Student Name _____ Student Number _____

UNIVERSITY OF TORONTO AT MISSISSAUGA
April-May 2004 Examination
BIO210H5S
Angela Lange & Robert Reisz
Duration - 2 hours
No aids allowed
Total Marks for Exam = 100

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question. (1 mark each, 60 marks total for this section)

1) The following are major steps in the process of endochondral ossification.
1. Blood vessels invade the perichondrium.
2. Osteoclasts create a marrow cavity.
3. Chondrocytes enlarge and calcify.
4. Osteoblasts replace calcified cartilage with spongy bone.
5. The perichondrium is converted into a periosteum and the inner layer produces bone.
The correct order for these events is
A) 3, 1, 5, 4, 2.
B) 1, 3, 5, 4, 2.
C) 1, 5, 3, 4, 2.
D) 2, 3, 1, 5, 4.
E) 3, 1, 4, 5, 2.

2) Jane has an upper respiratory infection and begins to feel pain in her teeth. This is a good indication that the infection is located in the
A) frontal sinuses.
B) sphenoid bone.
C) temporal bone.
D) maxillary sinuses.
E) zygomatic bones.

3) In determining the age of a skeleton, all of the following pieces of information would be helpful, **except**
A) the number of cranial sutures.
B) the size and roughness of the markings on the bones.
C) the presence or absence of fontanels.
D) the presence or absence of epiphyseal plates.
E) the mineral content of the bones.

4) Which of the following is primarily responsible for stabilizing, positioning, and bracing the pectoral girdle?
A) tendons
B) ligaments
C) the joint shape
D) muscles
E) the shape of the bones within the joint

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5) Muscles that extend the elbow attach to the
A) coronoid process.
B) radial tuberosity.
C) olecranon process.
D) medial epicondyle.
E) lateral epicondyle.

6) A movement toward the midline of the body is termed
A) inversion.
B) abduction.
C) adduction.
D) flexion.
E) extension.

7) During relaxation, muscles return to their original length because of all of the following, **except:**
A) actin and myosin actively pushing away from one another.
B) the contraction of opposing muscles.
C) the pull of gravity.
D) the elastic nature of the sarcolemma.
E) elastic forces.

8) Damage to which of the following muscles would interfere with the ability to breathe?
A) sacrospinalis
B) rectus abdominis
C) external intercostals
D) platysma
E) quadratus lumborum

9) Which of the following describes the action of the digastricus?
A) elevates the larynx
B) elevates the larynx and depresses the mandible
C) depresses the larynx
D) depresses and retracts the tongue
E) elevates the mandible

10) The most common lever systems in the body are those which have the applied force between the fulcrum and the resistance. These are called _____ levers.
A) first class
B) second class
C) third class
D) fourth class
E) fifth class

11) Neurons that are small and offer no anatomical clues to distinguish axons from dendrites are called
A) anaxonic. B) unipolar. C) bipolar. D) tripolar. E) multipolar.

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12) The posterior horns of the spinal cord contain
A) sensory nuclei.
B) somatic motor nuclei.
C) autonomic motor nuclei.
D) nerve tracts.
E) sympathetic nuclei.

13) The cranial nerves that are involved in controlling eye movements are
A) I, II, and III.
B) III, IV, and VI.
C) II, III, and IV.
D) II and VI.
E) III and V.

14) Major centers concerned with autonomic control of breathing, blood pressure, heart rate, and digestive activities are located in the
A) medulla oblongata.
B) pons.
C) mesencephalon.
D) diencephalon.
E) cerebellum.

15) A sudden flash of bright light would cause
A) contraction of the pupillary constrictor muscles.
B) contraction of the pupillary dilator muscles.
C) relaxation of the ciliary body.
D) relaxation of the ciliary ligaments.
E) an increase in the size of the iris.

16) The following is a list of the steps that occur in the production of an auditory sensation.
1. The pressure wave distorts the basilar membrane on its way to the round window.
2. Movement of the tympanic membrane causes displacement of the malleus.
3. Displacement of the stereocilia stimulates sensory neurons of the cochlear nerve.
4. Movement of the malleus causes movement of the incus and stapes.
5. Distortion of the basilar membrane forces the hair cells of the organ of Corti toward or away from the tectorial membrane.
6. Movement of the oval window establishes pressure waves in the perilymph of the vestibular duct.
The proper sequence for these steps is
A) 2,4,1,6,5,3. B) 2,4,6,3,5,1. C) 2,1,4,6,5,3. D) 2,4,6,1,5,3. E) 2,5,4,6,1,3.

