STUDENT NAME: ……..……..

STUDENT NUMBER: ……..

University of Ottawa

ANP 1105A

Midterm #2

Date: November 15, 2010

Duration: 1 hr 20 min

Instructor: Joanna Komorowski

INSTRUCTIONS:

1. **49 multiple choice questions** (1 mark/1 correct answer per question) plus one labeling questions (2 marks) and one listing question 2 marks) = 53 total + bonus question (2marks) = 55 marks total possible
2. Please answer the multiple choice questions on the on the exam and on the computer sheet that is provided

3. Please **put your name and student number at the top of this page** and at the top of the final page. **Please do not forget to put your course code (ANP 1105A), your surname (last name) and the initials, on the first page of the scantron sheet!!!**

4. Make sure this exam is complete. This exam contains **11 pages.**

5. The excuse of missing a page will not be accepted after the examination.

Good luck!!!!!

1. **Anterior pituitary hormones include all but one of the following:**

A. Growth hormone (GH)
B. Thyroid stimulating hormone (TSH)
C. Antidiuretic hormone (ADH)
D. Luteinizing hormone (LH)
E. Follicle stimulating hormone (FSH

2. **The "resting and digesting" division of the autonomic nervous system is the:**

A. sympathetic division
B. parasympathetic division
C. somatic division
D. peripheral division

3. **Hypersecretion of GH in an adult produces:**

A. giantism
B. goiter
C. dwarfism
D. exophthalmos
E. acromegaly

4. **An example of a short loop negative feedback control would be:**

A. suppression of TSH production by the thyroid hormones
B. suppression of gonadotropin releasing hormone (GnRH) by LH
C. regulation of insulin levels by glucose
D. regulation of blood calcium levels

5. **The posterior pituitary:**

A. is the site of release of TSH (thyroid stimulating hormone)
B. is composed of neural tissue
C. is linked to the hypothalamus via the hypophyseal portal system
D. is the site of storage of the “hormone of love and trust”
E. B) and D)

6. **Which of the following is TRUE about hormonal receptors?**

A. they become up-regulated by persistently high levels of a specific hormone
B. they become down-regulated by persistently high levels of a specific hormone
C. steroid hormones do not require any receptors to exert their effect on DNA and initiate gene transcription
D. thyroid hormone receptors are located on the cellular membrane

7. **The integration centre of the autonomic nervous system is the:**

A. cortex
B. hypothalamus
C. vagus nerve
D. brain stem
E. None of the above

8. **Which of the following is TRUE about hormones?**

A. Steroid hormones are fat soluble and thus easily cross cellular membranes.
B. All hormones are released from the cells producing them via exocytosis.
C. Steroid hormones act via G-protein and a second messenger system.
D. Protein and peptide hormones directly stimulate gene transcription via binding to DNA associated receptors

9. **Hormone secretion can be stimulated by:**

A. another hormone
B. circulating levels of a substance regulated (controlled) by a particular hormone
C. neural stimulation
D. all of the above

10. **Which of the following statements is FALSE?**

A. Metabolic rate and metabolism of glucose as well and fat are regulated by both the sympathetic and parasympathetic nervous system.
B. Under stressful conditions, the sympathetic nervous system dominates over the parasympathetic.
C. Sympathetic cardiac nerves stimulate HR whereas parasympathetic nerves slow down HR
D. The sympathetic nervous system has a more widespread effect in the body than does the parasympathetic nervous system.

