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# OPSC Asst. Prof.

**Previous Year Paper**  
**(Physiology)**

**17 Nov, 2024**





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T.B.C. : APB-14-23/24

Sl. No. **2241**

Test Booklet Series

## TEST BOOKLET

ASSISTANT PROFESSOR (BROAD SPECIALTY)  
(PHYSIOLOGY)

**A**

**K-14**

Time Allowed : 3 Hrs.

Maximum Marks : 200

### INSTRUCTIONS TO CANDIDATES

1. IMMEDIATELY AFTER COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET DOES NOT HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET OF SAME SERIES ISSUED TO YOU.
2. ENCODE CLEARLY THE TEST BOOKLET SERIES **A, B, C OR D**, AS THE CASE MAY BE, IN THE APPROPRIATE PLACE IN THE ANSWER SHEET USING BALL POINT PEN (BLUE OR BLACK).
3. You have to enter your **Roll No.** on the Test Booklet in the Box provided along side. **DO NOT** write *anything else* on the Test Booklet.
4. **YOU ARE REQUIRED TO FILL UP & DARKEN ROLL NO., TEST BOOKLET / QUESTION BOOKLET SERIES IN THE ANSWER SHEET AS WELL AS FILL UP TEST BOOKLET / QUESTION BOOKLET SERIES AND SERIAL NO. AND ANSWER SHEET SERIAL NO. IN THE ATTENDANCE SHEET CAREFULLY. WRONGLY FILLED UP ANSWER SHEETS ARE LIABLE FOR REJECTION AT THE RISK OF THE CANDIDATE.**
5. This Test Booklet contains **200** items (questions). Each item (question) comprises four responses (answers). You have to select the correct response (answer) which you want to mark (darken) on the Answer Sheet. In case, you feel that there is more than one correct response (answer), you should mark (darken) the response (answer) which you consider the best. In any case, choose **ONLY ONE** response (answer) for each item (question).
6. You have to mark (darken) all your responses **ONLY** on the **separate Answer Sheet** provided, by using **BALL POINT PEN (BLUE OR BLACK)**. See instructions in the Answer Sheet.
7. All items (questions) carry equal marks. All items (questions) are compulsory. Your total marks will depend only on the number of correct responses (answers) marked by you in the Answer Sheet. There shall be negative marking for wrong answers. For each wrong answer, 0.25 marks shall be deducted from the marks awarded for correct answers.
8. Before you proceed to mark (darken) in the Answer Sheet the responses to various items (questions) in the Test Booklet, you have to fill in some particulars in the Answer Sheet as per instructions sent to you with your **Admission Certificate**.
9. After you have completed filling in all your responses on the Answer Sheet and after conclusion of the examination, you should hand over to the Invigilator the *Answer Sheet* issued to you. You are allowed to take with you the candidate's copy / second page of the Answer Sheet along with the **Test Booklet**, after completion of the examination, for your reference.
10. Sheets for rough work are appended in the Test Booklet at the end.

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1. Volume of Intra cellular fluid in body is
- (A) 0.2\* body weight
  - (B) 0.4\* body weight
  - (C) 0.6\* body weight
  - (D) 0.8\* body weight
2. Homeostasis is called a dynamic equilibrium because
- (A) Can achieve constant equilibrium in extreme changes of its environment.
  - (B) The set point of all homeostatic variables is always fixed.
  - (C) Body maintains an internal balance within fluctuating limits
  - (D) All the variables are given the equal importance.
3. Most osmotically active intra cellular cation
- (A)  $K^+$
  - (B)  $Na^+$
  - (C)  $Ca^{++}$
  - (D)  $Mg^{++}$
4. Plasma protein contributes only 1mOsm/ litre in plasma osmolality because of
- (A) High molar concentration, Low molecular weight
  - (B) Low molar concentration ,High molecular weight
  - (C) Low molar concentration, Low molecular weight
  - (D) High molar concentration, High molecular weight
5. Feed forward system is employed during the regulation of
- (A) Blood Volume
  - (B) pH
  - (C) Temperature
  - (D) Blood pressure
6. Assuming complete dissociation of all solutes which of the following solutions would be hyperosmotic to 1mM NaCl?
- (A) 1 mM of glucose
  - (B) 1.5 mM of glucose
  - (C) 1 mM of  $CaCl_2$
  - (D) 1mM of Sucrose

7. A 60 kg patient has a haematocrit reading of 40 and a plasma volume of 3 litres. What is his total blood volume?
- (A) 4 liters  
(B) 5 liters  
(C) 6 liters  
(D) 7 liters
8. The emeiocytosis or reverse pinocytosis requires which ion?
- (A)  $\text{Na}^+$   
(B)  $\text{Ca}^{++}$   
(C)  $\text{Mg}^{++}$   
(D)  $\text{K}^+$
9. True about facilitated diffusion are all except
- (A) Occurs in direction of concentration gradient  
(B) Does not require energy  
(C) Occurs in direction opposite to electrical gradient  
(D) Facilitated by charge of molecule
10. Transient temperature of lipid bilayers of cell membrane is increased by
- (A) Cholesterol  
(B) Saturated fatty acids  
(C) Hydrocarbons  
(D) Unsaturated fatty acids
11. Cellular junction present in cardiac muscle are all except
- (A) Zonula occludens  
(B) Fascia adherens  
(C) Gap Junctions  
(D) Macula adherens
12. Which of the following is not a G-protein coupled receptor
- (A) Glutamate  
(B) GABA A  
(C) GABAB  
(D) Muscarinic cholinergic receptors
13. In Neuron, initiation of impulse starts in
- (A) Axon  
(B) Axon Hillock + Initial segment  
(C) Cell body  
(D) Dendritic tree
14. Orthodromic conduction is
- (A) An axon an conduct impulse in one direction only  
(B) An axon an conduct impulse in both direction only  
(C) The jumping of depolarization from node to node  
(D) The point at which a runaway spike potential

