EXAM NUMBER_____

STRUCTURAL BASIS OF MEDICAL PRACTICE
EXAMINATION 5

September 30, 2011

PART I. Answer in the space provided. (12 pts)

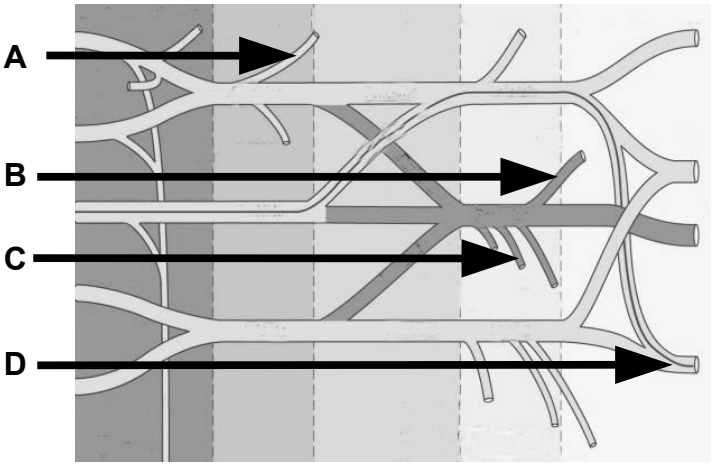
1. Identify the structures. (2 pts)

A. _____

B. _____

C. _____

D. _____



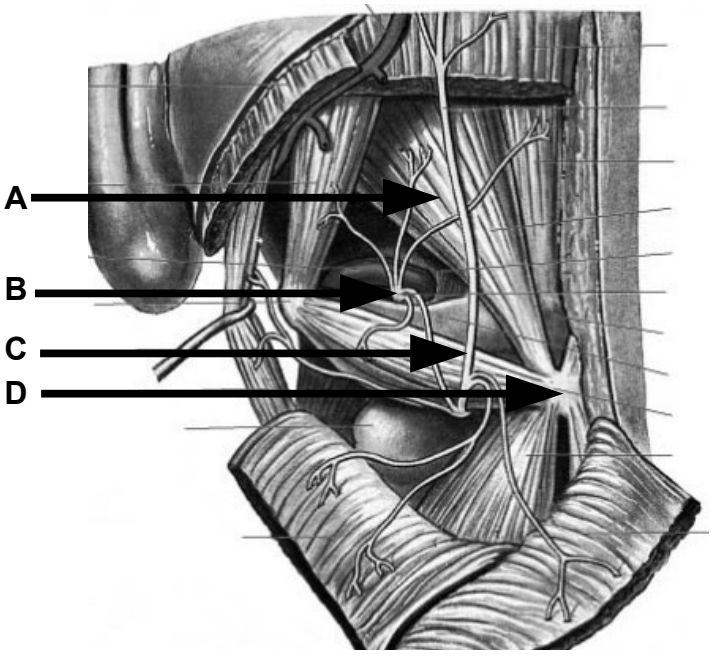
2. Identify the structures. (2 pts)