17) The structure that separates the cochlear duct from the tympanic duct is the
A) tectorial membrane.
B) basilar membrane.
C) membranous labyrinth.
D) bony labyrinth.
E) stapedius.

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18) Which of the following statements concerning vision is **false**?
A) Approximately half of the fibers in each optic nerve cross to opposite sides of the brain at the optic chiasm.
B) Fibers of the optic nerve synapse at the lateral geniculates of the thalamus.
C) The image that is formed on the retina is inverted.
D) Depth perception is improved when one eye is closed.
E) The visual cortex of the brain contains a sensory map of the field of vision.

19) The ciliary muscle helps to
A) control the amount of light reaching the retina.
B) control the shape of the lens.
C) control the production of aqueous humor.
D) move the eyeball.
E) regulate the smoothness of the surface of the cornea.

20) Endocrine organs can be regulated by all of the following, **except**
A) hormones from other endocrine glands.
B) changes in the genetic makeup of certain hypothalamic cells.
C) direct neural stimulation.
D) changes in the composition of extracellular fluid.
E) releasing hormones from the hypothalamus.

21) In which situation would the stroke volume be the greatest?
A) when venous return is increased
B) when venous return is decreased
C) when the force of contraction is decreased
D) when the difference between the end diastolic volume and the end systolic volume is small
E) when calcium channel blockers are present

22) The bicuspid or mitral valve is located
A) in the opening of the aorta.
B) in the opening of the pulmonary trunk.
C) where the vena cavae join the right atrium.
D) between the right atrium and right ventricle.
E) between the left atrium and left ventricle.

23) The right atrium receives blood from the
A) pulmonary veins.
B) pulmonary trunk.
C) aorta.
D) inferior vena cava.
E) conus arteriosus.

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24) Contractions of the papillary muscles
A) close the atrioventricular valves.
B) close the semilunar valves.
C) eject blood from the ventricles.
D) prevent the atrioventricular valves from reversing into the atria.
E) eject blood from the atria into the ventricles.

25) The following are various components of the conducting system of the heart.
1. Purkinje fibers
2. AV bundle
3. AV node
4. SA node
5. bundle branches
The sequence in which an action potential would move through this system is
A) 1, 4, 3, 2, 5.
B) 3, 2, 4, 5, 1.
C) 3, 5, 4, 2, 1.
D) 4, 3, 2, 5, 1.
E) 4, 2, 3, 5, 1.

26) If there is a blockage between the AV node and the AV bundle, how will this affect the appearance of the electrocardiogram?
A) The P-R interval will be smaller.
B) The QRS interval will be longer.
C) There will be more p waves than QRS complexes.
D) There will be more QRS complexes than p waves.
E) The T wave will disappear.

27) The two common iliac veins form the _____ vein.
A) femoral
B) greater saphenous
C) inferior vena cava
D) hepatic portal
E) innominate

28) The fusion of the brachiocephalic veins forms the
A) inferior vena cava.
B) superior vena cava.
C) innominate vein.
D) subclavian vein.
E) azygos vein.

29) Blood from the brain returns to the heart by way of the _____ vein.
A) vertebral
B) azygos
C) innominate
D) internal jugular
E) external jugular

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30) Blood moves forward through veins by all of the following, **except:**
A) because the pressure in the veins is lower than in the arteries.
B) because of contraction-relaxation pumping of the smooth muscle in the wall of the vein.
C) with the aid of the thoracoabdominal pump.
D) because valves in the veins prevent the backflow of blood.
E) with the aid of contractions of skeletal muscles.

31) The goal of cardiovascular regulation includes all of the following, **except** to ensure that
A) blood flow changes occur at the appropriate time.
B) blood flow changes occur in the appropriate area.
C) changes occur without drastically altering blood pressure.
D) sufficient concentrations of blood cells are present to meet emergency situations.
E) changes occur without drastically altering blood flow to a vital organ.

32) The pair of superior ligaments in the larynx that are covered by epithelium and help to close the glottis are
A) intrinsic ligaments.
B) extrinsic ligaments.
C) vestibular folds.
D) vocal folds.
E) intrinsic laryngeal muscles.

33) The elastic cartilage that shields the opening to the larynx during swallowing is the _____ cartilage.
A) thyroid
B) cricoid
C) corniculate
D) cuneiform
E) epiglottic

34) The function of pulmonary ventilation is to
A) remove carbon dioxide from the blood.
B) supply oxygen to the blood.
C) maintain an adequate alveolar ventilation.
D) remove air from dead air space.
E) prevent gas exchange in the bronchioles.