15. Maximum number of Na channels per square micrometer is present in
- Cell body
  - Axon terminal
  - Surface of myelin
  - Nodes of Ranvier
16. Synaptic potential can be recorded by
- Patch clamp technique
  - Voltage clamp technique
  - Microelectrode
  - EEG
17. Absolute refractory period is due to
- Opening of calcium channels
  - Closure of potassium channels
  - Closure of active gates of sodium channel
  - Closure of inactive gates of sodium channel
18. Synaptic conduction is mostly orthodromic because of
- Dendrites cannot be depolarized
  - Once repolarized an area cannot be depolarised
  - The strength of antidromic impulse is less
  - The chemical mediator is localised only in presynaptic terminal
19. A man slept on Sofa with head over forearm , next morning he complains of tingling, numbness over forearm , it is caused by nerve fibre
- sensitivity of hypoxia to  $A > B > C$
  - sensitivity to Pressure  $A > B > C$
  - sensitivity of hypoxia  $C > B > A$
  - sensitivity to pressure  $B > A > C$
20. The distance between one stimulating electrode to recording electrode is 4.5 cm. when the axon is stimulated , the latent period is 1.5 ms. What is the conduction velocity of the axon
- 15 m/s
  - 30 m/s
  - 40 m/s
  - This cannot be determined from the information given
21. The force of muscle contraction can be increased by all of the following except
- Increasing the frequency of activation of motor units
  - Increasing the number of motor units activated
  - Increasing the amplitude of action potentials in the motor neurons
  - Recruiting larger motor units

22. Function of phospholamban is:

- (A) Regulates Na K pump
- (B) Transports calcium out of the mitochondria
- (C) Binds actin with myosin
- (D) Collects calcium into the sarcoplasmic reticulum

23. The number of muscle fibers innervated by a motor axon is smallest in

- (A) Gastrocnemius
- (B) Orbicularis oculi
- (C) Single-unit smooth muscle
- (D) Soleus

24. True about type II muscle fibers

- (A) Contracts slowly
- (B) Higher mitochondrial content
- (C) Glycolytic
- (D) Not useful for intense moments of short duration

25. There is mutation of gene coding for the ryanodine receptors in malignant hyperthermia. Which of the following statements best explains the increased heat production in malignant hyperthermia.

- (A) Increased muscle metabolism by excessive Calcium
- (B) Thermic effect of food
- (C) Increased sympathetic discharge
- (D) Mitochondrial thermogenesis

26. True regarding excitation contraction coupling in smooth muscles is

- (A) Presence of troponin is essential
- (B) Sustained contraction occurs with high calcium concentration
- (C) Phosphorylation of actin is required for contraction
- (D) Presence of cellular calcium is essential to cause muscle contraction

27. A substance blocks the Na<sup>+</sup>/Glucose receptor at the PCT. What response do you expect to occur in the nephron?

- (A) Increased aldosterone secretion
- (B) Decreased vasopressin secretion
- (C) Decreased renin secretion
- (D) Decreased salt excretion

28. Renal autoregulation is absent in which of the following cases?
- (A) Denervated kidney
  - (B) Isolated, perfused kidney
  - (C) Paralysis of vascular smooth muscle
  - (D) All of the above
29. Which among the following organs has the least arteriovenous oxygen difference?
- (A) Brain
  - (B) Kidney
  - (C) Skin
  - (D) Liver
30. Not absorbed from the PCT:
- (A)  $\text{Na}^+$
  - (B) Phosphate
  - (C)  $\text{HCO}_3^-$
  - (D)  $\text{H}^+$
31. In the presence of vasopressin, the greatest fraction of filtered water is re-absorbed which part of the nephron:
- (A) Proximal tubule
  - (B) Distal tubule
  - (C) Loop of Henle
  - (D) Collecting duct
32. Which one of the following substances, actively transported by the tubular cells, has the highest Tubular Transport Maximum?
- (A) Plasma protein
  - (B) Hemoglobin
  - (C) Glucose
  - (D) Sodium
33. Main function of DCT cells:
- (A) Acidification of urine
  - (B) Water absorption
  - (C) Amino acid reabsorption
  - (D)  $\text{HCO}_3^-$  reabsorption
34. Which of the following statements about renal function is not true?
- (A) Oncotic pressure of filtrate is equal to glomerular capillaries
  - (B) If afferent arteriole is vasoconstricted, then pressure in glomerular capillaries will fall
  - (C) The hydrostatic pressure of peritubular capillaries determine the glomerulotubular balance
  - (D) Ureteric obstruction increases the hydrostatic pressure of Bowman's space and reduces the GFR

35. A substance is present in concentration of 2 mg% in the afferent arteriole and zero mg% in the efferent. True about the substance is
- (A) It is free filtered in glomerulus
  - (B) Secreted in cortical nephron
  - (C) Absorbed in PCT
  - (D) Impermeable in loop of Henle
36. In renal disease albumin is first to appear in urine because:
- (A) Of its high concentration in plasma
  - (B) Has molecular weight slightly greater than the molecules normally getting filtered
  - (C) High albumin: globulin ratio
  - (D) Tubular epithelial cells are sensitive to albumin
37. Macula densa is present in:
- (A) Collecting tubule
  - (B) Proximal convoluted tubule
  - (C) Distal convoluted tubule
  - (D) Loop of Henle
38. Which of the following relaxes mesangial cells in glomerulus?
- (A) Dopamine
  - (B) Histamine
  - (C) ATIII
  - (D) PDGF
39. A negatively charged molecule is filtered with more difficulty compared to a positive one because:
- (A) Presence of negatively charged sialoproteins on the filtering membrane
  - (B) Negatively charged molecules are larger
  - (C) Positively charged proteins on filtering membrane
  - (D) Urine is acidic
40. Osteoclast has specific receptor for:
- (A) Parathyroid hormone
  - (B) Calcitonin
  - (C) Thyroxin
  - (D) Vit D3

