1. Know the how to label the diagrams for: kidney, nephron & its associated blood supply, male reproductive system, female reproductive system, Menstrual Cycle (uterine & ovarian cycles and associated hormones)
2. What is the main excretory organ? kidney
3. What are the functions of the kidney? Produce urine, filter the blood, maintain water balance, regulate ion concentration in ECF, maintains blood pH, maintains blood plasma, excretes nitrogenous wastes, secretes hormones, excretes foreign substances
4. Ammonia, urea, uric acid and creatinine are known as nitrogenous wastes.
5. How are urea, uric acid, and creatinine formed? Omit – didn't discuss
6. Explain the 3 parts of a kidney: cortex, medulla, and pelvis. Cortex: outermost region that contains the Bowman's capsule, PCT and DCT parts of the nephron; Medulla: middle region that contains the Loop of Henle and therefore due to selective/water reabsorption, is very salty; and the renal pelvis is the area in which all the collecting ducts drain into and therefore, collects the urine before moving into the ureter.
7. Explain the parts of a nephron. Bowman's capsule: blind entrance into nephron structure, place of pressure filtration, first contact with blood and nephron; next Proximal Convolted Tubule (PCT): in cortex, place of selective reabsorption; next Loop of Henle: in medulla place of water reabsorption (salt reabsorption); Distal Convoluted Tubule (DCT); in cortex, place of tubular secretion; Collecting Duct; drains into renal pelvis, site of action of ADH so therefore, some water reabsorption.
8. Explain the blood supply of the kidney (around the nephron). Exchange (whether reabsorption into the nephron or secretion from the nephron) occurs between the nephron on the blood vessels that enter the kidney. Know what happens at the glomerulus and the PCN (peritubular capillary network)
9. What are the function and structure of the kidney, ureter, urethra, urinary bladder, renal cortex/medulla/pelvis, and nephron – see your notes – but explain in your own words
10. Explain the process of urine formation – filtration, selective reabsorption, tubular secretion/excretion – see your notes (but explain in your own words)
11. Where does active transport and diffusion occur in the nephron? Anywhere there is water movement there is diffusion, specifically called osmosis). Active transport occurs at the PCT, DCT, Loop of Henle & Collecting Duct
12. What would happen if the glomerulus was damaged? Initial filtrate would not be produced or a very low volume of filtrate would be produced as this is where pressure filtration occurs
13. What is the role of the hypothalamus and posterior pituitary in urine formation? The hypothalamus produces anti-diuretic hormone (ADH) which is stored in the posterior pituitary. When osmoreceptors detect low blood volume/low blood pressure, the posterior pit. Will be signaled to secrete the store ADH which acts on the collecting duct to reabsorb more water from the nephron. As a result, urine would be highly concentrated in solutes (dark yellow)
14. Where is the adrenal gland located? How does it affect urine formation? - omit; didn't discuss
15. Explain how ADH regulates water in the urinary system – see answer to question 13
16. What are the primary male reproductive parts and their function? See notes
17. Where are sperm made? Mature? Made in the seminiferous tubule (within testes) and mature in the epididymis.
18. Where is testosterone produced? In the interstitial cells (within testes)
19. What 3 glands release substances that make up semen/seminal fluid? Prostate gland, seminal vesicle, bulbourethral gland. What are the functions of seminal fluid? Provide nutrients for sperm, provide lubrication, prostaglandins trigger uterus contractions which aids in sperm movement, provide alkaline buffer to protect sperm against the acidic vagina
20. Where do sperm gain the ability to swim? epididymis
21. What is the function of testosterone? Hollowing of vas deferens and produce sperm.
22. Explain the control of testosterone. With increased amounts of testosterone in the blood, it feeds information to the hypothalamus (stop GnRH production) and the anterior pituitary (stop LH and FSH) which shuts of testosterone production (and sperm production)
23. Explain the path of sperm through the male reproductive system. Testes, epididymis, vas deferens, urethra
24. What are the primary female reproductive parts and their function? – see notes, in your own words
25. Where are cilia found in the female reproductive system and what is their function? In the oviduct (fallopian tube) and assists with the movement of sperm towards the egg and the egg out of the oviduct
26. Explain the path of an egg through the female reproductive system. Produced in the ovary, swept into the oviduct via the fimbriae, travels down the oviduct into the uterus. If fertilized with likely adhere to vascularized endometrium in the uterus and develop into a fetus.
27. What are the functions of estrogen? Causes endometrium to thicken during the proliferative phase of the uterine cycle. During day 12 to 14 causes increased LH & FSH (positive feedback). During secretory phase of uterine cycle, increased estrogen stops LH and FSH secretion from anterior pituitary
28. Explain the Menstrual cycle: uterine cycle and ovarian cycle. Also, explain the associated hormonal changes that occur in each phase – see notes (in your own words)
29. Explain the control of hormones in the female reproductive system: gonadotropin releasing hormone, FSH, LH, estrogen, progesterone, and the role of the hypothalamus and pituitary gland – directly from notes (see notes)
30. What 2 substances cause contraction of the uterus? Prostaglandins and oxytocin
31. Compare and contrast the role of LH and FSH in the male and reproductive system. Males: LH stimulates interstitial cells to produce testosterone and FSH stimulates seminiferous tubules to produce sperm. Females: LH stimulates ovary to release developed ovum (egg) and develops the corpus luteum and FSH matures the follicles to produce the release the one egg per month
32. What is HCG? What does it do? Human Chorionic Gonadotropin is the hormone produced when a fertilized egg adheres to the vascularized uterine wall. It maintains the corpus luteum so that it will continue to produce high levels of estrogen and progesterone.

