V1

STUDENT NAME: ……..

STUDENT NUMBER: ……

ANP 1107A

Midterm #1

Date: February 10, 2012

Time: 1:00 h PM

Duration: 1 hr 20 min

Instructor:

Dr. J. Komorowski

INSTRUCTIONS:

1. **45 multiple choice questions** (1 mark/1 correct answer per question), two labelling question (2.5 marks + 2.5 marks = 5 marks), one question with definitions (6 marks) = **56 marks total** plus one BONUS QUESTION (2 marks).

2. Please use the computer sheet for the multiple-choice questions, but answer the labelling/written questions right on the exam itself as well.

3. Please put your name, student number and the version of the exam **(V1**) at the top of each page of this exam and on your computer sheet and hand in everything when you have finished.

4. Make sure this exam is complete. This exam contains **11 pages.** The excuse of missing a page will not be accepted after the exam.

GOOD LUCK!!!!!!!

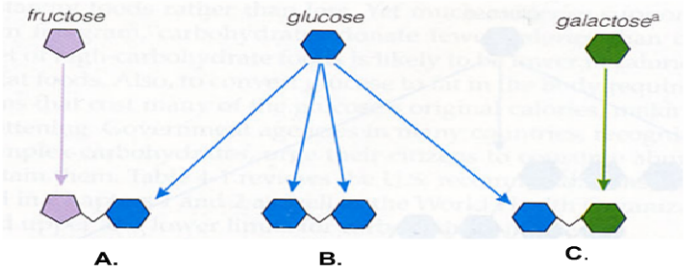
1. **Which of the following is true?**

   A. Adults require less protein per kilogram of body weight than children
   B. Kwashiorkor results from severe calorie deficiency and leads to "skin and bone" appearance
   C. Plant sources of protein usually contain all essential amino acids
   D. Soluble fibre is digested and absorbed in the small intestine

2. **Which of the following is true about saliva?**

   A. It contains amylase, pepsin and trypsin
   B. Its pH is alkaline (>7)
   C. About 70% of its content is water
   D. It contains defensins, lysozymes and some antibodies
   E. It is important for formation of chime

3. **Which of the following (A, B or C) represents maltose?**



4. **Jane experiences cramping pain and diarrhea after drinking milk. The enzyme she is unable to produce or produces in insufficient quantity is:**

   A. sucrase
   B. amylase
   C. maltase
   D. lactase

5. **The site of vitamin K production and absorption in the body is the:**

   A. liver
   B. large intestine
   C. kidneys
   D. stomach
   E. pancreas

6. **Which of the following decreases stomach's motility?**

   A. Increased secretion of gastrin
   B. Increased secretion of cholecystokinin
   C. Increased secretion of HCL
   D. Digestion of CHO in the stomach
   E. Distension of stomach

7. **Adam had his stomach removed due to cancer. Which of the following nutrients will not be absorbed from his small intestine as a result of this surgery?**

   A. Proteins
   B. Lipids
   C. Carbohydrates
   D. Vitamin B12
   E. Vitamin A

8. **In areas of the gastrointestinal tract specialized for the absorption of nutrients, the type of epithelium seen in the mucosa is:**

   A. simple squamous
   B. stratified squamous
   C. transitional
   D. simple columnar
   E. pseudostratified ciliated columnar

9. **Essential nutrients:**

   A. cannot be synthesized in the body or are synthesized in insufficient quantities
   B. are required in very low amounts
   C. are required for every metabolic process in the body
   D. include most carbohydrates, amino acids and fats
   E. can be produced from other organic molecules by the liver and kidneys

10. **Krebs cycle takes place in:**

    A. mitochondrial matrix
    B. inner mitochondrial membrane (cristae)
    C. cytosol
    D. cellular membrane

11. **The first organ to receive the blood-borne products of digestion is the:**

    A. liver
    B. pancreas
    C. heart
    D. brain

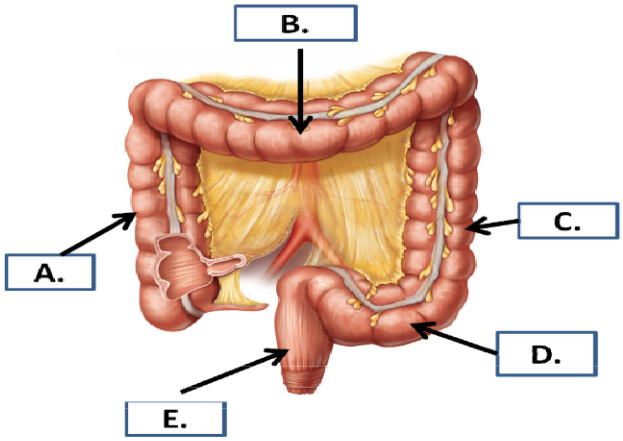
12. Which of the following is the correct order for the pathway that food follows through this area of the GI tract?