41. In tetany hyperexcitability is due to:
- (A) Low  $\text{Ca}^{++}$  causes increase permeability to  $\text{Na}^+$
  - (B) Prevent  $\text{K}^+$  release
  - (C) Prevent  $\text{Na}^+$  and  $\text{K}^+$  release
  - (D) Decrease  $\text{Ca}^{++}$  produce generation of AP
42. Calcium absorption is from:
- (A) Proximal small intestine
  - (B) Distal ileum
  - (C) Middle small intestine
  - (D) Ascending colon
43. In a seriously ill patient, addition of amino acids in diet results in a positive nitrogen balance. The mechanism for this is:
- (A) Increased growth hormones secretion
  - (B) Enhanced rate of gluconogenesis
  - (C) Increased absorption of amino acids from diet
  - (D) Increased secretion of insulin

44. Rapid infusion of insulin causes:
- (A) Hyperkalemia
  - (B) Hypokalemia
  - (C) Hyponatremia
  - (D) Hyponatremia
45. Insulin mediated glucose uptake occurs through:
- (A) GLUT1
  - (B) GLUT2
  - (C) GLUT3
  - (D) GLUT4
46. Insulin is secreted along with the following molecule in a 1:1 ratio:
- (A) Pancreatic polypeptide
  - (B) Glucagon
  - (C) GLP-1
  - (D) C peptide
47. Aldosterone synthesis is stimulated by which of the following?
- (A) ACTH
  - (B) Hyperkalemia
  - (C) Hyponatremia
  - (D) Exogenous steroids

48. Anti-inflammatory action of steroids due to:
- (A) Inhibition of phospholipase A2
  - (B) Inhibition of cyclooxygenase
  - (C) Increased activity of lipo lipase
  - (D) Inhibition of lipoxygenase
49. In thyroid follicle for how long thyroxine is stored:
- (A) 2-3 weeks
  - (B) 2-3 days
  - (C) 2-3 months
  - (D) 2-3 years
50. Which hormone has permissive role in puberty?
- (A) Leptin
  - (B) GnRH
  - (C) Insulin
  - (D) GH
51. Somatomedin mediates:
- (A) Deposition of chondroitin sulfate
  - (B) Lipolysis
  - (C) Gluconeogenesis
  - (D) Decreased rate of glucose uptake by cells
52. ADH regulate which of the following aquaporin?
- (A) aquaporin 1
  - (B) aquaporin 2
  - (C) aquaporin 3
  - (D) aquaporin 4
53. IGF-1 acts through which type of receptors?
- (A) G protein coupled
  - (B) Nuclear/cytoplasmic
  - (C) JAK/STAT
  - (D) None of the above
54. Various cells respond differentially to a second messenger (such as increased cAMP) because they have different:
- (A) Receptors
  - (B) Enzymatic composition
  - (C) Nuclei
  - (D) Membrane lipid
55. All of the following use c-AMP as a second messenger except:
- (A) Corticotropin
  - (B) Dopamine
  - (C) Glucagon
  - (D) Vasopressin

56. Endothelium derived relaxing factor (EDRF) induced vasodilatation is mediated by:
- (A) Increased intracellular cGMP
  - (B) Decreased intracellular cGMP
  - (C) Increased extracellular cAMP
  - (D) Decreased intracellular cAMP
57. Steroid receptor superfamily is present in:
- (A) Vitamin D3
  - (B) Insulin
  - (C) Glucagon
  - (D) Thyroid
58. A 50-year-old woman undergoes a neurological exam that indicates loss of pain and temperature sensitivity, vibratory sense, and proprioception in both legs. These symptoms could be explained by:
- (A) Tumor on the medial lemniscal pathway in the sacral spinal cord
  - (B) Peripheral neuropathy
  - (C) Large tumor in the sacral dorsal horn
  - (D) Large tumor affecting the posterior paracentral gyri
59. The inability to perceive the texture and shape an object occurs in lesion of:
- (A) Lateral spinothalamic tract
  - (B) Nucleus gracilis
  - (C) Spinoreticular tract
  - (D) Nucleus cuneatus
60. A man loses his right hand in a farm accident, four year later, he has episodes of severe pain in the missing hand (phantom limb pain). A detailed PET scan study of his cerebral cortex might be expected to show:
- (A) Expansion of the right hand area in his right somatic sensory area I (SI)
  - (B) Expansion of the right hand area in his left SI
  - (C) Projection of fibre from neighboring sensory areas into the right hand area of his right SI
  - (D) Projection of fibers from neighbouring sensors' areas into the right hand area of his left SI
61. Phantom limb sensations are best described by:
- (A) Weber-Fechner's law
  - (B) Power law
  - (C) Bell-Magendie law
  - (D) Law of projection

62. Perception of normal sensory stimuli as painful is called:
- (A) Hyperalgesia
  - (B) Allodynia
  - (C) Hyperpathia
  - (D) Causalgia
63. Venterolateral cordotomy for relief of pain in right lower limb due to cutting:
- (A) Left ventral spinothalamic tract
  - (B) Left lateral spinothalamic tract
  - (C) Right ventral spinothalamic tract
  - (D) Right lateral spinothalamic tract
64. If a single spinal nerve is cut, the area of tactile loss is always greater than the area of loss of painful sensations, because:
- (A) Tactile information is carried by myelinated fast conducting fibres
  - (B) Tactile receptors adapt quickly
  - (C) Degree of overlap of fibres carrying tactile sensation is much less
  - (D) In the primary sensory cortex tactile sensation is represented on a larger area
65. Which one of the following sensory receptors is found in epidermis?
- (A) Merkel disc
  - (B) Meissner's corpuscles
  - (C) Ruffini ending
  - (D) Pacinian corpuscles
66. True about Renshaw cell inhibition is:
- (A) Add on collateral sensation
  - (B) Increases by local anaesthetics
  - (C) Has memory for spinal cord
  - (D) Inhibition of feedback propagation
67. The hyperkinetic features of the Huntington's disease are due to the loss of:
- (A) Nigrostriatal dopaminergic system
  - (B) Intrastratial cholinergic system
  - (C) GABA-ergic and cholinergic system
  - (D) Intrastratial GABA-ergic and cholinergic system
68. Excitatory Neurotransmitters are:
- (A) Acetylcholine
  - (B) Glycine
  - (C) GABA
  - (D) NMDA