33. Explain the role of oxytocin in pregnancy. Explain how it is an example of positive feedback. Oxytocin is released as the cervix begins to be stretched (dilate) during the birthing process which causes increased uterine contractions and milk production. The more the fetus pushes on the cervix, the more oxytocin is produced (positive feedback) and therefore, the contractions become more frequent.

34. What event marks the beginning of pregnancy? Production of HCG and stop of menstrual cycle.

35. When does implantation occur? About 7 days after fertilization in the uterus.

36. The tube that transports urine from the kidney to the urinary bladder is the
   a) Urethra  
   b) Ureter  
   c) Collecting duct  
   d) Proximal convoluted tubule

37. The urinary bladder is useful because it
   a) Helps with defecation  
   b) Is a place where white cells attack bacteria  
   c) Stores urine to prevent constant urination  
   d) Transports urine to the outside of the body

38. Nervous control of urination involves what mechanism(s)?
   a) The brain determines need for urination from an internal clock  
   b) Stretch receptors in the urinary bladder directly send impulses to the sphincters to cause urination  
   c) Stretch receptors in the urinary bladder send impulses to the spine causing a urinary reflex but the brain can delay the reflex  
   d) Chemical receptors in the bladder detect urine concentration and trigger a reflex action

39. Which is **NOT** a function of the urinary system?
   a) Monitoring and maintaining blood pH at about 7.4  
   b) Regulating blood pressure by regulating salt balance in the blood  
   c) Hormone secretion to stimulate red blood cell production and regulate sodium ion levels  
   d) Production of water from oxygen and bicarbonate ions (HCO₃⁻)

40. Excretion is a process in which _____ is (are) removed from the body
   a) Water  
   b) Salt  
   c) Feces  
   d) Metabolic wastes

41. The microscopic anatomical unit of excretion found in the kidney is the
   a) Nephron  
   b) Glomerular (Bowman’s) capsule  
   c) Glomerulus  
   d) Alveoli

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42. In the diagram above of the nephron, which arrow represents the site of filtration?
   a) 1  
   b) 2  
   c) 3  
   d) 4

43. In the diagram, which arrow represents the site of tubular secretion?
   a) 1  
   b) 2  
   c) 3  
   d) 4

44. In the diagram, the loop of the nephron (loop of Henle) is found at which site?
   a) 1  
   b) 2  
   c) 3  
   d) 4  
   e) 5

45. In the diagram, hydrogen and potassium ions, creatinine, and ammonia will be excreted at which site?
   a) 1  
   b) 2  
   c) 3  
   d) 4  
   e) 5