35) Which of the following factors would increase the amount of oxygen discharged by hemoglobin to peripheral tissues?
A) decreased temperature
B) decreased pH
C) increased tissue PO2
D) decreased amounts of DPG
E) all of the above

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36) The sac-like structure that joins the ileum at the ileocecal valve is the
A) appendix.
B) sigmoid colon.
C) rectum.
D) haustra.
E) cecum.

37) Functions of the large intestine include
A) chemical digestion of chyme.
B) temporary food storage.
C) resorption of water and compaction of feces.
D) absorption of the products of digestion.
E) both B and C

38) The portion of the small intestine that attaches to the large intestine is the
A) cecum. B) appendix. C) ileum. D) duodenum. E) jejunum.

39) _____ are blade-shaped teeth that function in cutting or chopping.
A) Canines
B) Bicuspids
C) Cuspids
D) Incisors
E) Molars

40) The _____ gland empties into the oral cavity at the level of the second upper molar.
A) submaxillary
B) submandibular
C) parotid
D) sublingual
E) vestibular

41) Waves of muscular contractions that propel the contents of the digestive tract from one point to another are called
A) segmentation.
B) pendular movements.
C) peristalsis.
D) churning movements.
E) mastication.

42) Digestion refers to the
A) progressive dehydration of indigestible residue.
B) input of food into the digestive tract.
C) chemical breakdown of food.
D) absorption of nutrients in the gut.
E) mixing of nutrients with digestive enzymes.

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43) A modification of the digestive epithelium that allows expansion of the organ is the presence of
A) flat surfaces.
B) mucous glands.
C) ciliated columnar cells.
D) folds or pleats.
E) large amounts of skeletal muscle.

44) Functions of the stomach include all of the following, **except**
A) storage of ingested food.
B) denaturation of proteins.
C) initiation of protein digestion.
D) absorption of dipeptides.
E) mechanical breakdown of food.

45) A glomerulus is
A) the expanded end of a nephron.
B) a knot of capillaries that lies within the renal corpuscle.
C) the portion of the nephron closest to the renal corpuscle.
D) the portion of the nephron that attaches to the collecting duct.
E) the horseshoe-shaped segment of the nephron.

46) The process of urine formation involves all of the following, **except**
A) filtration of plasma.
B) reabsorption of water.
C) reabsorption of certain solutes.
D) secretion of wastes.
E) secretion of excess liproprotein and glucose molecules.

47) The following is a list of the blood vessels that carry blood to the kidney.
1. afferent arteriole
2. arcuate artery
3. interlobar artery
4. renal artery
5. glomerulus
6. interlobular artery
7. efferent arteriole
8. peritubular capillary

The proper order in which blood passes through these vessels is
A) 4, 6, 2, 3, 1, 5, 7, 8.
B) 4, 3, 2, 6, 1, 5, 7, 8.
C) 4, 3, 2, 6, 7, 5, 1, 8.
D) 4, 6, 2, 3, 7, 5, 1, 8.
E) 4, 3, 6, 2, 1, 5, 7, 8.

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48) An obstruction in the glomerulus would affect the flow of blood into the
A) renal artery.
B) efferent arteriole.
C) afferent arteriole.
D) intralobular artery.
E) none of the above

49) The _____ are double sheets of peritoneal membrane that hold some of the visceral organs in their proper position.
A) serosa
B) adventitia
C) mesenteries
D) fibrosa
E) lamina propria

50) The penetration of the endometrium by the blastocyst is referred to as
A) cleavage.
B) implantation.
C) placentation.
D) embryogenesis.
E) fertilization.

51) The solid ball of cells that is formed after several rounds of cell division following fertilization is called a
A) chorion. B) blastula. C) gastrula. D) morula. E) blastocyst.

52) The inner cell mass of the blastocyst will
A) form the placenta.
B) form the morula.
C) form the embryo.
D) form blood vessels of the placenta.
E) provide nutrients for early growth.

53) The region known as the primitive streak is the site of
A) germ cell formation.
B) endoderm formation.
C) ectoderm formation.
D) migration of ectodermal cells into the space between the epiblast and hypoblast.
E) amnion formation.

54) The ectoderm forms
A) muscle.
B) blood.
C) neural tissues.
D) the lining of the digestive tract.
E) the urinary system.

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55) The extraembryonic membrane that forms blood is the
A) yolk sac.
B) amnion.
C) allantois.
D) chorion.
E) decidua.

56) Problems involving the formation of the chorion would affect
A) the embryo's ability to produce blood cells.
B) the formation of limbs.
C) the embryo's ability to derive nutrition from the mother.
D) lung formation.
E) the urinary system.