69. Strychnine acts by:
- (A) Exciting all the excitatory synapses in the cord
  - (B) Blocking inhibitory synapses
  - (C) Being incorporated as substitute transmitter in monoaminergic synapses
  - (D) Directly exciting the skeletal muscle fibrosis
70. Substrate P, actions all except:
- (A) Vasoconstriction
  - (B) Pain transmission
  - (C) Axon reflex
  - (D) Peristalsis
71. Which of the following molecules moves from the endolymph into the stereocilia and depolarizes the hair cell?
- (A) Calcium ions
  - (B) Sodium ions
  - (C) Hydrogen ions
  - (D) Potassium ions

72. Visual contrast is enhanced due to lateral inhibition by which retinal cells?
- (A) Amacrine cells
  - (B) Bipolar cells
  - (C) Ganglion cells
  - (D) Horizontal cells
73. The only neurons in retina showing action potential are:
- (A) Rods and cones
  - (B) Bipolar cells
  - (C) Amacrine cells
  - (D) Ganglion cells
74. Relative color and luminosity of photoreceptive input under changing light conditions are regulated and maintained by:
- (A) Muller cells
  - (B) Amacrine cells
  - (C) Ganglion cells
  - (D) Retinal astrocyte
75. The rod receptor potential differs from other sensory receptors in that it shows:
- (A) Depolarization
  - (B) Decreased negativity
  - (C) Increased conductance of sodium
  - (D) Hyperpolarization

76. The processing of short-term memory to long-term memory is done in

- (A) Prefrontal cortex
- (B) Hippocampus
- (C) Neocortex
- (D) Amygdala

77. Nightmare is seen in:

- (A) REM sleep
- (B) Stage II NREM sleep
- (C) Stage IV NREM sleep
- (D) Stage I NREM sleep

78. Striatum damage affects priming:

- (A) Procedural memory
- (B) Short-term memory
- (C) Long-term memory
- (D) Explicit memory

79. Bruxism occurs in which phase of sleep?

- (A) NREM 2
- (B) NREM 3
- (C) REM sleep
- (D) NREM 4

80. Nucleus of cerebellum responsible for slow pursuit and saccades

- (A) Dentate
- (B) Fastigial
- (C) Emboliformis
- (D) Globose

81. Non-shivering thermogenesis in adults is due to:

- (A) Thyroid hormone
- (B) Brown fat between the shoulders
- (C) Noradrenaline
- (D) Muscle metabolism

82. Satiety centre is located at:

- (A) Ventromedial nucleus of hypothalamus
- (B) Dorsomedial nucleus of hypothalamus
- (C) Peritrigonal area
- (D) Lateral nucleus

83. Glutamate as a neurotransmitter is synthesized mainly in which part of basal ganglia?
- (A) Globus pallidus interna
  - (B) Globus pallidus externa
  - (C) Subthalamic nucleus
  - (D) Putamen
84. Purkinje fibers are inhibitory for:
- (A) Deep cerebellar nuclei
  - (B) Climbing fiber
  - (C) Basket cells
  - (D) Spinocerebellar tract
85. The function of the neocerebellum is:
- (A) Maintenance of equilibrium
  - (B) Servo-correction of voluntary movements
  - (C) Planning and programming of voluntary movements
  - (D) Maintenance of muscle tone
86. Following are the features of corticospinal involvement except:
- (A) Cog-wheel rigidity
  - (B) Spasticity
  - (C) Plantar extensor response
  - (D) Exaggerated deep tendon reflexes
87. The first reflex to return after recovery from spinal shock is:
- (A) Stretch reflex
  - (B) Flexor reflex
  - (C) Stepping reflex
  - (D) Postural antigravity reflex
88. According to sherrington classification the decerebrate rigidity is characterised by all except:
- (A) Rigidity occurs all muscles of the body
  - (B) Increased in the rate of discharge of the gamma efferent neuron
  - (C) Increased excitability of the motor neuron pool
  - (D) Decerebration produces no phenomenon akin to spinal shock
89. At an altitude of 13000 ft, the barometric pressure is 447 mm Hg. Calculate  $PiO_2$  of moist air:
- (A) 100 mm Hg
  - (B) 93 mm Hg
  - (C) 84 mm Hg
  - (D) 149 mm Hg

90. A 32-year-old high altitude mountaineer is observed to have a hematocrit of 70%. Which of the following represents the most likely cause/explanation?
- (A) Polycythemia with increased red cell mass
  - (B) Relative polycythemia due to dehydration
  - (C) Polycythemia due to hemoconcentration
  - (D) Polycythemia with high altitude pulmonary edema
91. The following acute respiratory response to ascent to high altitude, there is normalization of blood pH. The mechanism is:
- (A) Increased erythropoiesis leads to increased buffering by hemoglobin
  - (B) Increased excretion of  $\text{HCO}_3^-$  by the kidneys
  - (C) Increased levels of 2,3-DPG
  - (D) Retention of bicarbonate by the kidneys
92. What will be the effect on respiration if a transmission is made between the pons and medulla?
- (A) Apnea
  - (B) Irregular and gasping
  - (C) No effect
  - (D) Slow and deep
93. Acclimatization at mountain phenomenon involved:
- (A) Respiratory alkalosis
  - (B) Respiratory acidosis
  - (C) Metabolic alkalosis
  - (D) Metabolic acidosis
94. RAMP signal initiation by:
- (A) DRG
  - (B) VRG
  - (C) Pre-Bötzing
  - (D) Pneumotaxic centre
95. Inspiratory depth is halted by:
- (A) Pneumotaxic center
  - (B) Apneustic center
  - (C) Inspiratory center
  - (D) Expiratory center
96. The normal value of P50 on the oxyhemoglobin dissociation curve in an adult is:
- (A) 1.8 kPa
  - (B) 2.7 kPa
  - (C) 3.6 kPa
  - (D) 4.5 kPa