A. ileum, jejunum, cecum, duodenum, pylorus
B. pylorus, duodenum, jejunum, ileum, cecum
C. jejunum, duodenum, pylorus, cecum, ileum
D. pylorus, duodenum, ileum, jejunum, cecum
E. jejunum, duodenum, cecum, ileum, pylorus

13. Which of the following statements is TRUE?

A. The function of the enzyme salivary amylase is to begin digesting proteins.
B. Fibre in the food increases fecal bulk and speeds the movement of the indigested content through the large intestine
C. The mucosa is found only in the small intestine because this is the only part of the gastrointestinal tract in need of mucus.
D. Chemical digestion involves processes such as segmentation.
E. The main cause of stomach (peptic) ulcers is stress

14. Which of the following (A, B, C, D or E) represents the sigmoid colon?



15. The muscularis of most organs of the gastrointestinal tract consists of two layers of smooth muscle except in the:

A. duodenum
B. ileum
C. rectum
D. stomach
E. esophagus

16. Secretin and cholecystokinin (CCK) are secreted by the:

A. stomach
B. pancreas
C. small intestine
D. liver
E. gallbladder

17. Which of the following statements about salivation is TRUE?

A. Salivation can be triggered by stress
B. Salivation can be inhibited by the activation of the sympathetic nervous system
C. Salivation is usually inhibited by bacterial toxins in the stomach.
D. All of the above

18. Which of the following statements is FALSE?

A. There are two sources of amylase: the pancreas and the salivary glands.
B. Glucose can be converted into building blocks for triglycerides.
C. There are three sources of amylase: the salivary glands, stomach's chief cells and pancreas
D. It is possible to obtain all of the amino acids that the body needs if one is a vegetarian.
E. There are two primary storage sites for glycogen in the body: the liver and skeletal muscle.

19. Triglycerides found in foods, such as butterfat in milk or white fat streaks in bacon, are split by a specific enzyme in preparation for absorption. Which of the following enzymes is responsible?

A. rennin
B. pepsin
C. lipase
D. cholecystokinin

20. The order of events during lipid absorption is:

A. chylomicron->intestinal epithelium->micelle->lacteal->blood
B. micelle->chylomicron->intestinal epithelium->micelle->blood
C. lacteal->chylomicron->intestinal epithelium->micelle->blood
D. micelle->intestinal epithelium->chylomicron->lacteal->blood
E. chylomicron->intestinal epithelium->micelle->blood->lacteal

21. Which of the following pairs of digestive system actions correctly describes two of the functions of the small intestine?

A. bicarbonate secretion and bacterial action
B. acid secretion and digestion of lipids
C. water absorption and bacterial action
D. segmentation and peristalsis

22. Which of the following is NOT a brush border enzyme?

A. lactase
B. carboxypeptidase
C. enterokinase
D. sucrase

23. You have just eaten toast with butter and ham and have drunk a glass of orange juice. Which of the following organs or glands would be active in helping you digest this food?

A. pancreas
B. salivary glands
C. mucus producing glands
D. all of the above

24. Which of the following is/are paired CORRECTLY?

A. gastrin // stimulation of bile release by the gallbladder
B. lactase // protein digestion
C. secondary active transport // intestinal absorption of amino acids
D. omega 3 fatty acids//butter and meat
E. essential amino acid // must be synthesized in the liver

25. Gallbladder contraction to release bile is stimulated by:

A. gastrin
B. cholecystokinin
C. secretin
D. histamine
E. acetylcholine

26. Which of the following occurs during the cephalic phase of gastric secretion?

A. chemoreceptors detect a change in the pH of gastric juice
B. stretch receptors detect distension of the stomach
C. chemoreceptors detect fatty acids in the duodenum
D. the sight, smell, thought or taste of food triggers parasympathetic impulses
E. CCK is released by enteroendocrine cells

27. In well fed students, that are on a balanced diet and are currently listening to the lecture on metabolism, amino acids play a significant role in the following, EXCEPT:

A. production of some hormones
B. production of the cells of the immune system
C. formation of most structural materials
D. formation of ATP

28. The difference between the effects of secretin and the effects of CCK on the pancreas is that:

A. secretin stimulates secretion of pancreatic juice, while CCK inhibits secretion of pancreatic juice and closes hepatopancreatic sphincter
B. secretin causes dilation of the pancreatic duct, while CCK causes constriction of the duct.
C. Secretin is released in the stomach, while CCK is released in the small intestine
D. secretin stimulates secretion of pancreatic juice rich in bicarbonate, while CCK stimulates secretion of pancreatic juice rich in digestive enzymes.