57) Interstitial cells produce
A) sperm.
B) inhibin.
C) nutrients.
D) androgens.
E) androgen-binding protein.

58) Functions of testosterone include all of the following, **except**
A) initiation of puberty.
B) determining secondary sex characteristics.
C) stimulating overall metabolism.
D) stimulating sexual behaviors and sex drive.
E) promoting the functional maturation of sperm.

59) A rise in the blood levels of follicle stimulating hormone at the beginning of the ovarian cycle is responsible for
A) follicle maturation.
B) menstruation.
C) ovulation.
D) menopause.
E) atresia.

60) Menstruation is triggered by a drop in the levels of
A) FSH.
B) LH.
C) relaxin.
D) estrogen and progesterone.
E) human chorionic gonadotropin.

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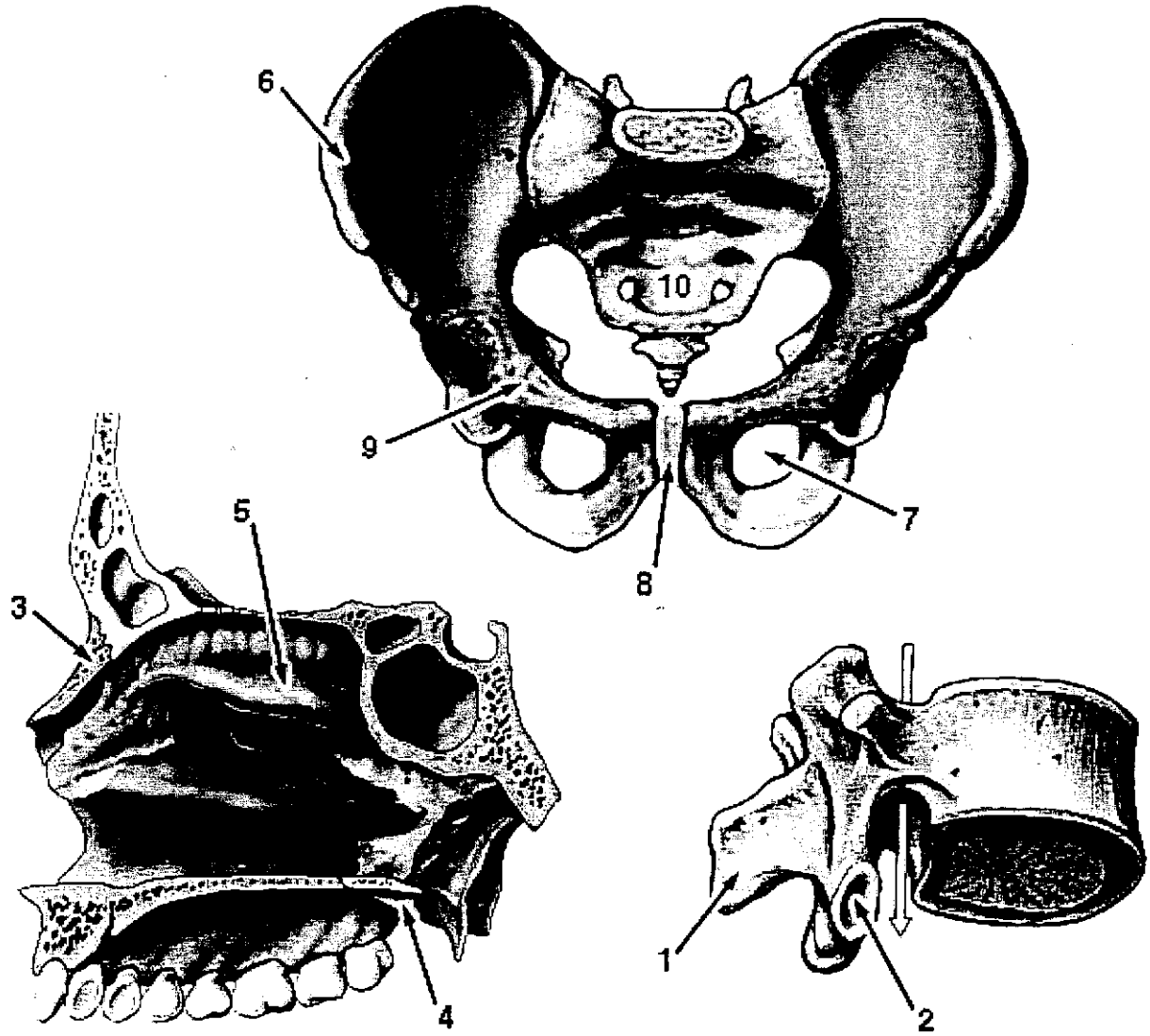
Short Answer Questions:
Part A: Answer 4 questions from Questions 1-5 (5 marks each; 20 marks total)