A. _____

B. _____

C. _____

D. _____



EXAM NUMBER_____

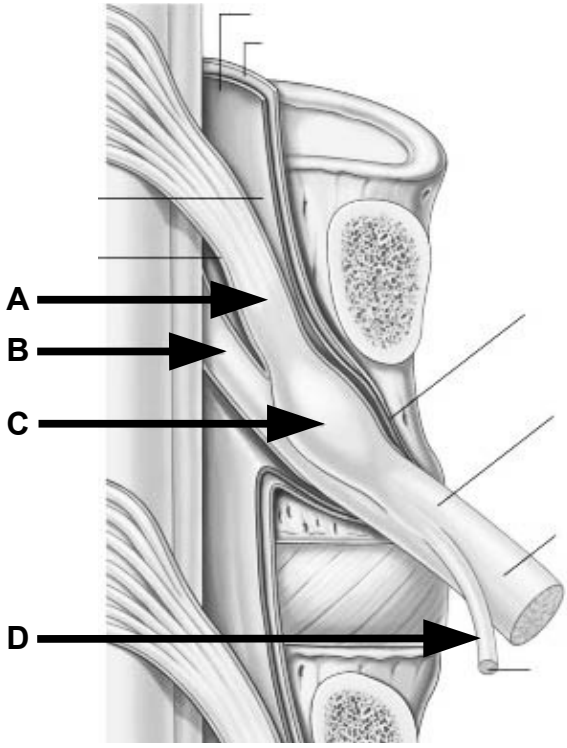
3. **Identify the structures. (2 pts)**

A. _____

B. _____

C. _____

D. _____



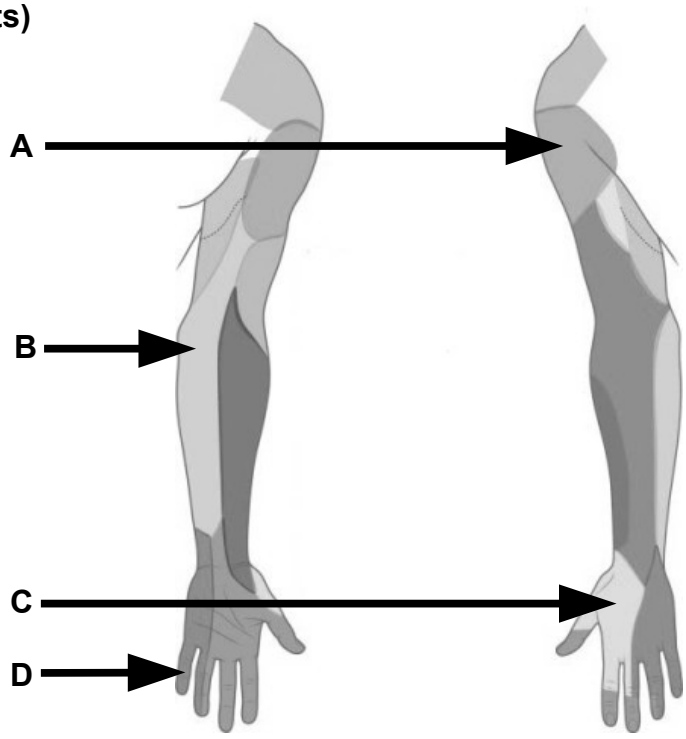
4. **Identify the nerve distributions. (2 pts)**

A. _____

B. _____

C. _____

D. _____



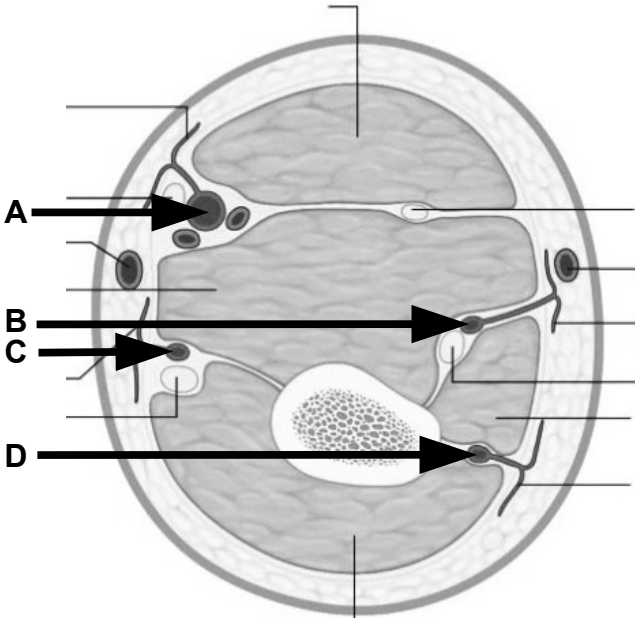
5. Identify the structures. (2 pts)

A. _____

B. _____

C. _____

D. _____



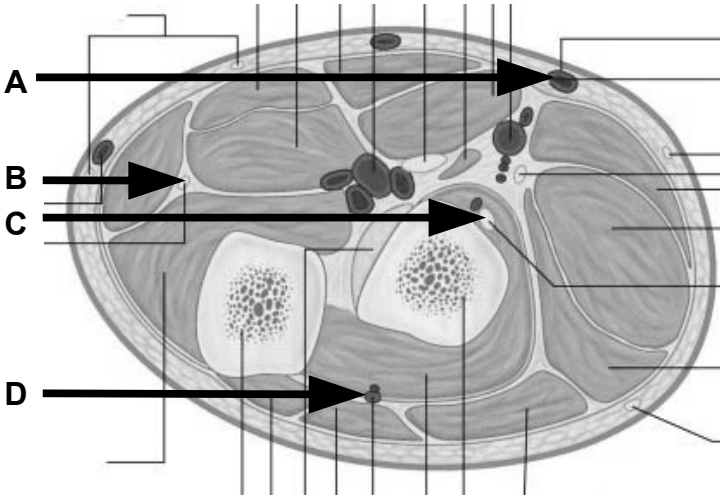
6. Identify the structures. (2 pts)

