Choose whether these statements are true or false:

48) The role of the kidney in homeostasis may include which of the following:
   a) regulation of extracellular fluid composition
   b) regulation of red blood cell formation.
   c) secretion of certain hormones, such as angiotension II, prostaglandins, and kinins in the regulation of blood pressure.
   d) secretion of erythropoietin.

49) The following is (are) a feature of the glomerulus?
   a) podocyte
   b) fenestrated epithelium
   c) slit membrane
   d) foot processes.

53) The loops of Henle of the outer cortical nephrons
   a) do not play any important role in overall function, and are simply unimportant vestiges of evolutionary development
   b) do not participate in the urinary diluting mechanism
   c) are functionally unimportant in the renal conservation of sodium and water
   d) do not contribute to the medullary osmotic gradient.

54) For those substances that are actively reabsorbed, the maximal amount that can be transported per unit time by the kidney tubules:
   a) is termed the tubular transport maximum
   b) requires specific transport systems for each substance transported.
   c) depends on the maximum rate at which the transport mechanism itself operates.
   d) is dependent upon tubular load.

55) Solute particles move from the plasma of the renal glomerulus to the fluid in the bowman's capsule by:
   a) active transport
   b) diffusion
   c) renal flow
   d) bulk flow

56) NH3 (ammonia) produced by the kidneys comes mainly from:
   a) leucine
   b) glycine
   c) alanine
   d) glutamine
57) Polyuria (diuresis), which occurs in the diabetic with a GFR = 120 ml/min and blood sugar level = 350 mg%, is indicative of:
   a) diuresis due to reduced active transport of sodium out of the tubule because of diminished activity of the sodium pump.
   b) losses of water and sodium which can be prevented by administration of antidiuretic hormone (ADH) and an aldosterone like mineralocorticoid.
   c) a cellular and extracellular hydration due to water retention of the glucose; hence diuresis is never observed in a diabetic individual
   d) an osmotic diuresis due to glucosuria, and the water loss will exceed "salt" loss

58) The tonicity of the urine as it enters the renal collecting duct may be:
   a) hypotonic
   b) isotonic
   c) hypertonic
   d) hypotonic or isotonic but never hypertonic

59) Extracellular dehydration results in:
   a) stimulation of the volume and osmoreceptors and increased ADH secretion
   b) inhibition of the volume and osmoreceptors and increased ADH secretion
   c) increased extracellular osmolality.
   d) inhibition of the volume and osmoreceptors and increased ADH secretion

60) About 4 to 6 days after you place a "normal" patient on a low sodium diet to reduce his or her weight, which of the following will be observed?
   a) plasma rennin and aldosterone are above normal
   b) plasma rennin and aldosterone are below normal
   c) plasma sodium concentration is normal
   d) plasma sodium is below normal

61) The substances which makes up the greatest part of the reabsorptive "load" in the renal tubule is:
   a) glucose
   b) urea
   c) potassium
   d) sodium

62) The renal "countercurrent" mechanism is dependent upon the anatomic arrangement of the:
   a) vasa recta
   b) collecting ducts
c) loop of Henle
d) proximal tubule.

63) secretion of aldosterone will result from:
a) low extracellular sodium
b) low extracellular volume
c) high extracellular potassium
d) high ECF volume.

64) Aldosterone secretion is controlled by levels of:
a) angiotensin II
b) ADH
c) plasma volume
d) plasma bicarbonate.

65) The renal clearance of:
a) a substance is expressed in units of volume per unit time
b) urea is lower than that of inulin.
c) chloride increases after an injection of aldosterone.
d) PAH eventually falls as the plasma concentration of PAH rises.

66) The fluid in the distal part of the proximal convoluted tubule has:
a) a higher urea concentration than the fluid in bowman's capsule
b) a similar PH to that in the ureter when the kidneys excrete an acid urine.
c) a negative potential relative to that in the peritubular blood
d) an osmolarity about 1/3 that in glomerular filtrate due to the active reabsorption of about 1/3 of the filtered sodium chloride in the proximal tubule.

67) In the nephron:
a) fluid in the top of the loop of Henle is hypertonic with respect to glomerular filtrate
b) glomerular filtrate is hypertonic with respect to the fluid in the distal convoluted tubule.
c) antidiuretic hormone (ADH) causes the fluid in the collecting ducts to be hypertonic with respect to that in the proximal convoluted tubule.
d) the fluid at the end of the proximal convoluted tubule is hypertonic with respect to glomerular filtrate.

68) The glomerular:
a) capillary pressure is normally in the 35 - 45 mm Hg.
b) afferent arterioles offer more resistance to blood flow than the efferent arterioles
c) capillaries are more permeable to water than most other capillaries in the body.
d) capillary blood sodium : potassium ratio is the same as that found in glomerular filtrate.