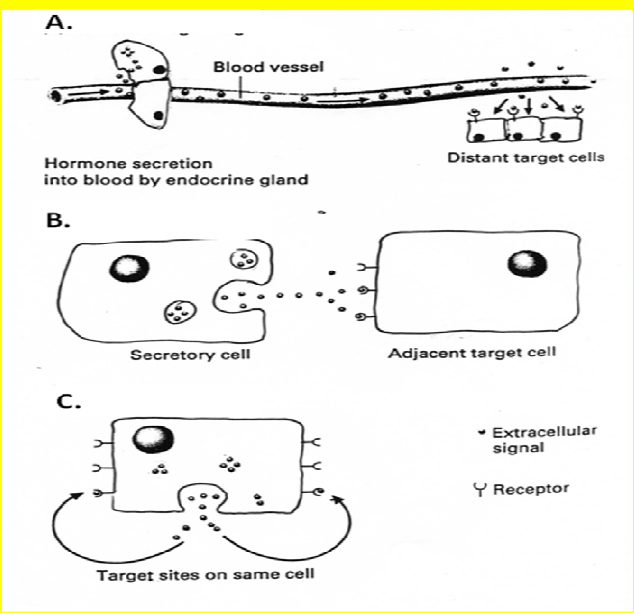
11. **Protein hormones influence cellular activities by:**

A. activating the second messenger cyclic AMP
B. using calcium ions as a second messenger
C. changing the permeability of the cell membrane
D. binding to DNA and initiating the transcription of a specific gene
E. all of the above

12. **Which of the following is TRUE about the autonomic nervous system?**

A. The regulatory responses of the endocrine system to homeostatic imbalance are faster than responses of the nervous system.
B. Axon terminals of the preganglionic and postganglionic neurons of the sympathetic nervous system release acetylcholine.
C. The parasympathetic nervous system is mobilized during a "fight or flight" situation.
D. The sympathetic nervous system causes an increase in heart rate and blood pressure.

13. Which of the following (A, B or C) represents the autocrine stimulation?



14. Homeostasis is the condition in which the body maintains:

A. the lowest possible energy usage.
B. a relatively stable internal environment, within limits.
C. a static state with no deviation from preset limits.
D. a dynamic state with an unlimited range.

15. Choose the TRUE statement about endocrine regulation:

A. endocrine regulation involves positive feedback to prevent severe changes in the body.
B. an example of humoral stimulation would be increased secretion of the hormone insulin in response to a rise in blood glucose levels.
C. endocrine organs secrete hormones into a series of ducts.
D. regulating hormones from the hypothalamus are delivered directly to the anterior pituitary cells by hypothalamic neurons.

16. Thrombopoetin is a hormone that:

A. stimulates platelet production
B. blocks the activity of thrombin
C. activates thrombin
D. dissolves thrombi (plural of thrombus)

17. Which of the following is NOT a phase of erythropoiesis?

A. production of ribosomes
B. mitosis of reticulocytes
C. ejection of the nucleus
D. synthesis of hemoglobin molecules
E. all of the above are phases of erythropoiesis

18. Releasing and inhibiting hormones are produced by the ..... to control the .....

A. hypothalamus // posterior pituitary
B. posterior pituitary // hypothalamus
C. hypothalamus // anterior pituitary
D. pineal gland // hypothalamus
E. anterior pituitary // hypothalamus

19. Which of the following cause ONLY the extrinsic pathway of blood coagulation to be followed?

A. sticking of platelets to roughened blood vessel walls
B. activation of a proenzyme exposed to collagen
C. the release of tissue factor by damaged tissue cells
D. release of heparin by the liver
E. the conversion of prothrombin to thrombin

20. Which of the following statements is TRUE?

A. Lack of the coagullation factor VIII is the main cause of sickle cell anemia.
B. Thalassemia is a hereditary disorder common in people of the African-American origin.
C. Polycythemia vera is a hereditary disease characterized by a low number of RBCs.
D. Hemophilia A and B are the hereditary disorders affecting men but carried by women

21. The two hormones released from the posterior pituitary are synthesized in the:

A. anterior pituitary
B. hypothalamus
C. posterior pituitary
D. infundibulum
E. none of the above

22. A type of anemia in which RBCs have changed shape, are rigid and tend to occlude blood vessels and thus may lead to hypoxia is called……..anemia.

