Questions

1. **Which of the following muscles is innervated by the recurrent branch of the median nerve?**

A. Abductor pollicis brevis
B. Adductor pollicis
C. Extensor pollicis brevis
D. Third lumbrical
E. Abductor pollicis longus

2. **Which of the following is not a synovial joint?**

A. Sternoclavicular
B. Scapholunate
C. Atlantoaxial
D. Glenohumeral
E. Distal tibiofibular

3. **Which of the following is not a feature seen in anterior spinal cord syndrome?**

A. Bilateral motor paralysis below the level of the lesion
B. Absent pain and temperature sensation below the level of the lesion
C. Absent proprioception below the level of the lesion
D. Sexual dysfunction
E. Hypotension

4. **The lungs - True/False**

Ventilation is greatest at the lung apex
Perfusion is greatest at the lung base
The left lung has 10 segments
Type II pneumocytes are most abundant

5. **Anatomical shunt – True/False**

Deoxygenated blood enters the systemic circulation
It is a form of V/Q mismatch
Does not occur under normal conditions
May be caused by Crigler-Najjar syndrome

6. **What is synthesised in the zona glomerulosa?**

A. Androgens
B. Erythropoietin
C. Glucocorticoids
D. Mineralocorticoids
E. Oestrogen

7. **Cerebrospinal fluid. True/False**

The total volume of CSF is approximately 500ml
CSF protein is approx 1% that of blood plasma
Is found in the subarachnoid space
Glucose levels are higher than blood plasma

8. **Red blood cells and oxygen transport. True/False**

Survive for approximately 120 days
Each haemoglobin molecule contains 2 haem groups
80% is HbA1
Approximately 1.5% of total oxygen is carried in plasma

9. **Which of the following shifts the oxygen-haemoglobin dissociation curve to the left?**

A. Low temperature
B. Low pH
C. Anaemia
D. Increase $PaCO_2$
E. Pregnancy

10. Which of the following describes the volume of air remaining in the lungs after a normal expiratory breath?

A. Residual volume
B. Functional residual capacity
C. Expiratory reserve volume
D. Tidal volume
E. Vital capacity

11. Which of the following form part of the diaphragmatic surface of the heart? True/False.

Right atrium
Left atrium
Right ventricle
Left ventricle

12. The following nerve fibres are unmyelinated. True/False

A alpha
C fibres
A Delta
A Beta

13. Which of the following are antigen presenting cells? True/False

Macrophages
Dendritic cells
Natural Killer cells
B cells

14. Where do T-cells mature?

A. Bone marrow
B. Thymus
C. Lymph nodes
D. Thyroid
E. Spleen

15. What is the function of antibody? True/False

Opsonisation
Complement activation
NETosis
Agglutination

16. Which of the following reduces serum calcium levels?

A. Parathyroid hormone
B. Vitamin D
C. Osteoclast activation
D. Calcitonin
E. Hyperthyroidism

17. Hypokalaemia is associated with which of the following?

A. Metabolic acidosis
B. A prolonged PR interval
C. Acute kidney injury
D. Hyperaldosteronism
E. Rhabdomyloysis

18. Cystic fibrosis is most commonly due to which type of genetic abnormality?

A. Deletions
B. Point mutation
C. Trinucleotide repeat disorders
D. Aneuploidy
E. Translocations

19. During which phase of the cell cycle does DNA replication occur?

A. G0
B. G1
C. S
D. G2
E. M

20. Reed-Sternberg cells are found in which condition?

A. Myleoma
B. Chronic lymphocytic leukaemia
C. Acute myelocytic leukarmia
D. Non-hodgkins Lymphoma
E. Hodgkin's Lymphoma

Answers

Question 1

A

The recurrent branch of the median nerve supplies several thenar muscles. These include the opponens pollicis, abductor pollicis brevis, and the superficial portion of flexor pollicis brevis. The adductor pollicis muscle and third lumbrical are innervated by the ulna nerve. The abductor pollicis lungus and extensor pollicis brevis are supplied by the posterior interosseous nerve.

Question 2

E

The distal tibiofibular joint is a fibrous type joint. This is in contrast to the proximal tibiofibular joint which is a plane synovial joint. Synovial joints are defined by their joint capsule and secretion of synovial fluid.

Question 3

C

Anterior spinal cord syndrome occurs following damage to the anterior spinal artery and results in loss of function in the anterior two thirds of the spinal cord. The corticospinal tracts (motor function) and spinothalamic tracts (pain and temperature) are affected. Autonomic dysfunction may occur, however there is sparing of the dorsal columns.

Question 4

TTFF

Ventilation is greatest at the lung apex. Mycobacterium tuberculosis is most commonly found in the apex of the lung. It is a highly aerobic organism and favours the high oxygen levels found here. In contrast prefusion is greatest at the base. The left lung has 2 lobes and 8 segments. It is the right lung that contains 3 lobes and 10 segments. Type 1 pneumocytes are squamous cells which provide 95% of the surface area of the alveoli.

