from glycogen stores.

Degradation:¹



ATP COST

2 ATPs are required to store each glucose as glycogen.

Synthesis:¹