A. iron-deficiency
B. hemorrhagic
C. sickle cell
D. pernicious

23. Which of the following might trigger erythropoiesis?

A. decreased tissue demand for oxygen
B. increased tissue demand for oxygen
C. polycythemia
D. moving from a high altitude to a low altitude
E. kidney failure

24. Which of the following is necessary for the conversion of fibrinogen to fibrin?

A. thrombin
B. plasmin
C. heparin
D. antitrypsin
E. vonWillebrand factor

25. Macrocytic, megaloblastic anemia is characterized by:

A. large RBCs
B. small RBCs
C. too many RBCs
D. Both A) and C)
E. all of the above

26. During blood vessel injury, the role of the von Willbrand factor is:

A. to initiate platelets adhesion to the exposed collagen fibers
B. to release histamine that causes vasoconstriction of the injured vessel
C. to convert plasminogen to plasmin
D. to initiate release of prostacyclin

27. During a breakdown of RBCs, bilirubin is produced from:

A. globin chains of hemoglobin
B. portions of heme molecules that do not contain iron
C. portions of heme molecules that contain iron
D. iron found in hemoglobin molecules
E. abnormal proteins found in red blood cells

28. Adam has a platelet count of 80,000 per microliter of blood. Which of the following statements is TRUE about Adam's platelets count?

A. it is normal
B. it indicates thrombocytosis
C. it indicates thrombocytopnia
D. none of the above

29. Which of the following statements is FALSE?

A. The heme portion of the hemoglobin molecule is capable of binding both O2 and CO2.
B. Blood is considered a type of connective tissue.
C. The only complete cells in blood are leukocytes.
D. Platelets and mature RBCs do not contain nuclei

30. The enzyme that plays an important role in clot digestion and dissolution is called:

A. thrombin
B. plasmin
C. heparin
D. urokinase
E. streptokinase

31. Select the correct statement regarding RBCs:

A. the main sites of RBCs formation are the spleen and the liver
B. red bone marrow is the main site of RBCs formation in adults
C. each RBC contains about 250 million haemoglobin molecules
D. Both A) and C) are true
E. Both B) and C) are true

32. After erythrocytes have circulated for about 120 days, they are removed by macrophages found chiefly in the:

A. liver
B. appendix
C. spleen
D. bone marrow
E. heart

33. Which of the following is true about anemia?

A. Iron deficiency with anemia is characterized by high hematocrit
B. Sports anemia is characterized by low RBC count and can be cured by iron supplements
C. Iron deficiency without anemia is characterized by low ferritin but normal Hb levels
D. Pernicious anemia is due to low iron content in the diet

34. Which of the following statement IS NOT true about blood?

A. Blood has a pH of 7.35 – 7.45
B. Blood has a temperature of 38 C°
C. Blood accounts for approximately 15% of an adult male's body weight
D. Blood volume may be decreased by dehydration

35. .Compared to skeletal muscle, cardiac muscle:

A. has gap junctions that allow it to act as a functional syncytium
B. lacks striations
C. has more mitochondria
D. Both A) and B)
E. Both A) and C)

36. The left ventricular wall of the heart is thicker than the right ventricular wall because it has to:

A. accommodate a greater volume of blood
B. pump blood with greater pressure and against greater resistance
C. expand the thoracic cage during diastole
D. pump blood through a smaller valve

37. Mark had an untreated strep throat that led to calcification of his heart's bicuspid (mitral) valve. Now, he suffers from a reduced rate of blood flow:

A. from the left ventricle to the aorta
B. from the inferior vena cava into the right atrium
C. from the left atrium into the left ventricle
D. from the right atrium into the right ventricle
E. from the right ventricle into the pulmonary artery

38. Oxygenated blood flows to the heart through the:

A. superior vena cava
B. pulmonary artery
C. coronary veins
D. pulmonary veins

39. The coronary arteries arise from:

A. inferior vena cava
B. aorta
C. superior vena cava
D. pulmonary trunk
E. right atrium

40. The pericardium is:

A. the outermost muscular layer of the heart
B. the innermost lining of the heart
C. the thick muscular layer of the heart that provides pumping action
D. a double-walled membranous sac that encloses the heart