Question 1: Identify



1. Structure _____
2. Structure _____
3. Bone _____
4. Bone _____
5. _____
6. Process _____
7. _____
8. _____
9. Process _____
10. _____

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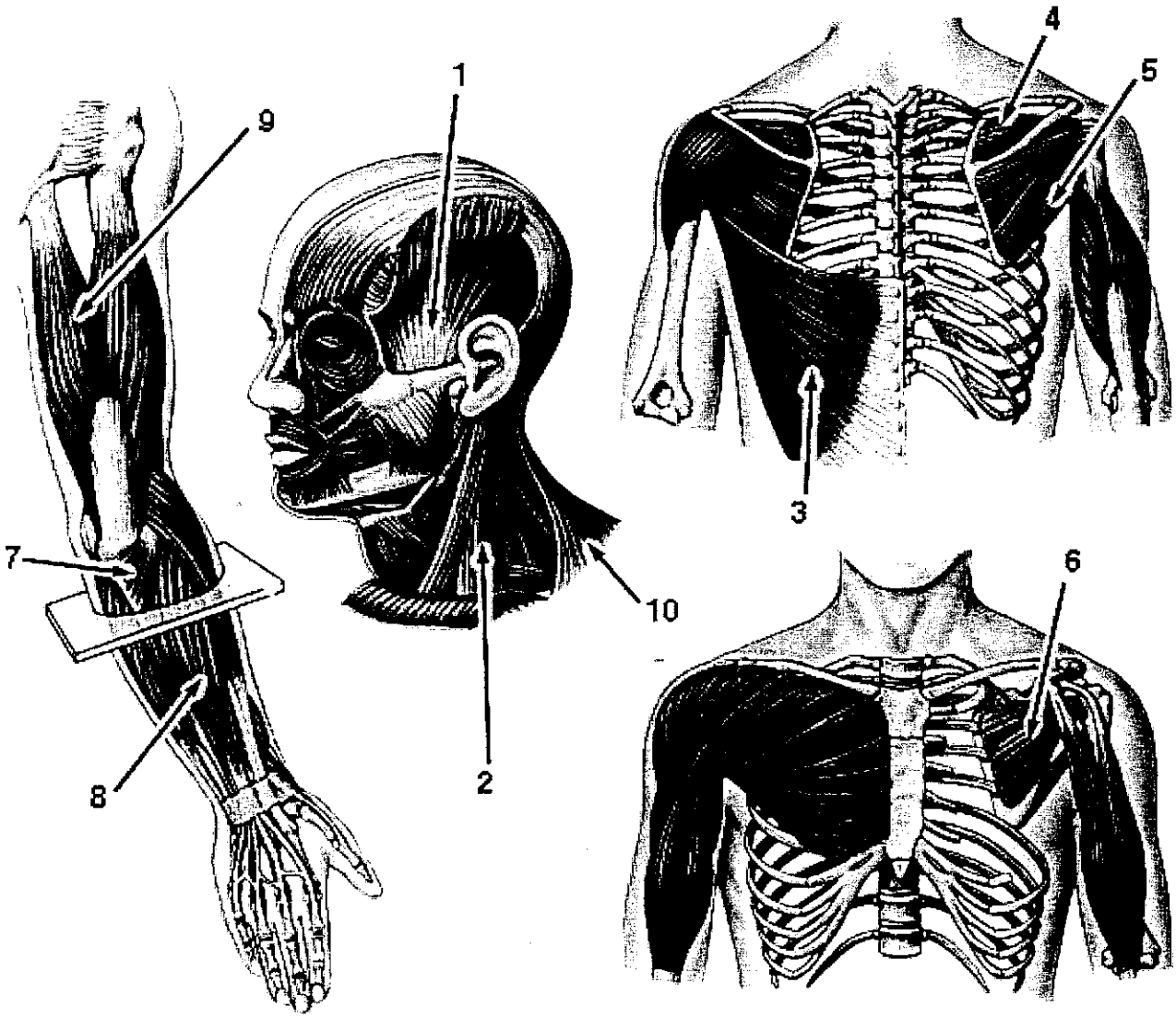
Question 2: Identify



