

MARKING SCHEME



UNIVERSITY OF NAIROBI

UNIVERSITY EXAMINATIONS 2013/2014

LEVEL I MID-SEMESTER II EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN NURSING (BScN) AND BACHELOR OF PHARMACY (B.PHARM) – **MARKING SCHEME**

HNS101/UPC106: HUMAN ANATOMY

DATE: 13TH JUNE, 2014

TIME: 9:00AM – 11:00AM

INSTRUCTIONS:

1. Write your registration number in at the upper right end of every leaflet
2. This paper consists of **five (5)** structured essay questions of **20 marks each**
3. Answer all questions in the spaces provided
4. Use clear illustrations where necessary
5. Budget your time wisely
6. Write eligibly

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QUESTION 1:

(a) Describe the anatomy the oral cavity under the following subheadings:

i. **Development of the palate and associated anomalies (6 marks) – Any 6 points**

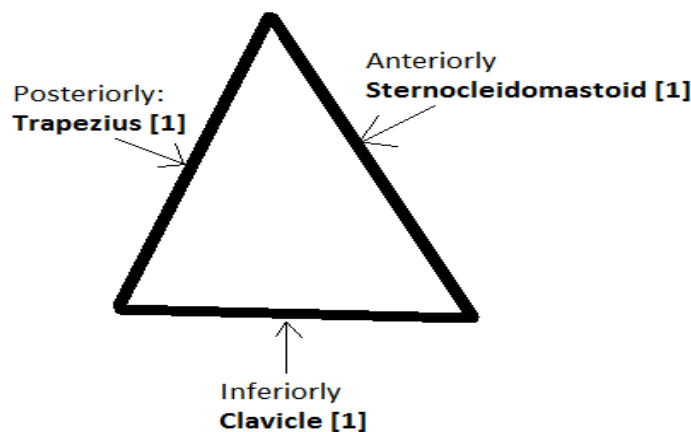
- The Primary Palate [1] is formed by merging of medial nasal prominences [1] to form the median palatal process (intermaxillary segment [1]). This forms part of hard palate anterior to the incisive fossa.
- The Secondary Palate [1] is formed by lateral palatal processes (shelves) [1] which project inferomedially on each side of the tongue but later assume a horizontal position above the tongue
- Bone gradually develops [1] in the primary palate and later extends into palatal processes to form the hard palate while posterior parts remain unossified and form the soft palate
- Congenital anomaly include Cleft Lip and Cleft Palate [1]

ii. **Light microscopic features of the lingual epithelium (6 marks)**

- Tongue lined by stratified squamous epithelium [1], para-keratinized (dorsum) or non-keratinized (ventral)
- Dorsum has numerous mucosal irregularities and elevations called lingual papillae: circumvallate [1]; filiform [1]; fungiform [1] and foliate [1].
- Taste buds [1] are present on fungiform, foliate, and circumvallate papillae

(b) Describe the anatomy of the neck under the following subheadings:

i. **Illustrate the boundaries of the posterior triangle using a diagram (3 marks)**



ii. **Medial and posterior relations of the *thyroid lobe* (5 marks)**

- Medial relations: (Any 4)
 - Trachea [1]; esophagus [1]; larynx [1]; pharynx [1]; recurrent laryngeal nerve [1]
- Posterior relations: (1)
 - Parathyroid glands [1]

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QUESTION 2:

(a) Write notes on the following regarding the nervous system:

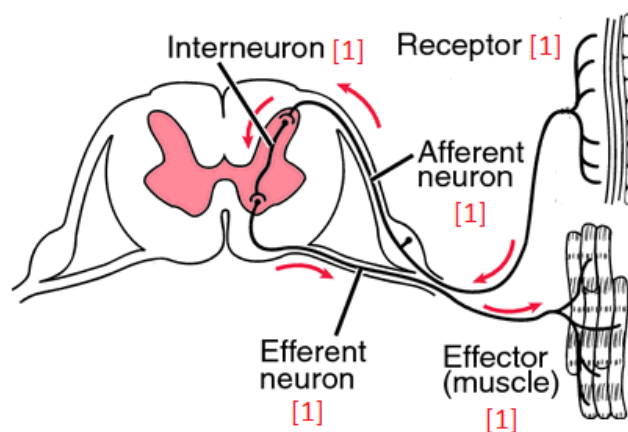
i. **Types of neuroglia cells indicating one function for each (5 marks) – Any 5**