Question 5

TTFF

In anatomical shunt deoxygenated blood enters the systemic circulation. Ventilation-perfusion mismatch occurs. In normal conditions several small cardiac veins drain directly into the left ventricle. This explains why the partial pressure of oxygen in the alveoli is slightly higher than the arterial partial pressure. Crigler-Najjar is a rare inherited defect in bilirubin metabolism.

Question 6

D

The adrenal cortex is the outmost layer of the adrenal gland and is separated into 3 distinct zones; the zona glomerulosa, the zona fasciculata and the zona reticularis. Aldosterone, a mineralocorticoid is produced in the zona glomerulosa. The zona fasiculata produced glucocorticoids and the zona reticularis synthesizes androgens.

Question 7

FTTF

The total volume of CSF is approximately 150ml. The body produces 450ml per day in the choroid plexuses of the third, fourth and lateral ventricles. Glucose levels are approximately 60% that of blood plasma. Protein levels in CSF are approximately 1% that of blood plasma.

Question 8

TFFT

Red blood cells are produced through erythropoiesis. Wear and tear occurs as they are forced through blood capillaries. They do not have a nucleus and are unable to synthesise new components. They survive approximately 120 days. Each heamoglobin contains 4 haem groups. 98% of haemoglobin is in the form HbA1, which includes 2 alpha and 2 beta chains. Approximately 1.5% of total oxygen is dissolved in plasma. The remaining is bound to haemoglobin.

Question 9

A

The oxygen-haemoglobin dissociation curve plots the partial pressure of oxygen against oxyhaemoglobin saturation. The curve is sigmoidal as a consequence of the conformational change in the structure of the haemoglobin molecule with the addition of each subsequent oxygen molecule. The curve is shifted to the left in the following conditions; low temperature, high pH, low 2,3-Diphosphoglycerate, low $PaCO_2$, HbF and carboxyhaemoglobin.

Question 10

B

The functional residual capacity is the volume of air remaining in the lungs after a normal breath. The residual volume is the air remaining in the lungs after maximal expiration. The tidal volume is the normal resting breath volume and the vital capacity is the maximal volume expired after maximal inspiration. The expiratory reserve volume is the volume of air that can be expired at the end of normal tidal volume.

Question 11

TFTT

The surfaces of the heart include the anterior surface (sternocostal), posterior surface (base), inferior (diaphragmatic), right pulmonary and left pulmonary. The diaphragmatic surface is comprised of the ventricles and a portion of the right atrium.

Question 12

FTFF

Group A nerve fibres are myelinated and transmit proprioception, nociception, cold sensation, impulses from muscle spindles and golgi tendon organs. Group C fibres are unmyelinated afferent fibres which convey nociception and warmth.

Question 13

TTFT

APCs present antigen on major histocompatibility complexes on their surfaces. This process is central to the production of a satisfactory immune response.

Question 14

B

T cells originate from haematopoietic stem cells found in the bone marrow. The cells then migrate to the thymus where they mature. Here they undergo a process of positive and negative selection to ensure they are capable of binding to MHC complexes but will not mount a response against normal cells.

Question 15

TTFT

Antibodies are a central feature of humoral immunity. The enable the development of a specific, targeted response to pathogens. They are globular plasma proteins with highly variable antigen binding sites. They have multiple roles in the immune response including opsonisation, complement activation, agglutination and neutralisation. NETosis, networks of extracellular traps, are produced by neutrophils and engulf pathogens.

Question 16

D

Serum calcium levels are maintained under tight regulatory control. When serum levels become low, parathyroid hormone secretion is stimulated which results in calcium release from bone, increased intestinal absorption, and increased renal resorption. Osteoclasts are responsible for bone breakdown and calcium release. Vitamin D has an important role in maintaining calcium levels through intestinal absorption and renal resorption. The hypermetabolic state of hyperthyroidism can lead to mild to moderate increases in serum calcium levels. Calcitonin is released by the parafollicular C cells of the thyroid gland, it opposes the effect of parathyroid hormone. It inhibits osteoclast activity and renal calcium resorption.

Question 17

D

Hypokalaemia occurs due to low serum potassium levels. This can be caused by loss from the gastrointestinal tract, intracellular potassium shifts, renal potassium loss and certain drugs. In hyperaldosteronism, excess aldosterone results in the loss of excess potassium in the urine.

Question 18

A

Cystic fibrosis is an autosomal recessive disorder which is primarily cause by defective chloride ion transport through the epithelia. In the sweat glands, mutations in the cystic fibrosis transmembrane conductance regulator gene result in excessive absorption of sodium and water from the lumen into the epithelial lining. This results in viscid secretions that obstruct the airway passages. Approximately 70% of cases are due to a three-base pair deletion.

Question 19

C

The resting cell is in Gap (G) 0. During G1 protein synthesis increases and the cell grows in size. DNA replication occurs during the synthesis (S) phase of the cell cycle. A further period of protein synthesis and growth follows in G2 as the cell prepares for mitosis. Mitosis occurs during the M phase.

Question 20

E

Reed-Sternberg cells are found in patients with Hodgkin's lymphoma. These large cells are often multinucleated and are pathognomonic of the disease.