1. _____
2. _____
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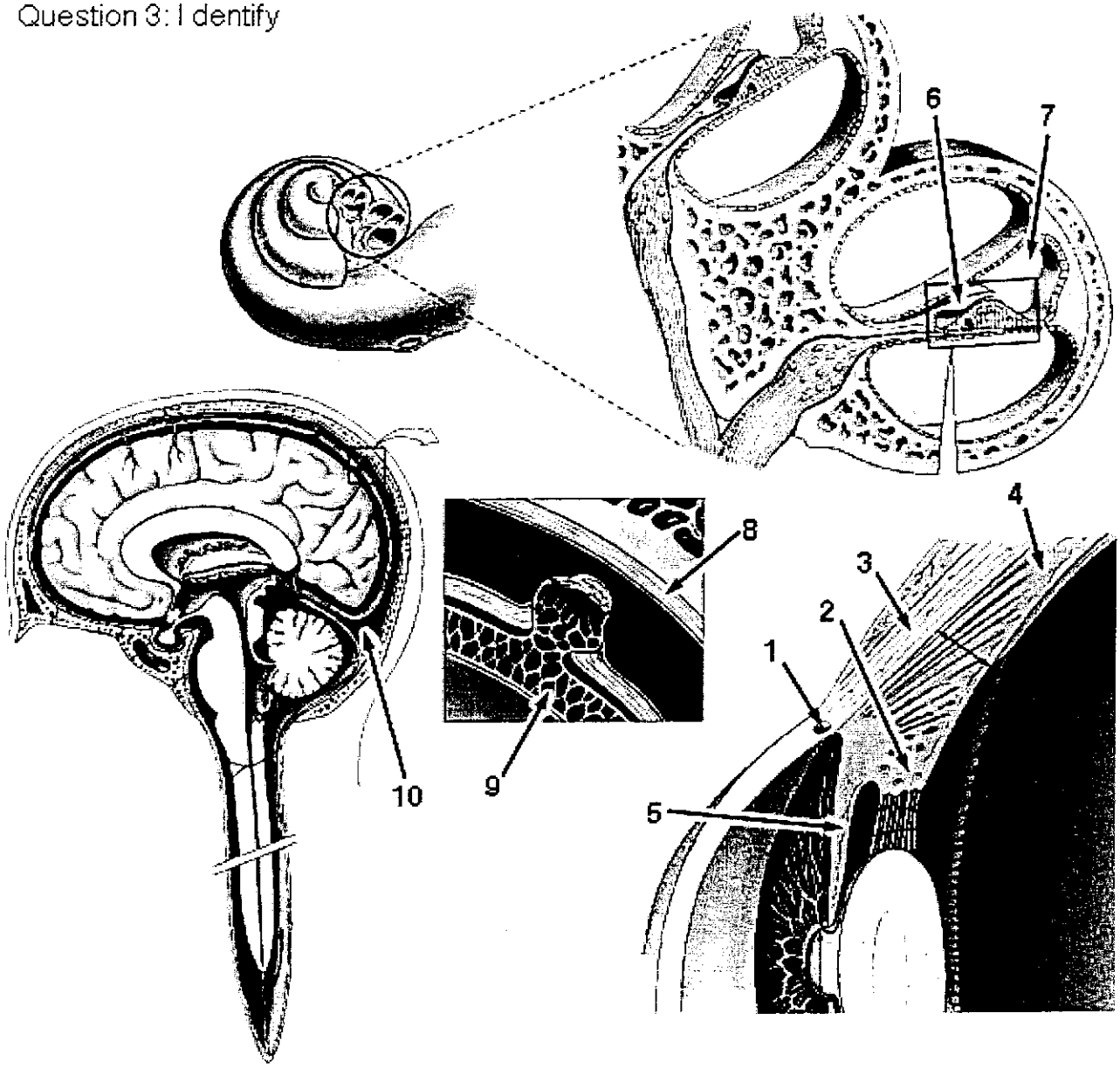
Question 3: I dentify