69) The cells of the distal convoluted tubule:
   a) reabsorb approximately 50% of the water in the glomerular filtrate.
   b) are capable of excreting hydrogen ions by a mechanism which involves carbonic anhydrase.
   c) are capable of reabsorbing sodium ions in exchange for hydrogen and potassium ions.
   d) determine the final composition of urine in accordance with body needs.

71) Evacuation of the bladder:
   a) depends on the integrity of a sacral spinal reflex arc
   b) follows activation of the sympathetic nerves to the bladder
   c) is normally accompanied by reflex of bladder contents into the ureters early in micturition.
   d) is prevented by destruction of the sensory nerves supplying the bladder

72) The proximal convoluted tubules:
   a) reabsorb most of the water and salts of the glomerular filtrate
   b) reabsorb all the glucose in the glomerular filtrate
   c) contain juxtaglomerular cells which secrete rennin.
   d) are the main target cells for antidiuretic hormone (ADH).

74) The collecting ducts in the kidney:
   a) can secrete water molecules activity into the urine
   b) are responsible for most of the reabsorption of water that occurs in the kidneys.
   c) determine to a large extent the final osmolarity of urine
   d) are rendered impermeable to water by antidiuretic hormone.

75) Aldosterone:
   a) is produced mainly in the juxtaglomerular apparatus
   b) increases sodium reabsorption by the nephron
   c) increases potassium reabsorption by the nephron.
   d) tends to increase the hydrogen ion concentration in the blood.

76) The renal clearance:
   a) is calculated from \( \frac{U}{V} \) where \( U \) is urinary concentration of the material, \( V \) urine volume / min, and \( P \) is plasma concentration.
   b) of inulin provides an estimate of glomerular filtration rate
   c) of creatinine provides an estimate of renal plasma flow in man
   d) of phosphate is decreased by parathromone.
77) Potassium :
   a) is secreted in the distal convoluted tubule
   b) is reabsorption in the proximal convoluted tubule
   c) completes with hydrogen ions for secretion by the distal convoluted tubule in
      exchange for sodium ions
   d) excretion in the urine is decreased by the action of mineralocorticoids.

78) Aldosterone :
   a) is secreted in increased amounts when blood volume falls
   b) is a polypeptide.
   c) secretion tends to increase renal arterial pressure.
   d) secretion results in a reduction in urinary volume.

79) Secretion of rennin :
   a) is believed to occur from the cells of the juxtaglomerular apparatus.
   b) leads to fluid retention by decreasing the glomerular filtration rate.
   c) leads to increased formation of angiotensin in the blood
   d) leads to a raised aldosterone level in systemic blood.

80) A patient suffering from a deficiency of antidiuretic hormone
    (diabetes insipidus) is likely to:
   a) excrete urine with a specific gravity below 1.005.
   b) produce a quantity of urine per day equal in volume to the glomerular filtrate.
   c) have extracellular fluid with a raised osmolarity.
   d) have intracellular fluid with a lowered osmolarity.

81) When a patient is treated with an aldosterone antagonist there is
    likely a fall in:
   a) urine volume.
   b) plasma potassium concentration.
   c) blood volume.
   d) blood viscosity.

82) Interference with active reabsorption of sodium by the kidney is
    likely to cause:
   a) a rise in the volume of urine passed in a given time.
   b) a rise in plasma potassium level.
   c) a decreased interstitial fluid volume.
   d) a rise in plasma specific gravity.
83) A patient treated with a drug which inhibits carbonic anhydrase is likely to have:
   a) an increased urinary volume.
   b) decreased loss of potassium in the urine.
   c) a fall in plasma bicarbonate.
   d) a reduced blood volume.

84) Cutting the sympathetic nerves to the bladder may cause:
   a) retention of urine.
   b) loss of pain sensation in the bladder.
   c) periodic micturition.
   d) relaxation.

85) Which of the following statements about the fluid in distal part of proximal tubule is true: T& F
   a) Urea concentration is higher than in Bowman's capsule.
   b) glucose concentration is similar to that in plasma.
   c) osmolarity is about 25% that of glomerular filtrate.
   d) bicarbonate concentration is lower than in plasma as it is usually completely reabsorbed in the proximal tubular.

86) Glucose in renal tubules: T& F
   a) is completely reabsorbed in the first part of the PT.
   b) is reabsorbed by secondary active reabsorption (co)transport with Na+.
   c) carrier at luminal border is Na+ dependent.
   d) crosses the basolateral border by facilitated diffusion.

87) Which is true or false about potassium:
   a) is reabsorbed in PCT.
   b) is activity secreted in the DCT.
   c) deficiency favors hydrogen ion secretion in DT.
   d) excretion is determined largely by potassium intake.
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