A. _____

B. _____

C. _____

D. _____



Part II. Circle the correct answer. All, none, or some may apply. (22 pts)

1. With regard to the back, suboccipital region, and scapular region:

    a. The vertebral artery lies on the superior surface of the transverse process of the axis in the groove for the vertebral artery.

    b. The ligamentum flavum resists flexion of the vertebral column.

    c. The rectus capitis posterior major muscle extends the head at the atlantooccipital joint.

    d. From proximal to distal, the greater occipital nerve passes inferior to the suboccipital triangle before passing through the splenius capitis muscle and then the semispinalis capitis muscle.

    e. Disruption of the C1 ventral ramus causes weakened rotation and flexion of the head.

    f. The suboccipital nerve enters the back inferior to the occipital bone and superior to the atlas.

    g. The denticulate ligaments are extensions of the arachnoidea that separate the dorsal and ventral rami.

    h. The dural sac extends inferior to the level of the 2nd lumbar vertebrae.

    i. The posterior vertebral venous plexus is within the subarachnoid space.

    j. The transversospinalis group of muscles are innervated by the dorsal rami (segmental) of spinal nerves.

    k. The iliocostalis muscle attaches to the ribs along the costochondral joints.

    l. The intermediate muscles of the back are innervated by the long thoracic nerve.

2. With regard to the axilla:

    a. Disturbances of dermatomal distributions are caused by compression of the brachial plexus at the scalene muscles, and disturbances of peripheral nerve distributions are caused by compression of the brachial plexus at the pectoralis minor.

    b. A lesion of the axillary nerve within the axilla causes an uncompensated loss of abduction of the arm.

    c. The third part of the axillary artery begins distal to the pectoralis minor muscle.

    d. A lesion of the thoracodorsal nerve weakens scapular retraction and causes a condition known as “winging” of the scapula.

    e. A lesion of the musculocutaneous nerve within the axilla causes an uncompensated loss of elbow flexion.

f. A lesion of the radial nerve in the axilla weakens flexion at the elbow.

g. A lesion of the posterior cord proximal to the upper subscapular nerve causes uncompensated loss of medial rotation.

h. A lesion of the upper root of the brachial plexus causes uncompensated loss of protraction of the scapula.

i. A lesion of the axillary nerve weakens every possible movement at the glenohumeral joint with the exception of abduction from 0 - 90 degrees.

j. A lesion of the radial nerve at the spiral groove causes an uncompensated loss of extension at the elbow.

3. With regard to the arm and cubital fossa:

   a. A lesion of the musculocutaneous nerve proximal to the coracobrachialis muscle causes an uncompensated loss of flexion at the elbow.

   b. The coracobrachialis muscle and the short head of the biceps muscle arise from the coracoid process and flex the forearm.

   c. The coracobrachialis and the short head of the biceps are biarticulate and have a common site of origin.

   d. The brachioradialis, innervated by the radial nerve, flexes the forearm and extends the wrist.

4. With regard to the forearm and the dorsum of the hand:

   a. Lesions of the musculocutaneous and radial nerves cause an uncompensated loss of flexion of the forearm.

   b. A lesion of the ulnar nerve superior to the elbow causes the resting position of the wrist to be extended and radially deviated.

   c. A lesion of the median nerve superior to the elbow causes the resting position of the wrist to be extended and radially deviated.

   d. The extensor carpi radialis brevis muscle originates from the lateral epicondyle of the humerus and passes the posterior surface of the scaphoid bone.

   e. The dorsal carpal arch receives contributions from the radial artery, anterior interosseous artery, posterior interosseous artery, and the dorsal branch of the ulnar artery.

   f. Passing between the heads of pronator teres is the median nerve and the brachial artery.

   g. The extensor pollicis brevis forms the anterior/lateral border of the anatomical snuff box.

h. The pronator quadratus receives the most distal motor innervation from the posterior interosseous nerve.

i. The tendon of flexor carpi radialis longus crosses the anatomical snuff box proximal to the crossing of the radial artery.

j. The extensor carpi ulnaris receives the only muscular branch of the ulnar nerve in the forearm.