46. In the diagram, glucose, salt, and water will normally be reabsorbed at which site?
   a) 1  
   b) 2  
   c) 3  
   d) 4  
   e) 5

47. In the diagram, the highest concentration of solutes in the medulla would be found at which site?
   a) 1  
   b) 2  
   c) 3  
   d) 5

48. In the diagram, the effect of the hormone ADH will be at which site?
   a) 1  
   b) 2  
   c) 3  
   d) 4  
   e) 5

49. Which of the following would be an indication of kidney failure?
   a) Urea in the urine  
   b) Salts in the urine

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50. **Which of these is the correct sequence of blood vessels about the nephron?**
   a) Renal artery, capillary bed, afferent arteriole, efferent arteriole, renal vein
   b) Efferent arteriole, glomerulus, venule, afferent arteriole, collecting duct
   c) Afferent arteriole, glomerulus, efferent arteriole, capillary bed, venule, renal vein
   d) Afferent arteriole, glomerulus, capillary bed, efferent arteriole, venule renal vein

51. **What is the correct order an excreted water molecule moves from glomerulus to collecting duct?**
   a) Loop of nephron – glomerular capsule – proximal convoluted tubule – distal convoluted tubule
   b) Glomerular capsule – proximal convoluted tubule – loop of nephron – distal convoluted tubule
   c) Proximal convoluted tubule – glomerular capsule – loop of nephron – distal convoluted tubule
   d) Glomerular capsule – proximal convoluted tubule – distal convoluted tubule – loop of nephron

52. **The ___ capillaries are enclosed by the Bowman’s capsule.**
   a) Peritubular
   b) Glomerular
   c) Collecting tubule
   d) Loop of Henle

53. **Which of the following is NOT one of the three steps (processes) involved in urine formation?**
   a) Pressure filtration
   b) Selective reabsorption
   c) Countercurrent mechanism
   d) Tubular secretion

54. **Selective reabsorption occurs in the ____ of the nephron.**
   a) Glomerulus
   b) Distal convoluted tubule
   c) Proximal convoluted tubule
   d) Collecting duct

55. **Tubular secretion allows hydrogen ions, creatinine and penicillin to be excreted in the distal convoluted tubule. How are these molecules moved across?**
   a) Fluid pressure similar to what happens in the glomerulus
   b) Passive diffusion
   c) Osmosis
   d) Active transport

56. **Glucose is found in glomerular filtrate but NOT in the urine because**
   a) The kidney stores glucose as glycogen
   b) Kidney cells require glucose because energy is needed for active transport
   c) Glucose is reabsorbed back into the bloodstream
   d) Glucose is converted to amino acids in the kidney.

57. **Normally, concentration of metabolically important substances, such as glucose, are**
   a) High in glomerular filtrate but only a trace in urine
   b) Low in glomerular filtrate but high in urine
   c) High in glomerular filtrate and urine
   d) Low in both glomerular filtrate and urine

58. **Normally, concentrations of wastes, such as urea, are**
   a) High in urine in comparison to plasma
   b) High in the filtrate but low in urine
   c) In trace amounts in urine but are high in blood
   d) Not in the filtrate but are a little in the urine

59. **Which mechanism used to form urine requires a high blood pressure?**
   a) Glomerular filtration
   b) Selective reabsorption
   c) Tubular secretion
   d) Phagocytosis

60. **Which of the following is NOT true about the collecting ducts?**
   a) They are found within the medulla
   b) Fluid enters them from the distal convoluted tubule
   c) Water diffuses out of them into the medulla
   d) The urine within them becomes hypertonic to the blood

61. **Penicillin leaves the blood plasma through tubular walls and not through the glomerulus. Therefore, penicillin is removed from the blood by the process of**
   a) Osmosis
   b) Pressure filtration
   c) Tubular secretion
   d) Diffusion