41. Chose a correct order of blood flow: starting at the superior vena cava, blood flows to the: 1) left atrium, 2) right atrium, 3) left ventricle, 4) pulmonary artery, 5) aorta 6) right ventricle

A. 1, 3, 4, 2, 6, 5
B. 2, 6, 4, 1, 3, 5
C. 2, 1, 6, 3, 4, 6

42. Which of the following lists the elements of the heart's conduction system in the correct order?

A. SA node, AV node, AV bundle, bundle branches, Purkinje fibres
B. SA node, AV bundle, bundle branches, AV node, Purkinje fibres
C. AV node, AV bundle, SA node, bundle branches, Purkinje fibres
D. SA node, AV bundle, bundle branches, AV node, Purkinje fibres
E. None of the above

43. Cardiac muscle fibres remain depolarized longer than skeletal muscle fibres because:

A. voltage-gated sodium channels close more quickly to trap sodium inside longer
B. voltage-gated potassium channels open at the same time as sodium channels, allowing more positively charged potassium to enter
C. it takes longer to reach threshold, and the duration of depolarization is directly proportional to the time it takes to reach threshold
D. the intercalated discs are very thick relative to the rest of the sarcolemma and it takes longer for potassium to exit the cell to cause repolarization
E. right after sodium influx and closure of sodium channels, calcium enters the cytosol of the cardiac muscle cells and prolongs depolarization

44. Which of the following is true about the autorhythmic cardiac cells?

A. their depolarization is initiated by the influx of calcium through the leaky channels
B. their auto-rhythm can be modulated by the autonomic nervous system
C. their action potentials have a plateau
D. they have stable resting potentials

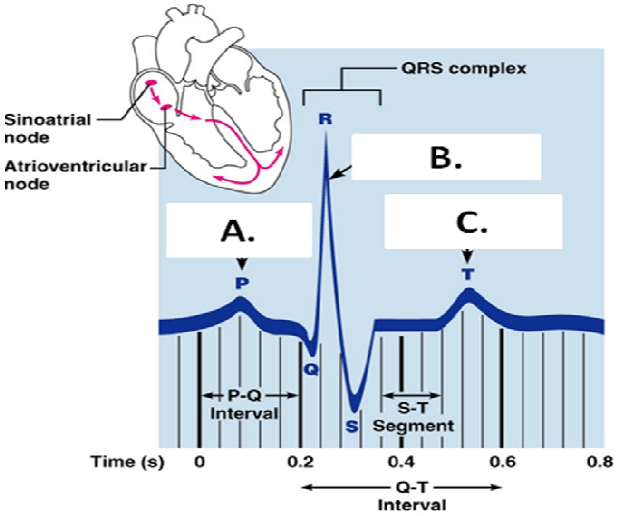
45. The cardiac electrical impulse normally begins spontaneously in the SA node because:

A. of its superior location in the right atrium
B. the SA node is the only area of the heart capable of spontaneous depolarization
C. the SA node has rich sympathetic innervation via the vagus nerve
D. the SA node depolarizes more often than other autorhythmic cells of the heart
E. B) and D)