97. The oxygen hemoglobin dissociation curve is sigmoid because:

- (A) Binding of one oxygen molecule increases the affinity of binding other  $O_2$  molecules
- (B) Binding of one oxygen molecule decrease the affinity of binding other  $O_2$  molecules
- (C) Oxygen affinity of hemoglobin decreases when the pH of blood falls
- (D) All of the above

98. Least amount of  $CO_2$  is in:

- (A) Anatomical dead space-end inspiration phase
- (B) Anatomical dead space-end expiration phase
- (C) Alveoli-end inspiration phase
- (D) Alveoli-end expiration phase

99. Transport of carbon monoxide (CO) is diffusion limited because:

- (A) High affinity of CO for hemoglobin
- (B) Alveolar membrane is less permeable to CO
- (C) CO crosses epithelial barrier slowly
- (D) On exposure to air there is sudden increase in partial pressure

100. Haldane effect is:

- (A) pH changes with  $CO_2$  transport
- (B) Binding of  $CO_2$  to hemoglobin reduces its affinity for  $O_2$
- (C) Binding of  $O_2$  to hemoglobin reduces its affinity for  $CO_2$
- (D) Shift of  $Cl^-$  ion for  $HCO_3^-$  ion

101. Difference in the amount of  $O_2$  inspired and  $CO_2$  expired:

- (A) 20 mL/min
- (B) 50 mL/min
- (C) 75 mL/min
- (D) 100 mL/min

102. A man connected to a body plethysmograph for estimation of FRC inspires against a closed glottis. Which of the following statements is true?

- (A) The pressure in both the lungs and the box increases
- (B) The pressure in both the lungs and the box decreases
- (C) The pressure in the lungs decreases, but that in the box increases
- (D) The pressure in the lungs increases, but that in the box decreases

**103.** Closing capacity of lung is related to:

- (A) Small size bronchioles without cartilage in nondependent portion of lung
- (B) Small size bronchioles without cartilage in dependent portion of lung
- (C) Medium size bronchioles without cartilage in nondependent portion of lung
- (D) Medium size bronchioles without cartilage in dependent portion of lung

**104.** Measurement of anatomic dead space is by:

- (A) O<sub>2</sub> breath test
- (B) Helium dilution test
- (C) N<sub>2</sub> breath test
- (D) PCO<sub>2</sub>

**105.** Physiological dead space is calculated by:

- (A) Boyle's law
- (B) Dalton's law
- (C) Bohr equation
- (D) Charles' law

**106.** Pulmonary surfactant is secreted by:

- (A) Type 1 pneumocytes
- (B) Clara cells
- (C) Bronchial epithelial cells
- (D) Goblet cell

**107.** Compliance of lungs is:

- (A) 200 mL/cm water
- (B) 800 mL/cm water
- (C) 500 mL/cm water
- (D) 1000 mL/cm water

**108.** Respiration stops in the last stage of expiration, in forced expiration because of:

- (A) Respiratory muscle fatigue
- (B) Collapse of alveoli
- (C) Dynamic compression of airways
- (D) Breaking effect of inspiratory muscles

**109.** True about normal expiration:

- (A) At the end of normal expiration air in lung is ERV
- (B) Chest wall has a tendency to move outward which is balanced by inward recoil of alveoli
- (C) In expiration pleural pressure is equal to alveolar pressure
- (D) Muscles that elevate the chest cage are classified as muscles of expiration

**110.** The intrapleural pressure is negative both during inspiration and expiration because:

- (A) Intrapulmonary pressure is always negative
- (B) Thoracic cage and lungs are elastic structure
- (C) Transpulmonary pressure determines the negativity
- (D) Surfactant prevents the lungs to collapse

111. Normal intrapleural pressure at the start/beginning of inspiration is \_\_\_\_\_ cm of H<sub>2</sub>O:
- (A) -7.5
  - (B) -5.0
  - (C) -2.0
  - (D) -0.5
112. Vulnerable period of heart is a time occurring during \_\_\_\_\_ wave and represent a period when premature beats may lead to fibrillation:
- (A) P
  - (B) R
  - (C) S
  - (D) T
113. Least conduction velocity is seen in:
- (A) AV node
  - (B) Purkinje fibers
  - (C) Bundle of his
  - (D) Ventricular myocardial fibres
114. Repolarization in isolated muscle piece fiber proceeds from:
- (A) Epicardium to endocardium
  - (B) Endocardium to epicardium
  - (C) Left to right
  - (D) Right to left
115. Single most important factor in control of automatic contractility of heart is:
- (A) Myocardial wall thickness
  - (B) Right atrial volume
  - (C) SA node pacemaker potential
  - (D) Sympathetic stimulation
116. Einthoven's triangle, what is the value of Lead III when Lead I = 2 mV and Lead II = 1 mV?
- (A) 1
  - (B) 2
  - (C) 3
  - (D) 4
117. The ECG of a 40-year-old male was recorded using standard bipolar limb leads. The sum of voltage of the three standard leads was found to be 5 millivolts. This indicates:
- (A) A normal heart
  - (B) Right ventricular hypertrophy
  - (C) Left ventricular hypertrophy
  - (D) Increased cardiac muscle mass
118. Which one of the following is the best index of afterload?
- (A) Left ventricular end-diastolic pressure
  - (B) Left ventricular mean systolic pressure
  - (C) Pulmonary capillary wedge pressure
  - (D) Total peripheral resistance

119. When the HR is 70 beats per min, cardiac cycle duration is:

- (A) 445 ms
- (B) 1450 ms
- (C) 700 ms
- (D) 850 ms

120. Volume receptors are:

- (A) Affected by total cardiovascular output
- (B) Stimulate by atrial systole and diastole
- (C) Stimulated by left ventricular contraction
- (D) Stimulated by aortic pressure