62. **Albumin is the large protein molecule found in egg white and blood plasma. Table salt dissociates into sodium and chloride ions. Urea is assembled in the liver. In a healthy person what is the fate of the majority of these molecules as they pass through a nephron?**
   a) All 3 pass across to the glomerular capsule and are excreted in urine
   b) All 3 pass across to the glomerular capsule but the salt ions are mostly reabsorbed
   c) Albumin remains in the blood, salt ions and urea are passed across and excreted
   d) Albumin remains in the blood, salt ions pass across but are reabsorbed , and the urea is passed across and excreted

63. **How can urine contain a higher concentration of wastes (be hypertonic) than the blood?**
   a) Urine cannot since the process is passive diffusion
   b) Reabsorption of water in the loop of Henle and collecting ducts leaves behind a more concentrated urine
   c) All stages in the kidney involve active transport
   d) Urine can be hypertonic for small molecules if it is hypotonic for an equal number of big molecules

64. **Which statement is NOT true about ADH?**
   a) It increases the permeability of the collecting ducts
   b) ADH increases water reabsorption
   c) ADH decreases urine volume
   d) It is secreted by the adrenal gland

65. **An increased amount of ADH leads to**
   a) An increased amount of urine
   b) A decreased amount of urine
c) No change in the amount of urine
d) Kidney failure

66. The loop of Henle will show
   a) Active release of sodium from the descending limb
   b) Active release of sodium from the ascending limb
   c) Passive release of sodium from the ascending limb
   d) Water release from the ascending limb

67. If the blood is alkaline
   a) More hydrogen ions, sodium, and bicarbonate ions are excreted
   b) Less hydrogen ions and more sodium and bicarbonate ions are reabsorbed
   c) Less hydrogen ions are excreted and less sodium and bicarbonate ions are reabsorbed
   d) The kidneys reabsorb increased amounts of water

68. Which of these characterizes the blood in the renal vein?
   a) High in CO₂ and high in urea
   b) High in CO₂ and low in urea
   c) Low in CO₂ and high in urea
   d) Low in CO₂ and high in urea

69. What do FSH, LH, testosterone, progesterone, and estrogen have in common?
   a) They occur only in the female
   b) They occur only in the male
   c) All of them directly affect the uterine lining
   d) All of them are necessary to sexual reproduction

70. The vas deferens
   a) Becomes erect
   b) Carries sperm
   c) Is surrounded by the prostate gland
   d) All of these

71. The uterus
   a) Is connected to both the oviducts and the vagina
   b) Is not an endocrine gland
   c) Contributes to the development of the placenta
   d) All of these

72. The prostate gland
   a) Is removed when a vasectomy is performed
   b) Is not needed to maintain the secondary sex characteristics
   c) Receives urine from the bladder
   d) All of these

73. Ovulation occurs
   a) As a result of hormonal changes
   b) Always on day 14
   c) In postmenopausal women
   d) As a result of implantation

74. Pregnancy begins
   a) When an egg is fertilized
   b) When ovulation occurs
   c) Upon successful implantation
   d) During the follicular phase

75. Which gland is an endocrine gland?
   a) Seminal vesicles
   b) Prostate gland
   c) Cowper’s gland
   d) Testes

76. In the human male, hormones from the ______ stimulate production of testosterone by secreting ______
   a) Testis; seminal fluid
   b) Hypothalamus; trophic hormones
   c) Pituitary gland; luteinizing hormone
   d) Seminal vesicles; follicle-stimulating hormone

77. The follicle-stimulating hormone stimulates the
   a) Release of the egg cell from the follicle
   b) Development of a follicle
   c) Development of the endometrium
   d) Beginning of the menstrual flow

78. Menstruation begins in response to
   a) An increase in circulating estrogen levels
   b) A decrease in circulating progesterone levels
   c) Rupture of the ovarian follicle
   d) Changes in the blood’s CO₂ level

True/False

79. The cells of the distal convoluted tubules have numerous mitochondria and microvilli to support active transport T

80. Urine contains substances that underwent pressure filtration and substances that underwent tubular secretion T

81. Blood pressure may be associated with filtration while osmotic pressure and active transport may be associated with reabsorption T

82. In fertile, sexually mature males, the urethra sometimes carries sperm and sometimes carries urine T

83. Fertilization usually occurs in the oviduct T