29. Which of the following is true about pepsinogen?

A. It is produced by the pancreas
B. It requires HCL for its conversion to pepsin
C. It is produced by the epithelial cells of the duodenum
D. It requires bicarbonate for its activation

30. Umami :

A. is derived from the tongue's/palate's ability to detect sweet taste
B. is the 5th sense of taste derived from the palate's ability to detect glutamate
C. is a digestive enzyme
D. is the type of carbohydrate-rich Japanese food

31. Increased activity of the sympathetic nervous system will:

A. increase the production of digestive juices
B. increase only the production of those digestive juices rich in buffers.
C. have no effect on the digestive system.
D. decrease the production of digestive juices.
E. increase the movement of food through the alimentary canal.

32. After secretion into the duodenum, the enzyme trypsinogen is converted into its active form by:

A. enterokinase
B. procarboxypeptidase
C. lysolecithin
D. an alkaline pH
E. an acidic pH

33. Which of the following enzymes acts in the stomach?

A. chymotrypsin
B. enterokinase
C. pepsin
D. dextrinase
E. trypsin

34. The intestinal absorption of glucose and galactose occurs via:

A. simple diffusion
B. osmosis
C. secondary active transport
D. bulk flow
E. endocytosis

35. When ketone bodies are present in the blood and urine in large amounts, it indicates increased metabolism of:

A. amino acids
B. fatty acids
C. glycogen
D. lactic acid
E. glucose

36. Digestion of which of the following would be affected the most if the liver were severely damaged?

A. lipids
B. carbohydrates
C. proteins
D. starches
E. all of the above would be affected equally

37. Hepatpcytes do NOT:

A. produce digestive enzymes
B. process nutrients
C. store fat-soluble vitamins
D. detoxify chemicals
E. produce bile

38. Which of the following statements regarding the digestion and absorption of fats is TRUE?

A. Emulsification of lipid droplets by bile salts facilitates the chemical digestion of fats.
B. Triglycerides are hydrolyzed by lipase, an intestinal brush border enzymes.
C. Fatty acids and glycerol are resynthesized into triglycerides once they enter the lacteals.
D. The absorption of triglycerides occurs primarily in the duodenum.

39. Deamination is the process whereby the amine group of an amino acid is:

A. transferred to fatty acid and used for amino acid production
B. removed from amino acid and converted to urea
C. transferred to a keto acid
D. converted to ammonia

40. Glucose CANNOT be obtained from:

A. glycogenolysis
B. fatty acid metabolism
C. gluconeognesis
D. pyruvic acid

41. During starvation, amino acids and .....can be converted to glucose.

A. glycerol
B. glycogen
C. glyceraldehyde
D. glucagon

42. Acetyl-CoA entering the Kreb's cycle CAN come from which of the following sources?

A. B-oxidation of fatty acids
B. pyruvic acid
C. amino acids
D. B) and C)
E. All of the above

43. Which of the following statements is FALSE?

A. Vitamin C is water soluble
B. The liver produces all of the fatty acids that our body needs.
C. Most vitamins are not made in the body but must be obtained from the diet.
D. Vitamins E and K are fat-soluble vitamins.