121. True about Bowditch's effect of heart:

- (A) Increased in HR decrease relaxation
- (B) Increased in HR increase relaxation
- (C) Increased in HR decrease contraction
- (D) Increased in HR increases contraction

122. Bernoulli's principle states:

- (A) Sum of kinetic energy of flow and pressure energy is constant
- (B) Low tones producing maximal stimulation at apex of cochlea
- (C) Magnitude of the sensation felt is proportionate to the intensity of stimulus
- (D) Force of contraction is proportional to the stretch of cardiac muscle

123. Precapillary sphincter relaxation is caused by:

- (A) Local metabolites
- (B) Circulating catecholamines
- (C) Sympathetic activity
- (D) Fall in capillary pressure

124. Critical closing pressure is:

- (A) Arterial pressure minus venous pressure
- (B) Capillary pressure minus venous pressure
- (C) Pressure below which capillaries close
- (D) None of the above

125. True about blood flow in various organs:

- (A) Liver > Kidney > Brain > Heart
- (B) Liver > Brain > Kidney > Heart
- (C) Kidney > Brain > Heart > Liver
- (D) Liver > Heart > Brain > Kidney

126. Which of the following is true about gastroduodenal motor activity?

- (A) Migrating motor complex/MMC in the fasting state lasts for 50 mins.
- (B) Duodenal slow waves are limited to the duodenum
- (C) From the duodenum the MMC moves distally at 5-10cm/min
- (D) Irregular spike potentials and contractions are seen in phase I

127. BER produced by: [Dec. 2016]

- (A) Smooth muscle at cardiac end of stomach
- (B) Antral G cell
- (C) Interstitial cells of Cajal
- (D) Myenteric plexus

128. Which of the following does not simulate enterogastric reflex?

- (A) Products of protein digestion in the duodenum
- (B) Duodenal distension
- (C) H<sup>+</sup> ions bathing duodenal mucosa
- (D) Hormones

129. Gastric emptying is mainly regulated by:

- (A) Neural reflexes
- (B) Enteric reflexes
- (C) Local hormones produced in stomach
- (D) Local hormones produced in duodenum

130. Mass movement of the colon would be abolished by:

- (A) Extrinsic denervation
- (B) Distension of the colon
- (C) Gastrocolic reflex
- (D) Destruction of Auerbach's plexus

131. Which of the following substance causes anterograde relaxation during gut peristalsis?

- (A) Acetyl choline
- (B) Substance p
- (C) Serotonin
- (D) Vasoactive intestinal peptide

132. Which causes antral gastrin release?

- (A) Antral distension
- (B) Acid
- (C) Secretin
- (D) Calcitonin

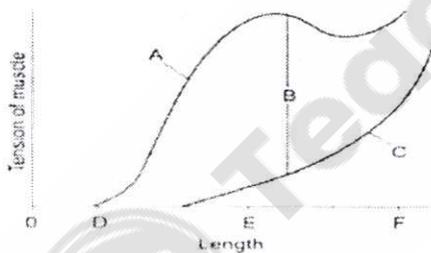
133. Fat in the duodenum lumen:
- (A) Stimulates gallbladder contraction
  - (B) Inhibits gallbladder contraction
  - (C) Inhibits CCK secretion
  - (D) Releases secretin
134. All of the following are trypsin inhibitors, except:
- (A) Alpha-1 antitrypsin
  - (B) Alpha-1 antiproteinase
  - (C) Enterokinase
  - (D) Egg-white
135. Minimum sodium is secreted in which of following:
- (A) Saliva
  - (B) Bile
  - (C) Duodenal secretion
  - (D) Stomach
136. Secretion of bile into bile canaliculus is by:
- (A) Osmotic gradient
  - (B) Facilitated diffusion
  - (C) Active transport across the membrane
  - (D) Simple diffusion
137. Normal gastric juice contains all except:
- (A)  $\text{Na}^+$
  - (B)  $\text{K}^+$
  - (C)  $\text{Ca}^{++}$
  - (D)  $\text{Mg}_2$
138. Vit. D increases absorption of calcium in intestine with the help of which of the following protein?
- (A) Calbindin
  - (B) Calreticulin
  - (C) Calsequestrin
  - (D) Calmodulin
139. Iron absorption takes place in which part of intestine?
- (A) Duodenum
  - (B) Ileum
  - (C) Jejunum
  - (D) Colon
140. Receptor for absorption of Vit. B12 intrinsic factor complex is located in:
- (A) Ileum
  - (B) Duodenum
  - (C) Transverse colon
  - (D) Descending colon

141. Colonic bacteria, on digestion of dietary fibres would give:
- (A) Free radicals
  - (B) Glycerol
  - (C) Butyrate
  - (D) Sucrose
142. Which hormone exhibits permissive action on puberty?
- (A) Insulin
  - (B) GH
  - (C) GnRH
  - (D) Leptin
143. Which gastrointestinal motor activity is most affected by vagotomy?
- (A) Secondary esophageal peristalsis
  - (B) Distension-induced intestinal segmentation
  - (C) Oral stomach accommodation
  - (D) Caudal stomach peristalsis
144. Homeostasis is called a dynamic equilibrium because
- (A) Can achieve constant equilibrium in extreme changes of its environment.
  - (B) The set point of all homeostatic variables is always fixed.
  - (C) Body maintains an internal balance within fluctuating limits.
  - (D) All the variables are given the equal importance.
145. A slow rising stimulus fails to fire a nerve because of a process known as
- (A) Adaptation
  - (B) Accommodation
  - (C) Refractoriness
  - (D) Electrotonus
146. A 56 year old woman presents with abnormal movements of the limbs. A lesion of the globus pallidus is suspected. Which of the following did she most likely to present with?
- (A) Chorea
  - (B) Athetosis
  - (C) Hemiballismus
  - (D) Parkinsonism
147. In extreme cold which is not the a mechanism of thermogenesis
- (A) Shivering
  - (B) Increased secretion of epinephrine
  - (C) Increased thyroxine
  - (D) Piloerection
148. Function of glomerular basement membrane is
- (A) Excitation
  - (B) Contraction
  - (C) Filtration
  - (D) Transport of anions

149. A 25 yr old patient after head trauma presented to the emergency room. On neurological examination he was found to have normal handwriting and could copy shapes of the objects but could not speak. Localise the CNS lesion of this patient.

