



KENYATTA UNIVERSITY

EXAMINATION FOR THE DEGREE OF BACHELOR OF PHARMACY

(BPharm Level I)

HMA 130: HUMAN ANATOMY III

3rd TRIMESTER 2021/2022

TIME: 3 HOURS

INSTRUCTIONS:

- This examination consists of **FOUR** sections; A, B, C and D
- Answer **ALL** questions
- Answer each section in **SEPARATE** booklets
- Label the booklets **CLEARLY**

SECTION A:

HMA 107: ANATOMY OF THE THORAX AND BREATHING MECHANISM

PART I: MULTIPLE CHOICE QUESTIONS (20 MARKS)

1. Uppermost structure in the hilum of right lung is:
 - a. pulmonary artery
 - b. superior pulmonary vein
 - c. bronchus
 - d. bronchial artery
 - e. pulmonary ligament
2. During quiet respiration the posterior end of lower border of lung passes across:
 - a. 6th rib
 - b. 8th rib
 - c. 10th rib
 - d. T12 spine
 - e. T11 rib

3. Select the *incorrect statement* about the increase in various diameters of thoracic cavity
- a. Pump-handle movement of sternum increases its anteroposterior diameter
 - b. Contraction of diaphragm increases its vertical diameter
 - c. Bucket-handle movement of ribs increases its transverse diameter
 - d. Pump-handle movement of sternum increases its vertical Diameter
 - e. Contraction of the external intercostal increase vertical diameter
4. Increase in vertical diameter of thoracic cavity is brought about by:
- a. Pump-handle movement of the sternum
 - b. Bucket-handle movement of the ribs
 - c. Contraction of diaphragm
 - d. Contraction of the internal intercostal muscles
 - e. Contraction of external intercostal muscles
5. All are characteristic features of a bronchopulmonary segment *except*:
- a. It is pyramidal in shape
 - b. It is aerated by a tertiary bronchus
 - c. It has its own segmental vein
 - d. It is surrounded by the connective tissue
 - e. It has its own artery
6. Number of bronchopulmonary segments in lower lobe of each lung is:
- a. Two
 - b. Three
 - c. Four
 - d. Five
 - e. Six
7. Lymphatics from the lower end of esophagus drains into:
- a. Deep cervical lymph nodes
 - b. Pretracheal lymph nodes
 - c. Posterior mediastinal lymph nodes
 - d. Celiac lymph nodes
 - e. Mediastinal lymph nodes

8. The lower 1/3 of Esophagus is supplied by which artery :
- Inferior thyroid
 - Descending thoracic aorta
 - Left gastric
 - Right gastric
 - Branchial artery
9. Nutrition to the nonrespiratory portions of lung is supplied by:
- Pulmonary artery
 - Pulmonary vein
 - Bronchial artery
 - Bronchiopulmonary artery
 - Esophageal artery
10. Aortic opening of diaphragm lies at the level of:
- Body of T6 vertebra
 - Body of T8 vertebra
 - Body of T10 vertebra
 - Body of T12 vertebra
 - Body of T11 vertebra
11. Which one is A TYPICAL ribs
- 1st rib
 - 3rd rib
 - 7th rib
 - 5th rib
 - 6th rib
12. Posterior intercostal membrane is the continuation of:
- External intercostal muscle
 - Internal intercostal muscle
 - Intercostalisintimi muscle
 - Subcostalis muscle
 - Innermost intercostal

13. Typical intercostal nerves are:

- a. 3rd to 6th intercostal nerves
- b. 7th to 11th intercostal nerves
- c. 7th to 10th intercostal nerves
- d. 1st and 2nd intercostal nerves
- e. 5th to 9th intercostal nerves

14. The statement about parietal pleura is correct: it.....

- a. develops from splanchnopleuric mesoderm
- b. is innervated by autonomic nerves
- c. lines the thoracic wall
- d. is insensitive to touch and temperature
- e. covers the lung surfaces

15. All structures traverse the whole length of mediastinum *except*:

- a. Esophagus
- b. Trachea
- c. Thoracic duct
- d. Sympathetic trunks
- e. Sympathetic chain

16. Conducting system of the heart is a modification of:

- a. Epicardium
- b. Myocardium
- c. Endocardium
- d. Both mesoderm and endoderm
- e. Myocardium and neurocrest cells