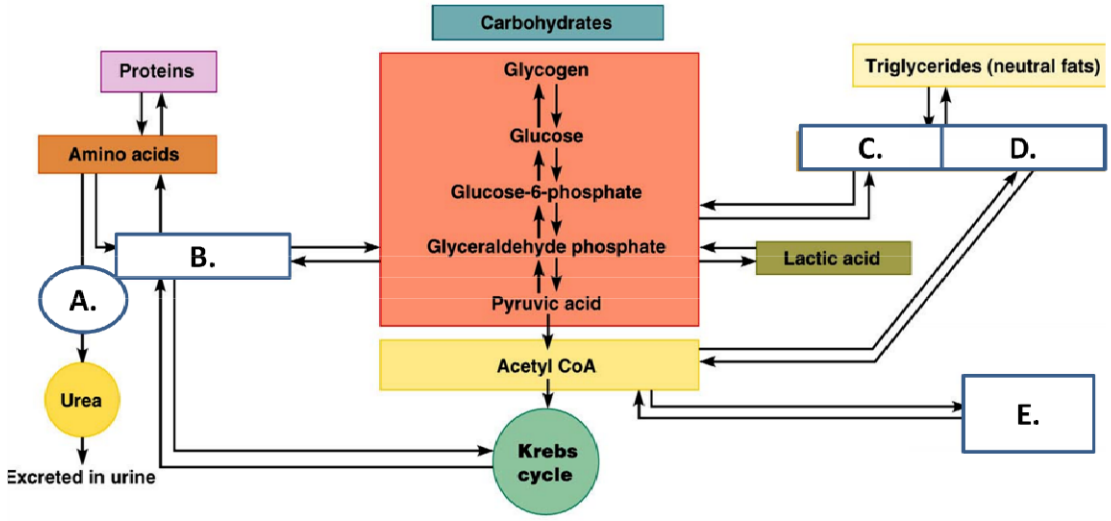
44. Choose the TRUE statement(s) about vitamins:

A. During winter/early spring months people living in Canada may have insufficient vitamin D content in their bodies due to insufficient production and depletion of this vitamin stores
B. Most vitamins are made in the body and thus do not have to be delivered with food on the everday basis
C. Intestinal bacteria digest all vitamins and thus prevent their absorption
D. Allof the B-vitamins can be stored in the body
E. During winter/early spring months people living in Canada may have insufficient vitamin A content in their bodies due to insufficient production and depletion of this vitamin stores

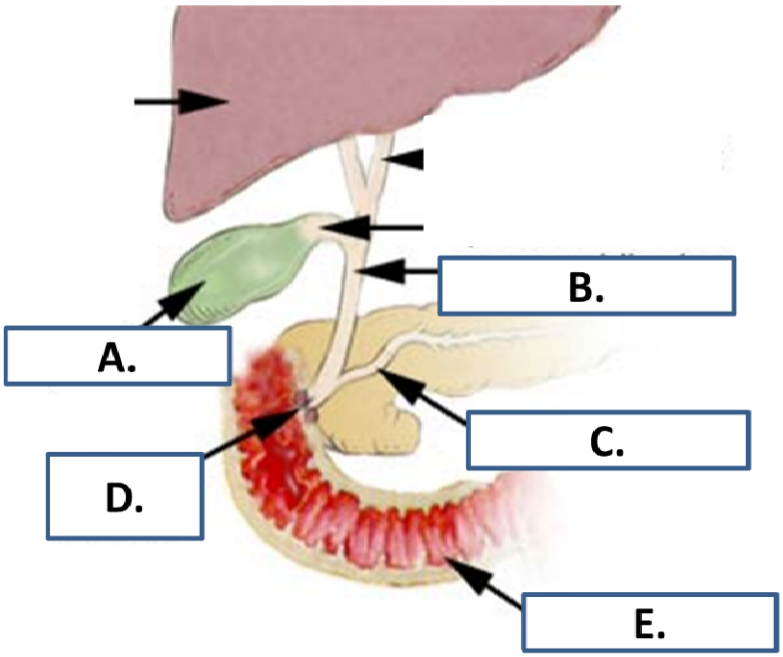
45. Anabolism includes reactions in which:

A. carbohydrates are metabolized to yield ATP
B. larger molecules or structures are built from smaller ones
C. structural proteins are used as a potential energy source
D. ketone bodies are formed
E. B) and D)

46. Name (label) the metabolites indicated by the letters A, B, C, D and E (0,5 mark each proper label, 2.5 marks total):



47. Name (label) the structures indicated by the letters A, B, C, D and E (0,5 mark each proper label, 2.5 marks total):



48. Please define and explain the physiological functions of <u>three (3)</u> of the following (2 mark each correct answer,6 marks total):

USE THE OTHER SIDE OF THE PAGE FOR YOUR DEFINITIONS

A. Peristalsis
B. Gluconeogenesis
C. Kwashiorkor
D. Hepatic portal circulation
E. Ketone bodies

BONUS (2 marks):

Describe briefly two structural/functional adaptations that help prevent damage to the stomach's epithelium and the underlying tissue(ONE SENTENCE FOR EACH ADAPTATION) (2 marks)