- (A) Wernike's area
- (B) Broca's area
- (C) Arcus Fasciculus
- (D) Internal capsule

150. In the length tension relationship of the skeletal muscle the length at which active tension is maximum



- (A) A
- (B) F
- (C) D
- (D) E

151. Position of stretch reflex receptors in left atrium-

- (A) AV septum
- (B) Interatrial septum
- (C) Entrance of pulmonary vein
- (D) None of the above

152. Oncotic pressure is Contributed by

- (A) Sodium
- (B) Chloride
- (C) Glucose
- (D) Albumin

153. The primary direct stimulus for excitation of central chemoreceptors regulating ventilation is

- (A) Increased  $H^+$
- (B) Increased  $CO_2$
- (C) Increased  $O_2$
- (D) Decreased  $CO_2$

154. Which hormone does not act through cAMP

- (A) TSH
- (B) Adrenaline
- (C) Insulin
- (D) ACTH

155. Normal cardiac index is

- (A) 3.2
- (B) 2.8
- (C) 2.4
- (D) 4.4

156. Submucosal plexus is also known as

- (A) Myentric plexus
- (B) Auerbach's plexus
- (C) Meissner's plexus
- (D) Extrinsic nerves

157. Damage to the pituitary stalk during surgery cause increase in which of the following Hormone

- (A) TSH
- (B) GH
- (C) Prolactin
- (D) Dopamine

158. Following changes are seen during capacitation of the sperms except.

- (A) Decreases permeability to calcium
- (B) Removal of cholesterol from acrosome
- (C) Increased motility
- (D) None of the above

159. Oxygen haemoglobin dissociation curve shifts to right in all of the following conditions Except

- (A) Hyperthermia
- (B) Decreased pH
- (C) Decreased  $H^+$
- (D) Increased  $CO_2$

160. Glucose transporter affected in Diabetes Mellitus

- (A) GLUT-2
- (B) GLUT-5
- (C) GLUT-4
- (D) SGLT-2

161. According to frank starling law the extent of preload is proportional to

- (A) Increase heart rate
- (B) End- diastolic volume
- (C) End systolic volume
- (D) Ejection systolic volume

162. Amplification of sound occurs in

- (A) Ear ossicles
- (B) Scala media
- (C) Auditory canal
- (D) Medial geniculate body

163. Hemoglobin molecule act as buffer due to \_\_\_\_\_.

- (A) Presence of Alanine amino acid in its globin chain
- (B) Presence of Tyrosine amino acid in its globin chain
- (C) Presence of Histidine amino acid in its globin chain
- (D) None of the above

164. Which of the following is true about HbS (Sickle hemoglobin)?

- (A) It has very high solubility under low oxygen tension.
- (B) It is due to substitution of valine for glutamic acid in beta chain of hemoglobin molecule.
- (C) It is a normal variation of hemoglobin.
- (D) It is present in large amount in normal Infants.

165. Platelets are having following function in Hemostasis except.

- (A) Aggregation at ruptured blood vessel site.
- (B) Adhesion at ruptured blood vessel site.
- (C) Release of various chemical mediators like serotonin.
- (D) Phagocytosis at ruptured blood vessel site.

166. Normal blood volume is about \_\_\_ of Bodyweight.

- (A) 8%
- (B) 14%
- (C) 28%
- (D) 20%

167. The QRS complex in Electrocardiogram normally represents-

- (A) Depolarization of Atria
- (B) Depolarization of AV node
- (C) Depolarization of Ventricles
- (D) Depolarization of Bundle of Hiss

168. The early part of Pacemaker potential in SA node is due to -

- (A) T type of Calcium channels
- (B) L type of Calcium channels
- (C) Voltage gated Na<sup>+</sup> Channels
- (D) Voltage gated K<sup>+</sup> Channels

169. The Percentage of blood volume stored in Veins is \_\_\_\_\_.

- (A) 8%
- (B) 12%
- (C) 5%
- (D) 55%

170. The influence of baroreceptors (Carotid and Aortic body) on Nucleus Tractus Solitarius (NTS) is always-

- (A) Excitatory
- (B) Inhibitory
- (C) Both
- (D) None of the above

171. Which of the following is incorrect about the hormone secretin?

- (A) It is the first hormone to be discovered.
- (B) It has excitatory effect on duodenal motility
- (C) It secretes pancreatic juice rich in enzymes.
- (D) It augments the action of CCK in producing pancreatic secretions of digestive enzymes

172. Which of the following has highest pH?

- (A) Gastric Juice
- (B) Saliva
- (C) Bile
- (D) Pancreatic Juice

173. The major trigger for Migratory Motor Complex is -

- (A) NO
- (B) Gastrin
- (C) CCK
- (D) Motilin

174. The mechanism that prevent rise in gastric Pressure so that lower esophageal sphincter is not breached even when meal is present in stomach.