17. Boundaries of the thoracic wall include the following EXCEPT?

- a. Thoracic vertebral bones
- b. Sternum and costal cartilages
- c. Ribs and intercostal spaces
- d. Pelvic diaphragm
- e. Suprapleural membrane

18. Which of the following statements is FALSE regarding the sternum?

- a. Is a flat bone
- b. Is divided into three parts; manubrium, body and xiphoid process
- c. It articulates with the 1st to 7th ribs
- d. Jugular notch lies between 2nd and 3rd intervertebral disc
- e. Sternal angle lies between 4th and 6th intervertebral disc

19. False regarding the ribs

- a. They are flat bones
- b. True ribs attach directly to the sternum and includes the first 8 ribs
- c. False ribs connect to the sternum indirectly
- d. Floating ribs do not connect with the sternum
- e. 1st rib is atypical and is the shortest and the most curved of all the rib

20. Which one of the following is typical rib

- a. 1st rib
- b. 2nd rib
- c. 3rd rib
- d. 10th rib
- e. 12th rib

SECTION A:PART 2 SHORT ANSWER QUESTION (5 MARKS EACH)

1. Describe the boundaries of superior thoracic aperture and any FIVE structures passing through it.
2. Describe the innervation of the chest wall
3. Describe the course and branches of posterior intercostal artery
4. Describe the mechanism of breathing

SECTION B:

HMA108:ANATOMY OF THE ABDOMEN

PART 1: MULTIPLE CHOICE QUESTIONS (20 MARKS)

1. Muscle whose aponeurosis forms both anterior and posterior walls of rectus sheath is:
 - a) External oblique
 - b) Internal oblique
 - c) Transversus abdominis
 - d) Pyramidalis
 - e) Rectus abdominis

2. The neurovascular plane in the anterior abdominal wall lies between:
 - a) External and internal oblique muscles
 - b) Internal and transversus abdominis muscles
 - c) Transversus abdominis muscle and fascia transversalis
 - d) Fascia transversalis and parietal peritoneum
 - e) Extraperitoneal fatty layer and parietal peritoneum

3. 45-year-old man entered the emergency department with a complaint of severe abdominal pain. During physical examination it is observed that his cremasteric reflex is absent. Which of the following nerves is responsible for the efferent limb of the cremasteric reflex?
 - a) Ilioinguinal
 - b) Iliohypogastric
 - c) Genitofemoral
 - d) Pudendal
 - e) Ventral ramus of T12

4. The decision is made by emergency department surgeons to perform an exploratory laparotomy on a 32-year-old female with severe abdominal pain. Where would the incision most likely be made to separate the left and right rectus sheaths?
 - a) Midaxillary line
 - b) Arcuate line
 - c) Semilunar line
 - d) Tendinous intersection
 - e) Linea alba

5. 35-year-old man is admitted to the hospital with an indirect inguinal hernia. During an open hernioplasty the spermatic cord and the internal abdominal oblique muscles are identified. Which component of the spermatic cord is derived from the internal abdominal oblique muscle?

- a) External spermatic fascia
- b) Cremaster muscle
- c) Tunica vaginalis
- d) Internal spermatic fascia
- e) Dartos fascia

6. A 19-year-old gang member was shot with a 9-mm bullet in his right lower quadrant. The bullet entered and traversed the anterolateral abdominal wall. The following structures form the layers of this wall.

- 1. Internal oblique muscle
- 2. Transversalis fascia
- 3. Transversus abdominis muscle
- 4. Camper fascia
- 5. Scarpa fascia
- 6. External oblique muscle

Which of the following best represents the order of structures traversed by the bullet?

- a) 4-5-6-1-3-2
- b) 4-5-2-6-1-3
- c) 4-5-1-6-3-2
- d) 4-2-6-1-3-5
- e) 5-4-6-1-3-2

7. 35-year-old immune-compromised woman is suffering from herpes zoster (shingles). She presents with a severe sharp burning pain and vesicular eruption on the skin around the umbilicus. Which spinal nerve contributes to this dermatome?