1. _____ 6. _____

2. _____ 7. _____

3. _____ 8. _____

4. _____ 9. _____

5. _____ 10. _____

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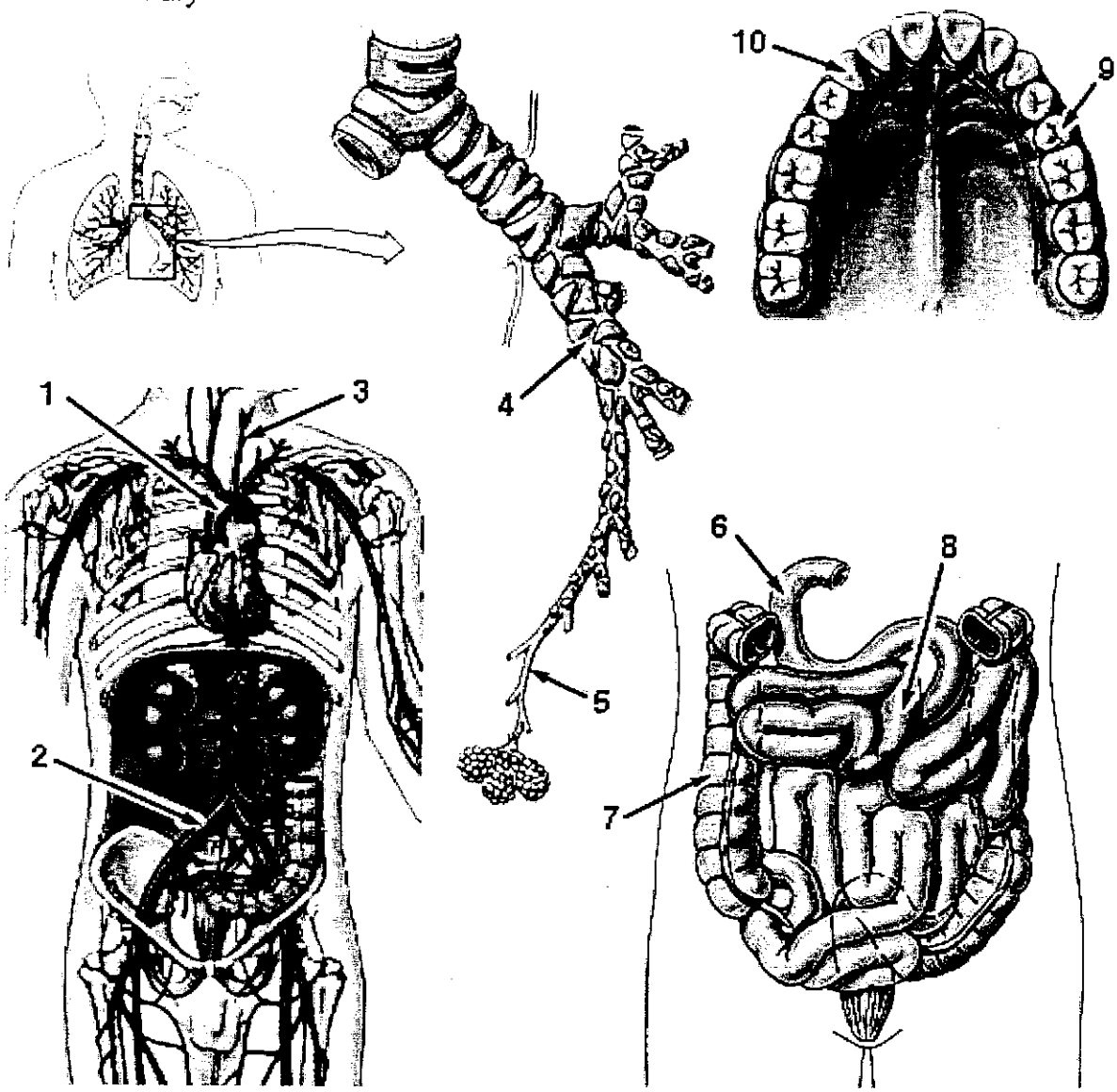
Question 4: Identify



