

EACH OF QUESTIONS 1 TO 15 HAS ONE CORRECT ANSWER

1. Which of the following are diploid cells involved in spermatogenesis (ONE CORRECT):

- A. spermatogonia
- B. spermatozoa
- C. spermatids
- D. all of the above
- E. none of the above

2. Which of the following is consistent with the actions of Viagra? (ONE CORRECT): Viagra

- A. inhibits phosphodiesterase
- B. reduces 5'GMP levels in vascular smooth muscle cells
- C. activates adenylate cyclase
- D. both A and B
- E. all of the above

3. Which of the following about oxytocin is correct (ONE CORRECT): Oxytocin...

- A. is produced by the anterior pituitary
- B. is only present in humans
- C. is a hypothalamic hormone
- D. promotes milk production
- E. plays a role in social attachment

4. The following about sex determination, choose the one that is correct? (ONE CORRECT)

- A. all nucleated cells in the body contain 46 chromosomes
- B. there are 23 pairs of homologous (matched) pairs of autosomes
- C. all genetic males are XY
- D. SRY recombination can lead to XY females
- E. SRY+ is the current test strategy for verifying biological sex in Olympic athletes

5. As discussed in class, which of the following relate to gonadotropin-releasing hormone (GnRH) (ONE CORRECT): GnRH....

- A. represses secretion of FSH
- B. represses secretion of LH
- C. deficiency in children is associated with failure to mature sexually
- D. both A and B are correct
- E. all of the above

6. Fertilization usually occurs up to _____ day(s) after intercourse and up to _____ day(s) after ovulation (ONE CORRECT)

- A. 1, 1
- B. 2, 1
- C. 3, 1
- D. 3, 3
- E. 3, 2

7. Which fetal stage undergoes nidation? (ONE CORRECT)

- A. blastocyst
- B. zygote
- C. morula
- D. oocyte
- E. corpus luteum

8. If you know mean arterial pressure, peripheral resistance, and heart rate, which of the following parameters can be calculated? (ONE CORRECT)

- A. end diastolic volume
- B. diameter of arteries
- C. viscosity of blood
- D. end systolic volume
- E. stroke volume

9. What structure is different between medium-sized arteries and medium-sized veins? (ONE CORRECT). The difference is the presence of....

- A. smooth muscle
- B. valve tissue
- C. endothelial cells
- D. elastic tissue
- E. fibrous tissue

10. Which ONE of the following statements is correct about fluid movement through the capillary wall? (ONE CORRECT)

- A. fluid moves out of a capillary when colloid osmotic pressure exceeds hydrostatic pressure
- B. colloid osmotic pressure changes across the length of a capillary while hydrostatic pressure stays constant
- C. hydrostatic pressure determined by the proteins present in the capillaries
- D. colloid osmotic pressure is determined by the blood pressure in the capillaries
- E. fluid is absorbed into a capillary when the colloid osmotic pressure exceeds hydrostatic pressure

11. Of the list below, blood is most highly oxygenated in which part of the cardiovascular system? ONE CORRECT.

- A. vena cava
- B. pulmonary vein
- C. right ventricle
- D. right atrium
- E. blood oxygen levels are similarly low in all these areas of the circulatory system

12. Calculate lung compliance if the change in transpulmonary pressure is 2 and the change in lung volume is 6 (ONE CORRECT). Lung compliance is....

- A. 3
- B. 1/3
- C. 6
- D. 12
- E. cannot calculate from the data provided

13. Inspiratory capacity is equal to (ONE CORRECT):

- A. the maximum amount of gas that can be expired after a normal tidal expiration
- B. the tidal volume plus the inspiratory reserve volume
- C. tidal volume plus functional residual capacity
- D. both A and B are correct
- E. all of A, B, and C are correct

14. A new mammalian species is discovered on earth! Calculate the stroke volume if the end diastolic volume is 4.5 litres (L) and the end systolic volume is 0.5 L (ONE CORRECT):

- A. 5.0 L
- B. 4.5 L
- C. 4.0 L
- D. 0.5 L
- E. cannot calculate stroke volume without knowing cardiac output (CO) and heart rate (HR)

15. Scientists measure the timing of electrical activity at one stage in the cardiac cycle and find it is 0.04 m/sec. They conclude that this most likely is occurring when the electrical conduction signal (ONE CORRECT)

- A. is moving through the bundle of His
- B. goes to the atrioventricular node
- C. descends down the intraventricular septum
- D. is in the Purkinje fibres
- E. is at the SA node

INCORRECT:

EACH OF QUESTIONS 16-30 HAS ONE INCORRECT ANSWER

16. Which of the following statements about sperm development is not correct (ONE INCORRECT):

- A. secondary spermatocytes undergo mitosis to produce spermatids
- B. secondary spermatocytes are haploid
- C. spermatogonia are diploid
- D. spermatogonia are stem cells
- E. spermatids give rise to spermatozoa

17. All of the following are layers of the human oocyte that the sperm must penetrate for fertilization (ONE INCORRECT):

- A. corona radiata
- B. inner acrosomal membrane
- C. zona pellucida
- D. perivitelline space
- E. plasma membrane

18. The following are all part of the erection process (ONE INCORRECT):

- A. erection is achieved by parasympathetic nerve-induced vasodilation of arterioles
- B. blood flows into the corpora cavernosa leading to compression of the tissue
- C. nitric oxide activates adenylate cyclase
- D. arterioles vasodilate because their endothelial cells are relaxing
- E. cGMP production causes calcium membrane channels to close

19. All of the following statements about prolactin are correct except one. Choose the one that is incorrect (ONE INCORRECT): Prolactin

- A. is secreted by both males and females
- B. plays a role in stimulation of milk production
- C. plays a supporting role in the regulation of the male reproductive system
- D. acts on the kidneys to help regulate water and electrolyte balance
- E. inhibiting hormone secretion is repressed by estrogen

20. The following factors are associated with variations in the timing of onset of puberty (ONE INCORRECT):

- A. genetics
- B. geographic altitude
- C. poor nutrition
- D. pulsatile GnRH release
- E. intestinal bowel disease

21. The following hormones are produced by the placenta to stimulate labour. ONE INCORRECT:

- A. corticotropin releasing hormone
- B. prostaglandin E2
- C. DHEAS
- D. estriol
- E. estradiol-17b

22. The following relate to a positive hormonal pregnancy test as discussed in class.... (ONE INCORRECT):

- A. the basis of the test is an immunoassay
- B. some of the antibodies are tagged with a dye
- C. antibodies directed against hCG hormone are in the test strip
- D. antibodies directed against the hCG antibodies are in the test strip
- E. the test detects hCG hormone made by the pregnant mother

23. The following are about blood vessels (ONE INCORRECT):

- A. elastic recoil drives blood through arteries
- B. vasoconstriction decreases blood flow to the capillary bed
- C. osmotic pressure at the arterial end of capillaries force fluid out into the surrounding tissue
- D. arterials have smooth muscle cells and connective tissue
- E. venules have smooth muscle cells and connective tissue

24. Which ONE statement about resistance to blood flow is INCORRECT? (ONE INCORRECT). Resistance is...

- A. proportional to blood vessel length
- B. proportional to blood viscosity
- C. proportional to radius
- D. inversely proportional to radius
- E. inversely proportional to diameter

25. The respiratory zone of the lungs contains which structures (ONE INCORRECT)

- A. primary bronchus
- B. respiratory bronchioles
- C. terminal bronchioles
- D. alveolar sacs
- E. alveolus

26. The following relate to gas exchange in the lungs (ONE INCORRECT):

In the lungs....

- A. oxygen is entering the blood and CO₂ is leaving the blood
- B. oxyhemoglobin formation occurs because blood CO₂ levels in the lungs are low
- C. blood pH increases
- D. oxygen to combines with hemoglobin
- E. blood alkalinity decreases

27. The following are about the microanatomy of cardiac muscle (ONE INCORRECT):

Heart muscle contains....

- A. A bands consisting of actin and myosin
- B. Z-discs to anchor myosin
- C. tropomyosin
- D. I-bands consisting of actin but not myosin
- E. sarcomeres

28. The following occur with excitation-contraction coupling in cardiac muscle (ONE INCORRECT)....

- A. Ca²⁺ from extracellular fluid binds to cardiac actin to stimulate contraction
- B. Ca²⁺ diffuses from the extracellular fluid to the cardiomyocyte cytoplasm
- C. ryanodine receptors mediate release of Ca²⁺ from the SR
- D. Ca²⁺ ATPase pumps calcium back into the SR
- E. after Ca²⁺ returns to the SR the myocardial cell relaxes

29. The following statements are about smooth muscle (ONE INCORRECT): Smooth muscle...

- A. contractions are involuntary
- B. cells are striated
- C. cells contain a single nucleus
- D. cells have a tapered shape
- E. is found in the walls of blood vessels

30. The following all relate to heart disease (ONE INCORRECT):

- A. angina occurs when plaque build-up in coronary arteries partially restricts blood flow to the heart
- B. heart attacks (MI) occur when atherosclerotic plaques block blood flow in a coronary artery
- C. ST-segment elevation on an ECG can indicate a heart attack
- D. beta-blockers given to patients with congestive heart failure increase heart rate
- E. heart rate generally decreases as individuals age