- a) T8
- b) T9
- c) T10
- d) T11
- e) T12

8. Select the true statement about the rectum:

- a. It is about 15 cm to 18 cm long
- b. It is straight in its course
- c. Its posterior surface is covered by peritoneum
- d. It presents anteroposterior and lateral curvatures
- e. Present with valves

9. The rectum is characterized by the presence of:

- a. Taenia coli
- b. Haustrations
- c. Permanent transverse mucosal folds within the lumen
- d. Appendices epiploicae
- e. Column of Morgagni

10. The length of the rectum in adults is about:

- a. 5 cm-7cm
- b. 7.5 cm-10cm
- c. 12 cm-15cm
- d. 15 cm-18cm
- e. 18cm -20cm

11. All are characteristic features of the large intestine except:

- a. Appendices epiploicae
- b. Sacculations
- c. Villi
- d. Taenia coli
- e. Haustration

12. Select the incorrect statement about the caecum:

- a. It forms the commencement of the large intestine
- b. It is ampullary type in most of the cases
- c. It has greater breadth than length
- d. It develops from the hindgut
- e. It forms part of colon

13. The caecum is supplied by:

- a. Ileocolic artery
- b. Middle colic artery
- c. Left colic artery
- d. Right colic artery
- e. Ileal artery

14. All of the following structures form the stomach bed except:

- a. Body of pancreas
- b. Splenic artery
- c. Right crus and dome of the diaphragm
- d. Transverse mesocolon
- e. Spleen

15. All the structures forming the stomach bed are separated from the stomach by the lesser sac except:

- a. Left kidney
- b. Left suprarenal gland
- c. Left colic flexure
- d. Spleen
- e. Inferior vena cava

16. Select the incorrect statement about the gastric canal:

- a. It is located along the lesser curvature of the stomach
- b. It is also called Magenstrasse
- c. It is produced due to the absence of longitudinal
- d. fold of gastric mucosa
- e. It is prone to ulceration

17. The membranous layer of superficial fascia of anterior abdominal wall is continuous with all except:

- a. Buck's fascia of penis
- b. Dartos muscle of scrotum
- c. Fascia of Gallaudet
- d. Colles' fascia of perineum
- e. Thoracic fascia

18. Which of the following structures lie in between the superficial and deep layers of superficial fascia of the anterior abdominal wall?

- a. Superior epigastric artery
- b. Inferior epigastric artery
- c. Superficial epigastric artery
- d. Lower five intercostal nerves
- e. Musculophrenic nerve

19. Anterior wall of rectus sheath below the arcuate line is formed by the aponeurosis of:

- a. External oblique
- b. Internal oblique
- c. Transversus abdominis
- d. Transversalis fascia
- e. inner most oblique

20. Muscle whose aponeurosis forms both anterior and posterior walls of rectus sheath is:

- a. External oblique
- b. Internal oblique
- c. Transversus abdominis
- d. Transversalis fascia
- e. Inner most oblique

SECTION B – PART 2: SHORT ANSWER QUESTION (20 MARKS; 5 MARKS FOR EACH QUESTION)

1. Describe the layers of the anterior abdominal wall
2. Outline the blood supply to gastrum
3. Describe the formation of portal anastomosis
4. Describe formation of hepatobiliary tree

SECTION C

HMA 110: THE URINARY SYSTEM AND KIDNEYS

PART 1: MULTIPLE CHOICE QUESTIONS

1. The kidneys are located in the
 - a) Pelvic cavity
 - b) Peritoneal cavity
 - c) Intra-peritoneal
 - d) Retroperitoneal
 - e) Anterior abdominal wall
2. Renal pyramids are located within
 - a) Column
 - b) Cortex
 - c) Medulla
 - d) Pelvis
 - e) Ureter

3. Which blood vessel conveys blood out of nephron
- a) Efferent Arteriole
 - b) Afferent Arteriole
 - c) Lobar arteries
 - d) Vasa recta
 - e) Intralobar artery
4. The trigone:
- a) Lies between urethral openings.
 - b) Overlies the anterior prostatic lobe.
 - c) Has many mucous folds.
 - d) Has valves over ureteric openings.
 - e) Is found in fundus
5. A urachal fistula represents a remnant of the:
- a) Cloaca
 - b) Allantois
 - c) Urogenital sinus
 - d) Hind gut
 - e) Mid gut
6. The length of the male urethra is about:
- a) 10 cm
 - b) 12 cm
 - c) 16 cm
 - d) 20 cm
 - e) 30 cm
7. Most tubular reabsorption occurs at the
- a) Loop of Henle
 - b) Proximal convoluted tubules
 - c) Distal convoluted tubules
 - d) Glomerulars
 - e) Collecting ducts