- (A) Peristalsis
- (B) Receptive relaxation
- (C) Segmentation contraction
- (D) Gastro colic reflex

175. The source of  $\text{NH}_4^+$  in renal tubular cells is-

- (A) Glutamine
- (B) Alanine
- (C) Valine
- (D) Tyrosine

176. Under the influence of Vasopression(ADH), the greatest fraction of filtered water is reabsorbed in the
- (A) Collecting duct
  - (B) Ascending limb of Loop of Henle
  - (C) Descending limb of Loop of Henle
  - (D) PCT
177. What should be the clearance of a substance that is freely filtered, neither reabsorbed nor secreted and not metabolised at all?
- (A) Clearance is equal to GFR
  - (B) Clearance is more than GFR
  - (C) Clearance is less than GFR
  - (D) None of the above
178. The main smooth muscle of urinary bladder responsible for its emptying of urine is Detrusor muscle. This muscle is supplied by
- (A) Parasympathetic division
  - (B) Sympathetic division
  - (C) Both
  - (D) None of the above
179. The medullary chemoreceptors are sensitive to-
- (A) Increased arterial  $PCO_2$
  - (B) Increased arterial  $PO_2$
  - (C) Increased arterial pH
  - (D) Decreased arterial pH
180. Which lung volume can't be determined using Spirometry?
- (A) Tidal Volume
  - (B) Inspiratory Reserve Volume
  - (C) Expiratory Reserve Volume
  - (D) Residual Volume
181. Major form in which  $CO_2$  is transported in blood is
- (A) Dissolved form
  - (B) As Bicarbonate
  - (C) In carbamino compound formed with hemoglobin
  - (D) In carbamino compound formed with plasma proteins
182. The following are functions of Lung surfactant except
- (A) Reduces surface tension in alveoli
  - (B) Prevents collapsing of alveoli
  - (C) Prevents pulmonary edema
  - (D) Helps in diffusion of gases

**183.** Assertion : Botulinum neurotoxin acts by preventing the release of neurotransmitters in the CNS and at the neuromuscular junction  
Reason: Botulinum toxins A and E cleave synaptosome associated protein-25 (SNAP-25) - a presynaptic membrane protein needed for fusion of synaptic vesicles containing acetylcholine to the terminal membrane, an important step in transmitter release

- (A) Both A and R are true and R is the correct explanation of A.
- (B) Both A and R are true but R is not the correct explanation of A.
- (C) A is true but R is false.
- (D) A is false but R is true.

**184.** Assertion : The stapedial reflex is a protective reflex  
Reason : Contraction of the stapedius muscle pulls the footplate of the stapes out of the round window

- (A) Both A and R are true and R is the correct explanation of A.
- (B) Both A and R are true but R is not the correct explanation of A.
- (C) A is true but R is false.
- (D) A is false but R is true.

**185.** Assertion : Polydipsia, in diabetes mellitus occurs due to osmotic diuresis  
Reason : Mannitol is a substance that can cause osmotic diuresis when administered intravenously.

- (A) Both A and R are true and R is the correct explanation of A.
- (B) Both A and R are true but R is not the correct explanation of A.
- (C) A is true but R is false.
- (D) A is false but R is true.

**186.** Assertion : Allodynia means an exaggerated response to a noxious stimulus.

Reason : Referred pain is usually to a structure that developed from the same embryonic segment or dermatome as the structure in which the pain originates

- (A) Both A and R are true and R is the correct explanation of A.
- (B) Both A and R are true but R is not the correct explanation of A.
- (C) A is true but R is false.
- (D) A is false but R is true.

**187.** Assertion: Muscle contraction force increases with rise in strength of stimulus.

Reason: This is due to increased contraction of individual muscle fibres with increase in stimulus strength.

- (A) both the A and the R are true and the R is a correct explanation of the A
- (B) both the A and R are true but the R is not a correct explanation of the A
- (C) A is true but the R is false
- (D) both the A and R are false

**188.** Detachment of myosin head from actin is caused by:

- (A) Change in troponin C configuration
- (B) Attachment of ATP to the head
- (C) Binding of ADP and IP to head
- (D) Pumping  $Ca_2^+$  into sarcoplasmic reticulum

**189.** Blood pH is 7.2,  $PCO_2$  is 30 mm Hg and  $HCO_3^-$  is 10 mEq. It is a picture of which partially compensated disorder?

- (A) Metabolic acidosis
- (B) Metabolic alkalosis
- (C) Respiratory acidosis
- (D) Respiratory alkalosis

**190.** Impaired function of aquaporin causes which of the following?

- (A) Nephrogenic diabetes insipidus
- (B) Liddle syndrome
- (C) Cystic fibrosis
- (D) Bartter's syndrome

**191.** In comparison to normal healthy person in the evening time, which among the following have elevated both ACTH and cortisol?

- (A) Just after awakening in the morning
- (B) Cushing's disease
- (C) Addison's disease
- (D) After exercise

**192.** Which of the following acts through tyrosine kinase receptor?

- (A) LH
- (B) Insulin
- (C) TSH
- (D) TRH

**193.** Absent of dystrophin protein in muscle fiber causes:

- (A) Duchenne muscular dystrophy
- (B) Becker muscle dystrophy
- (C) Myotonic dystrophy
- (D) Tibialis myopathies

194. Citrate-phosphate-dextrose stored blood is better for hypoxic patients than acid-citrate-dextrose stored blood because it is:

- (A) Less acidic
- (B) There is less decrease in 2,3 DPG
- (C) It has low P50
- (D) None of the above

195. VA/Q is infinity when:

- (A) Pressure of oxygens in the alveolar air is less than dead space volume
- (B) Partial pressure of oxygen and carbon dioxide are equal
- (C) When  $PAO_2$  is 159 mm Hg and  $PACO_2$  is 40 mm Hg
- (D) No exchange of  $CO_2$  and  $O_2$  in occur

196. Which of the following sources can produce the greatest amount of ATP per minute over a short period of time?

- (A) Aerobic system
- (B) Phosphagen system
- (C) Glycogen-lactic acid system
- (D) Phosphocreatine system

197. Exercise is also prescribed as an adjuvant treatment of depression. Most probably acts by:

- (A) Increasing pulse pressure
- (B) Improving hemodynamics
- (C) Rising epinephrine level
- (D) Inducing good sleep

198. A person who is running, the main source of energy he will be using in 1st mm is:

- (A) Glucose
- (B) Glycogen
- (C) Fat
- (D) Phosphagen

199. Isometric contraction occurs in which of the following muscle?

- (A) Respiratory muscle
- (B) Extra-ocular muscle
- (C) Antigravity muscle
- (D) GIT muscle

200. Initial hyperpnoea in exercise is because of:

- (A) Hypercapnoea
- (B) Hypoxemia
- (C) Lactic acidosis
- (D) Stimulation of cortex and proprioceptors

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