1. _____ 6. _____

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5. _____ 10. _____

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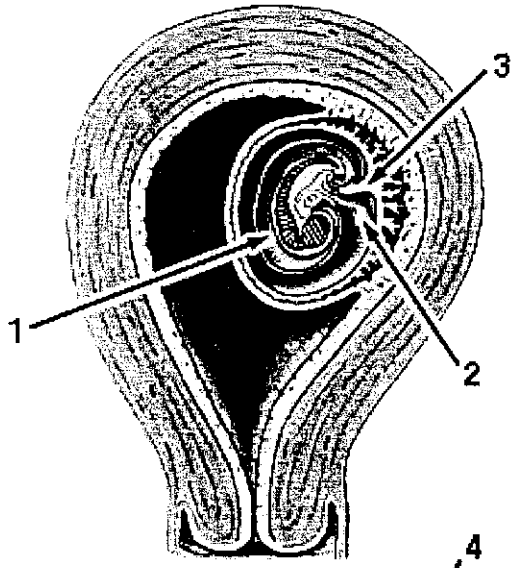
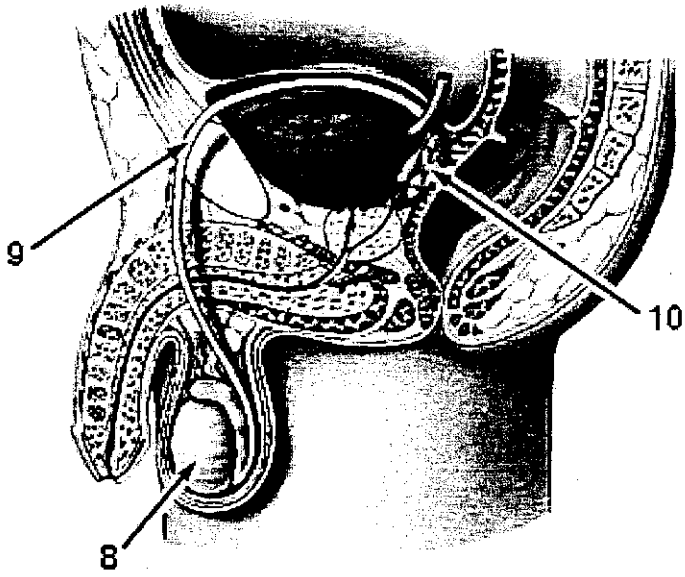
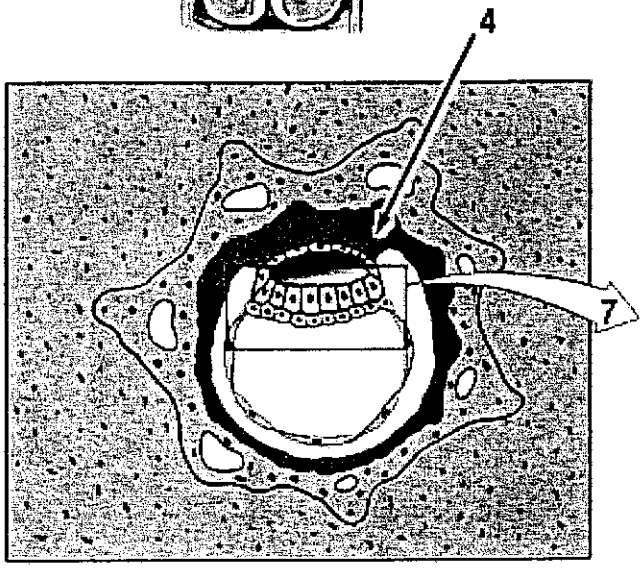
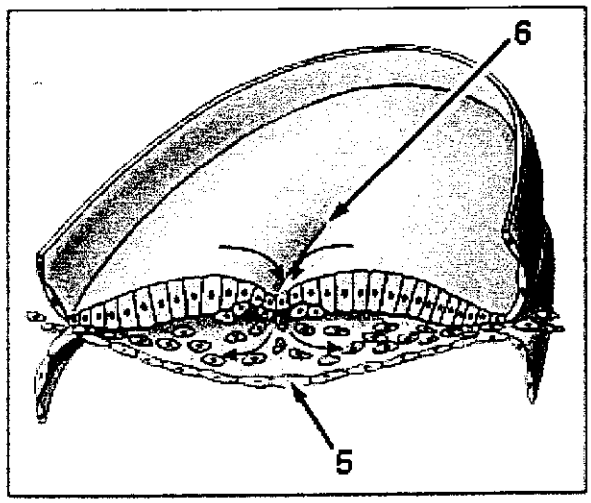
Question 5: Identify









1. _____

2. _____

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8. _____

9. _____

10. _____

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Short Answer Questions:
Part B: Answer 4 questions from Questions 6-10 (5 marks each; 20 marks total)

Question 6: If calcium ion concentration in the blood increases above normal, describe what hormones will be released, where their site of action (or target tissue) will be and what effect(s) they will have to return the blood calcium concentration back to normal.

Question 7: Name **five** different types of neuroglia. Describe their location within the nervous system and their function(s).

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Question 8: You have just eaten a carbohydrate rich meal. Describe the digestion of carbohydrates as they travel through your alimentary canal ending with absorption of the monosaccharides.

Question 9: Fill in the empty cells of the table below which looks at effects of the pituitary hormones involved in the reproductive cycle of males and females.

Gender	Hormone	Target	Hormonal effect
Male	luteinizing hormone		
	follicle-stimulating hormone		
Female	luteinizing hormone		
	follicle-stimulating hormone		

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Question 10: Identify the structures indicated.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____