8. The urethra does not traverse which of the following structures?
- a) The prostate
 - b) The clitoris
 - c) The urogenital diaphragm
 - d) The corpus spongiosum
 - e) The deep perineal pouch
9. Pancreatic alpha-cells secrete
- a) glucagon
 - b) lysozyme.
 - c) insulin
 - d) plasma proteins
 - e) pancreatic juices
10. Which hormone, produced by the kidneys, plays a role in the production of red blood cells?
- a) adrenaline
 - b) renin
 - c) aldosterone
 - d) erythropoietin
 - e) Angiotensin
11. Four sections of the vasculature of the kidney tubule are listed below. Which one lists them in the correct order of blood flow from left to right?
- a) efferent arteriole, glomerulus, afferent arteriole, peritubular capillaries.
 - b) afferent arteriole, glomerulus, efferent arteriole, peritubular capillaries.
 - c) peritubular capillaries, afferent arteriole, glomerulus, efferent arteriole.
 - d) glomerulus, afferent arteriole, peritubular capillaries, efferent venule
 - e) efferent arteriole, peritubular capillaries, glomerulus, afferent arteriole.
12. In what part of the kidney are the glomeruli located?
- a) In the cortex
 - b) In the medulla
 - c) In the hilus
 - d) In the minor calyces
 - e) In the major calyces

- 13. Which statement about kidney anatomy is correct? Renal pyramids are in the:**
- a) medulla end in a papilla that empties into a minor calyx
 - b) medulla end in a column that empties into a major calyx
 - c) cortex end in a papilla that empties into a minor calyx
 - d) cortex end in a column that empties into a minor calyx
 - e) cortex end in a column that empties into a major calyx
- 14. What is the place where the arteries, veins, lymphatics and nerves enter or leave the kidney called?**
- a) The carina
 - b) The reno-atrio notch
 - c) The renal pelvis
 - d) The hilus
 - e) The apex
- 15. Loop of Henle is lined by simple**
- a) Simple squamous epithelium
 - b) Simple cuboidal epithelium
 - c) Simple columnar epithelium
 - d) Simple cuboidal with microvilli
 - e) Transition epithelium
- 16. Macula densa is present in**
- a) Proximal Convoluted Tubules
 - b) Distal Convoluted Tubules
 - c) Afferent arteriole
 - d) Efferent arteriole
 - e) Loop of henle
- 17. Cortex of kidney contains the following structures except**
- a) Proximal Convoluted Tubules
 - b) Distal Convoluted Tubules
 - c) Renal corpuscle
 - d) Thin segment of loop of Henle
 - e) Afferent arterioles

18. what is the approximate weight of the adult kidneys?

- a) 100g
- b) 200g
- c) 500g
- d) 1000g
- e) 80 g

19. Which blood vessels surround the loops of Henle?

- a) Vasa recta
- b) Peritubular capillaries
- c) Interlobular arteries
- d) Efferent arterioles
- e) Afferent arterioles

20. Where are most micro-villi found in the nephron?

- a) Loop of Henle
- b) Distal convoluted tubule
- c) Loop of Henle
- d) Proximal convoluted tubule
- e) Collecting tubules

PART 2: SHORT ANSWER QUESTIONS (5 Marks each)

1. Outline the embryological development of the kidneys
2. List the cells found in kidney and state their functions
3. State the histological features of the Bowman's capsule.
4. Outline the layers covering the kidney and their significance

SECTION D

HMA 200: THE REPRODUCTIVE SYSTEM

PART 1: Multiple Choice Questions

1. All of the following factors play a role in the erection of penis except:

- a) Psychogenic/cutaneous stimulation
- b) Parasympathetic stimulation
- c) Filling of blood in cavernous spaces of corpora cavernosa by the helicine arteries
- d) Sympathetic stimulation
- e) Corpora cavernosa to relax, allowing blood to flow in and fill the open spaces