46. Normal heart sounds are caused by which of the following events?

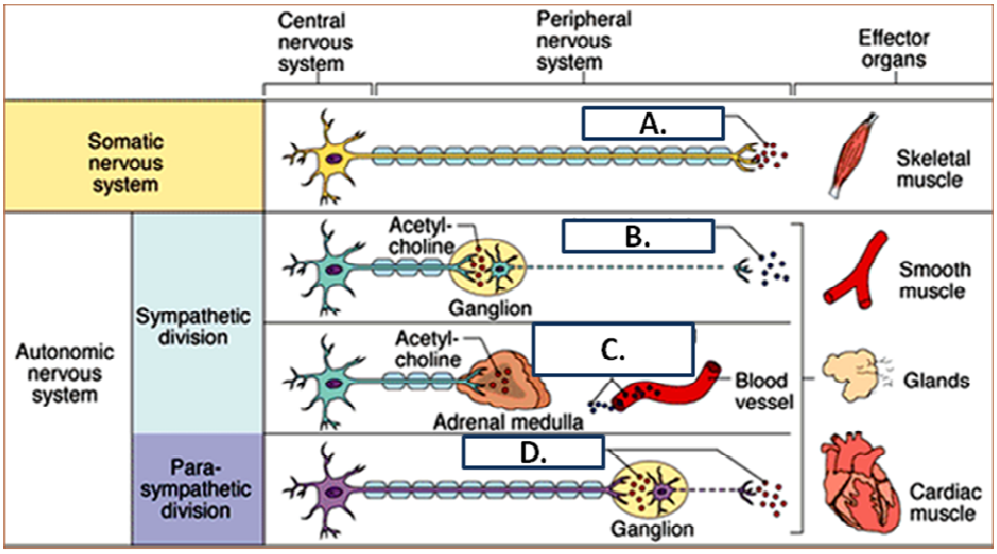
A. excitation of the SA node
B. closure of the heart valves
C. friction of blood against the chamber walls
D. opening and closing of the heart valves

47. Which of the following waves on the EKG (A, B or C) represents ventricular depolarization? 1 mark



48. Which of the following illustrates release of norepinephrine (released alone or in combination with another similarly acting neurotransmitter)?

A. A
B. A and B
C. B and C
D. C and D
E. D



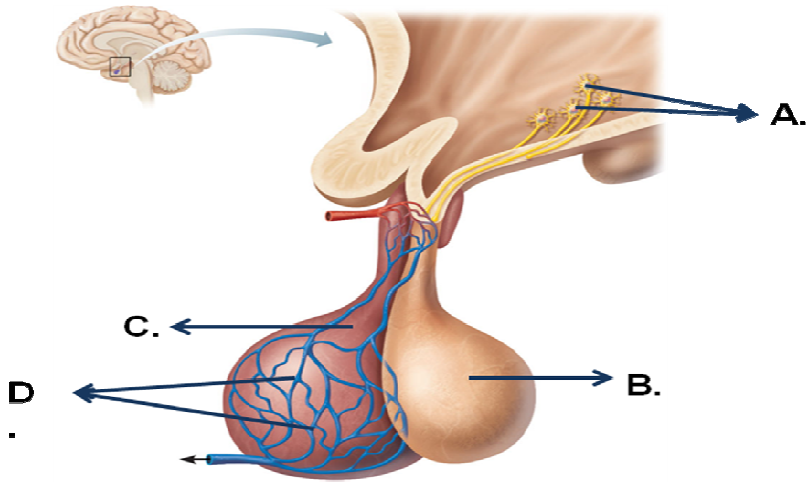
49. Which of the following hormones stimulates release of somatomedin C?

A. TSH
B. ACTH
C. GH
D. FSH

50. Please list four (4) dietary strategies that can help prevent microcytic/megaloblastic anemia? (0.5 mark each; 2 marks total).

- **<u>Microcytic anemia</u> – foods for the prevention/treatment of iron deficiency**
  - Red meat
  - Organic meat
  - Foods rich in non-heme iron, such as spinach or kale, combined with vitamin C containing foods (red and green peppers, citrus fruits, tomatoes, broccoli, sauer-kraut, miso, etc)
  - Cooking in iron-cast pots and pans
  - Avoidance of combining iron containing foods with coffee, strong tea, red wine, phytates, calcium supplements, zink supplements, etc.
- **Macrocytic anemia**
  - Animal food products such as meat, milk, eggs, etc (containing vitamin B12)
  - Green leafy vegetables, such as kale, dark green lettuce, etc. (containing folic acid)
  - Combining green leafy vegetables with milk products (e.g., yoghurt or cheese)
  - Making sure that green leafy vegetables are fresh

51. Please label the following (0.5 mark each label, 2 marks total)



52. BONUS (2marks)

Please draw action potentials of the skeletal and cardiac muscle cells (contractile cells) and explain two (2) MAIN differences between these action potentials