- Astrocytes [1/2] – healing/BBB etc [1/2]
- Ependymal cells [1/2] – line ventricular system/secret CSF [1/2]
- Oligodendrocytes [1/2] – myelination in the CNS [1/2]
- Microglial [1/2] – immunity/macrophages/defense [1/2]
- Schwann [1/2] – myelination in the PNS [1/2]
- Neurosatellite cells [1/2] – surround/support sensory neurons in ganglia [1/2]

ii. **Process of formation of the neural tube (7 marks) – Any 7 points**

- Formation of the notochord [1]
- Induction [1] of the ectoderm by the notochord
- Thickening of the ectoderm to form the neural plate [1]
- Folding of the neural plate to form the neural groove [1] and neural folds [1]
- Cells at the edge detach to form the neural crest [1]
- Neural folds fuse [1] craniocaudally to form the neural tube
- Closure of the cranial and caudal neuropores [1]

(b) **Illustrate using a diagram the components of a reflex arc (5 marks)**



(c) **List 3 ascending pathways in the spinal cord and state the modalities conveyed by each (3 marks)**

- Spinothalamic – pain; temperature; touch [1]
- Dorsal column (fasciculus gracilis/cuneatus) – proprioception; vibration [1]
- Spinocerebellar – unconscious proprioception [1]

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QUESTION 3

(a) Describe the parts and recesses of the pleura (7 marks)

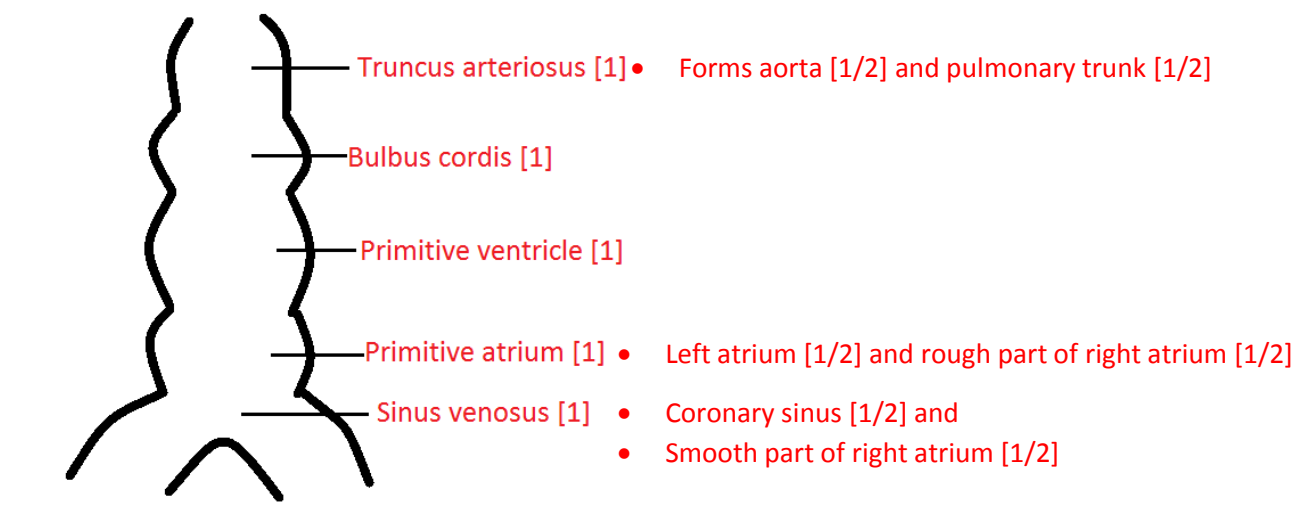
- The pleura has two layers namely the *parietal* [1] and the *visceral* [1] layers separated by the *pleural cavity* [1]
- The parietal layer has *cervical* [1/2], *mediastinal* [1/2], *diaphragmatic* [1/2] and *costal* [1/2] parts
- Recesses are regions devoid of lung tissue and include *costovertebral* [1] and *costomediastinal* [1] recesses

(b) Describe the light microscopic features of the trachea (6 marks) – **Any 6 points**

The wall of the trachea consists of the following layers:

- *Mucosa* [1], composed of a *pseudostratified columnar ciliated* [1] epithelium; and a *lamina propria* [1] that is rich in elastic fiber and lymphatic tissue
- *Submucosa* [1], composed of a dense connective tissue layer
- Cartilaginous layer, composed of *C-shaped hyaline cartilages* [1] bridged posteriorly by *smooth (trachealis) muscle* [1]
- *Adventitia* [1], composed of connective tissue that binds the trachea to adjacent structures

(c) With the aid of diagram illustrate the parts of primitive heart tube and *state* the derivatives of each part (7 marks)



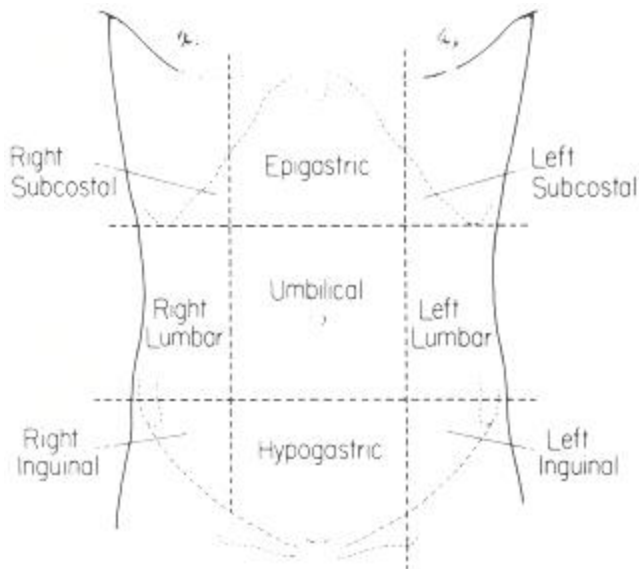
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QUESTION 4

(a) Illustrate the divisions of the nine abdominal regions and state ONE abdominal organ found in each quadrant mentioned (10 marks)

1 mark for each region and one correct content = 9 marks

1 mark for the correct planes



(b) Write notes on location, contents and clinical relevance of the inguinal canal (6 marks)

Location

- Lower part of anterior abdominal wall [1]

Contents (give a mark for gender dimorphism)

- Male [1/2] – spermatic cord [1] and ilioinguinal nerve [1]
- Female [1/2] – round ligament [1] and ilioinguinal nerve

Clinical relevance

- Site of occurrence of inguinal hernia [1]

(c) Name four main muscles found in the anterior abdominal wall (4 marks)

- External oblique [1]
- Internal oblique [1]
- Transversus abdominis [1]
- Rectus abdominis [1]

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QUESTION 5

(a) Describe the boundaries, contents and clinical relevance of the femoral triangle (8 marks)

Boundaries (3 marks)

- Laterally – *Sartorius* [1]
- Medially – *adductor longus* [1]
- Base/superiorly – *inguinal ligament* [1]

Contents (Any 3)

- Femoral artery [1]; Femoral vein [1]; Femoral nerve [1]; Deep inguinal lymph nodes [1] etc

Clinical relevance (Any 2)

- Femoral venous access for blood [1]; Femoral artery pulse [1]; Femoral hernia [1]; Inguinal lymphadenopathy [1] etc

(b) Describe the light microscopic features of skeletal muscle (5 marks)

- Striations [1]
- Multinucleated cells [1]
- Elongated cells [1]
- Peripheral nuclei [1]
- Covered by endomysium [1]

(c) Describe the development of the upper limb (7 marks) – **any 7**

- The *upper limb bud* [1] develops within the *lateral mesoderm* [1] opposite the *caudal cervical segments* [1] 1-2 days ahead of lower limb bud. The bud consists a mass of mesenchyme covered by ectoderm
- A thick band of ectoderm, the *apical ectodermal ridge* [1/2], overlies the limb bud and is responsible for *proximodistal patterning* [1/2]
- Mesenchymal cells aggregate at the posterior margin of the limb bud to form the *zone of polarizing activity* [1/2] which controls the patterning in the *anterior-posterior axis* [1/2]
- Mesenchyme forms muscles, blood vessels and cartilage bone models [1]
- The distal ends of the limb buds flatten into paddle-like *hand-plate* [1] where mesenchymal tissue condense to form *digital rays* [1]
- The intervening regions of digital rays break down by *apoptosis* [1] to separate the digits
- *Lateral rotation* [1] of the limb occurs, making the thumb to become lateral