5. With regard to the hand:

a. The ulnar artery is medial to the ulnar nerve at the proximal entrance to Guyon's canal.

b. The origin of the flexor digiti minimi is, in part, from the pisiform bone.

c. Branches of the superficial radial nerve are palpable as they cross the surface of the extensor pollicis longus tendon.

d. Compression of the median nerve within the carpal tunnel may cause a supinated resting position for the thumb (ape hand).

6. With regard to the joints of the upper limb:

a. An articular disk limits abduction at the wrist and contributes to pivoting movements at the distal radioulnar joint.

b. Making a fist entails tightly flexing the finger joints with assistance from the extensors of the hand.

c. The costoclavicular ligament assists in stability of the acromioclavicular ligament.

d. The deep transverse metacarpal ligament is at the level of the metacarpophalangeal joint.

Part III. Indicate your understanding of the following. Answer in the space provided. (30 pts)

1. Disturbances of cutaneous sensation along a dermatome distribution signals problems with a spinal nerve (herniated disc). Disturbances of cutaneous sensation along a peripheral nerve distribution signals problems with a peripheral nerve (entrapment). **Identify the C5 and T1 dermatomes. Account for their adjacent distributions despite the nonadjacent cord levels of the spinal nerves. (6 pts)**

2. Compression of the median nerve within the carpal tunnel my lead to atrophy and dysfunction of the muscles of the thenar eminence. **Discuss the innervation, vasculature, movements, and muscles of the thenar eminence. (6 pts)**

3. “Saturday night palsy” refers to nerve damage that can occur a person falls asleep with their arm compressed by a chair arm. **Discuss boundaries, relationships, contents and injuries of the triangular interval (lower triangular space). (6 pts)**

4. A lumbar puncture is a procedure for withdrawing cerebral spinal fluid for diagnosis. **Discuss the location, fascial layers penetrated, and spaces penetrated when withdrawing cerebral spinal fluid from the spinal canal. (6 pts)**

5. The stability of the axial skeleton is greatly dependent on ligamentous support. A failure of ligamentous support may cause back pain; one of the most frequent complaints that leads to an office visit by patients. **Discuss the anatomy, relationships, and functions of the posterior longitudinal ligament of the vertebral column. (6 pts)**

Part IV. Answer in the space provided (including the back of each page and additional pages for each question if required). (36 pts)

1. A 50 year-old professional athlete fell on his outstretched hand and fracture the hook of the hamate bone. A bone fragment invaded the Tunnel of Guyon and severed the deep branch of the ulnar nerve. The four fingers on the ulnar side have the appearance of a "claw hand." He has lost his ability for fine movements of these fingers. **Discuss the joints, ligaments, fascial specializations, tendon insertions, vasculature, and innervations of the medial four digits of the hand. Account for the refined movements of flexion relative to extension. (12 pts)**

2. A 45 year-old female comes to your office with persistent right shoulder pain. She states she states she has recently begun a weight-training program. The morning after increasing the weight for her military press she noted that her shoulder was painful. She felt that she may have slept on it in the wrong position. The shoulder has not improved and she now has difficulty raising her arm above her head. On physical exam, her "oil can" test is positive. She has difficulty abducting her right arm above her shoulder. She cannot hold her right arm up when resistance is applied during abduction. **Review the anatomy of the scapular region and shoulder joint. Include bones, articular surfaces, cavities, capsules, ligaments, contents, muscles, movements and limitations of movement, vasculature, innervation, relationships to surrounding structures, and lymphatic drainage. (12 pts)**

3. A 35 year-old female tennis player complains of tenderness on the outer bony part of the elbow. She reports morning stiffness of the elbow with persistent aching and pain when the fingers and wrist are extended. **Review the anatomy of the elbow region and cubital fossa. Include bones, articular surfaces, cavities, capsules, ligaments, contents, boundaries, muscles, movements and limitations of movement, vasculature, innervation, relationships to surrounding structures, and lymphatic drainage. (12 pts)**