INVOLVEMENT IN ANY EXAMINATION IRREGULARITY SHALL LEAD TO DISCONTINUATION

2. **Layer of the anterior abdominal wall that does not continue in the scrotal wall is:**
- a) Skin
 - b) Campers fascia
 - c) External oblique muscle
 - d) Internal oblique muscle
 - e) Transversus abdominis muscle
3. **The innermost covering of the testis is formed by:**
- a) Parietal layer of tunica vaginalis
 - b) Visceral layer of tunica vaginalis
 - c) Tunica vasculosa
 - d) Tunica albuginea
 - e) Cremasteric muscle
4. **The forward angulations between the long axes of vagina and cervix is called angle of:**
- a) Anteflexion
 - b) Anteversion
 - c) Retroflexion
 - d) Retroversion
 - e) hyperanteflexion
5. **Select the incorrect statement about the clitoris:**
- a) It is homologous to the penis in male
 - b) It does not consist of corpus spongiosum
 - c) It transmits urethra
 - d) It develops from the genital tubercle
 - e) Contains erectile tissues
6. **The bulbourethral glands of the male are embedded in which muscle fibres?**
- a) Sphincter urethrae
 - b) Terminal bronchioles
 - c) Superficial transverse perineus
 - d) Bulbospongiosus
 - e) Ischiocarvenosus
7. **The fossa navicularis is located within which of the following structures?**
- a) The glans penis
 - b) The corpus spongiosum
 - c) The bulb of the penis
 - d) The urogenital diaphragm
 - e) The prostate gland

8. Regarding the scrotum, find the TRUE statement:
- a) The scrotal subcutaneous tissue has fat.
 - b) Has the voluntary muscle called dartos.
 - c) The tissues of the scrotum are lax and can fill with fluid.
 - d) In cryptorchidism, the scrotum is well developed.
 - e) Does have a septa
9. Regarding the male urethra, which of the following statement is TRUE:
- a) Develops entirely from the urogenital sinus.
 - b) Receives the ejaculatory ducts in its prostatic part.
 - c) Is narrowest in its prostatic part.
 - d) Is lined along its whole length by transitional epithelium.
 - e) Its 10 cm long
10. Regarding the processus vaginalis, identify the TRUE statement:
- a) It covers only the testis and no part of the epididymis.
 - b) Is a process of peritoneum.
 - c) Forms a covering for the adult ductus (vas) deferens.
 - d) Lies outside the internal spermatic fascia.
 - e) In adult it form the spermatic cord
11. The following lobe of the prostate has no glandular tissue:
- a) Anterior
 - b) Median
 - c) Posterior
 - d) Right lateral
 - e) Left lateral
12. The fallopian tube, identify the TRUE statement:
- a) Is developed from the paramesonephric duct or the Mullerian duct.
 - b) Is lined wholly by non ciliated columnar epithelium.
 - c) Is narrower laterally.
 - d) Undergoes cyclical changes.
 - e) Does not open into peritoneal cavity
13. Regarding the lateral cervical (Cardinal, Mackendrodt's) ligament:
- a) Its located at the base of the broad ligament.
 - b) Is regarded as the main ligamentous support of the uterus.
 - c) The ureter runs along the upper portion of this ligament.
 - d) The uterine artery pierces the ligament near its inferior attachment.
 - e) It offer the main support of uterus

14. **The vagina receives lubrication from:**
- a) Body of uterus
 - b) Cervix
 - c) Transudate from its lamina propria.
 - d) Glands of the labia majora.
 - e) Posterior fornix
15. **The most important support of the uterus is:**
- a) Broad ligament.
 - b) Round ligament.
 - c) Pubocervical ligament.
 - d) Transverse cervical ligament.
 - e) Cardinal, Mackendrodt's
16. **The vaginal canal communicates with:**
- a) Rectum
 - b) Urethra
 - c) Recto vesical pouch
 - d) Recto uterine pouch
 - e) Pouch of Douglas
17. **Which of the following structures does not receive innervation from the branches of the pudendal nerve?**
- a) Skin of the penis or clitoris.
 - b) Ischiocavernosus muscles.
 - c) The posterior fornix of the vagina.
 - d) Urethral sphincter.
 - e) Cremaster muscles
18. **The middle lobe of the prostate is the part between:**
- a) Rectum and prostatic urethra.
 - b) Ejaculatory ducts and the rectum.
 - c) Ejaculatory ducts and the prostatic urethra.
 - d) Pubis and prostatic urethra.
 - e) Membranous and penile urethra.

19. The ductus (vas) deferens is connected to the prostatic urethra by:

- a) The prostatic utricle.
- b) Gartner's duct.
- c) The ejaculatory duct.
- d) The urachus.
- e) The trigone

20. The prostatic urethra has the openings of the:

- a) Vas deferens
- b) Ducts of the bulbo-urethral glands.
- c) Prostatic utricle
- d) Ejaculatory ducts
- e) Penile urethra

PART2: SHORT ESSAY QUESTIONS (5 Marks each)

1. Outline the development of the testis.
2. State the histological organization of the ovary.
3. Outline the layers of the scrotum.
4. Outline the structures offering support to the uterus