

पुस्तिका में पृष्ठों की संख्या-32  
No. of Pages in Booklet -32  
पुस्तिका में प्रश्नों की संख्या-180  
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**BSAP-22**

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प्रश्न पुस्तिका संख्या /  
Question Booklet No.

Paper Code : 13

SUBJECT : **Physiology**  
(Broad Speciality)

समय: 3.00 घण्टे

Time: 3.00 Hours

अधिकतम अंक: 180

Maximum Marks: 180

प्रश्न-पत्र पुस्तिका के पेपर सील/ पॉलिथिन बैग को खोलने पर परीक्षार्थी यह सुनिश्चित कर लें कि प्रश्न पुस्तिका संख्या तथा ओ.एम.आर. उत्तर-पत्रक पर अंकित बारकोड समान हैं। इसमें कोई भिन्नता हो तो परीक्षार्थी वीक्षक से दूसरा प्रश्न-पत्र प्राप्त कर लें। ऐसा सुनिश्चित करने की जिम्मेदारी अभ्यर्थी की होगी।

**On opening the paper seal/ polythene bag of the Question Booklet the candidate should ensure that Question Booklet Number and Barcode of OMR Answer Sheet must be same. If there is any difference, candidate must obtain another Question Booklet from Invigilator. Candidate himself shall be responsible for ensuring this.**

### परीक्षार्थियों के लिए निर्देश

- सभी प्रश्नों के उत्तर दीजिए।
- सभी प्रश्नों के अंक समान हैं।
- प्रत्येक प्रश्न का केवल एक ही उत्तर दीजिए।
- एक से अधिक उत्तर देने की दशा में प्रश्न के उत्तर को गलत माना जाएगा।
- प्रत्येक प्रश्न के चार वैकल्पिक उत्तर दिये गये हैं, जिन्हें क्रमशः 1, 2, 3, 4 अंकित किया गया है। अभ्यर्थी को सही उत्तर निर्दिष्ट करते हुए उनमें से केवल एक गोले अथवा बबल को उत्तर-पत्रक पर नीले बॉल प्वाइंट पेन से गहरा करना है।
- OMR** उत्तर-पत्रक इस परीक्षा पुस्तिका के अन्दर रखा है। जब आपको परीक्षा पुस्तिका खोलने को कहा जाए, तो उत्तर-पत्रक निकाल कर ध्यान से केवल नीले बॉल प्वाइंट पेन से विवरण भरें।
- प्रत्येक गलत उत्तर के लिए प्रश्न अंक का 1/3 भाग काटा जायेगा। गलत उत्तर से तात्पर्य अशुद्ध उत्तर अथवा किसी भी प्रश्न के एक से अधिक उत्तर से है। किसी भी प्रश्न से संबंधित गोले या बबल को खाली छोड़ना गलत उत्तर नहीं माना जायेगा।
- मोबाइल फोन अथवा इलेक्ट्रॉनिक यंत्र का परीक्षा हॉल में प्रयोग पूर्णतया वर्जित है। यदि किसी अभ्यर्थी के पास ऐसी कोई वर्जित सामग्री मिलती है, तो उसके विरुद्ध आयोग द्वारा नियमानुसार कार्यवाही की जायेगी।
- कृपया अपना रोल नम्बर ओ.एम.आर. पत्रक पर सावधानी पूर्वक सही भरें। गलत अथवा अपूर्ण रोल नम्बर भरने पर 5 अंक कुल प्राप्तांकों में से काटे जा सकते हैं।
- यदि किसी प्रश्न में किसी प्रकार की कोई मुद्रण या तथ्यात्मक प्रकार की त्रुटि हो, तो प्रश्न के हिन्दी तथा अंग्रेज़ी रूपान्तरों में से अंग्रेज़ी रूपान्तर मान्य होगा।

**चेतावनी :** अगर कोई अभ्यर्थी नकल करते पकड़ा जाता है या उसके पास से कोई अनधिकृत सामग्री पाई जाती है, तो उस अभ्यर्थी के विरुद्ध पुलिस में प्राथमिकी दर्ज कराते हुए विविध नियमों-प्रावधानों के तहत कार्यवाही की जाएगी। साथ ही विभाग ऐसे अभ्यर्थी को भविष्य में होने वाली विभाग की समस्त परीक्षाओं से विवर्जित कर सकता है।

### INSTRUCTIONS FOR CANDIDATES

- Answer all questions.
- All questions carry equal marks.
- Only one answer is to be given for each question.
- If more than one answers are marked, it would be treated as wrong answer.
- Each question has four alternative responses marked serially as 1, 2, 3, 4. You have to darken only one circle or bubble indicating the correct answer on the Answer Sheet using **BLUE BALL POINT PEN**.
- The **OMR** Answer Sheet is inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars carefully with **blue ball point pen** only.
- 1/3 part of the mark(s) of each question will be deducted for each wrong answer.** A wrong answer means an incorrect answer or more than one answers for any question. Leaving all the relevant circles or bubbles of any question blank will not be considered as wrong answer.
- Mobile Phone or any other electronic gadget in the examination hall is strictly prohibited. A candidate found with any of such objectionable material with him/her will be strictly dealt as per rules.
- Please correctly fill your Roll Number in O.M.R. Sheet. **5 Marks** can be deducted for filling wrong or incomplete Roll Number.
- If there is any sort of ambiguity/mistake either of printing or factual nature, then out of Hindi and English Version of the question, the English Version will be treated as standard.

**Warning :** If a candidate is found copying or if any unauthorized material is found in his/her possession, F.I.R. would be lodged against him/her in the Police Station and he/she would liable to be prosecuted. Department may also debar him/her permanently from all future examinations.

**इस परीक्षा पुस्तिका को तब तक न खोलें जब तक कहा न जाए।**

**Do not open this Test Booklet until you are asked to do so.**

1. The following characteristic feature of Haemoglobin-Oxygen is physiologically not viable -
  - (1) A higher  $P_{50}$  than Normal means that  $O_2$  binds less tightly to Hb.
  - (2) An increase in 2,3-DPG shifts the  $O_2$  uptake curve to left.
  - (3) An increase in  $PCO_2$  and in temperature cause right shift of  $O_2$  uptake curve.
  - (4) A decrease in pH increases  $P_{50}$ .
2. A woman has a plasma osmolarity of 300 mOsm/L and a urine osmolarity of 1200 mOsm/L. The correct diagnosis is -
  - (1) Syndrome of Inappropriate Antidiuretic Hormone (SIADH)
  - (2) water deprivation
  - (3) central diabetes insipidus
  - (4) nephrogenic diabetes insipidus
3. The primal action of Growth Hormone (GH) on the following select cell type induces long bone growth -
  - (1) Chondrocytes
  - (2) Osteocytes
  - (3) Intracellular matrix
  - (4) Lymphocytes
4. The term homeostasis is coined by ..... in 1929.
  - (1) Walter Cannon
  - (2) Claude Bernard
  - (3) Willen Einthoven
  - (4) Charles Scott Sherrington
5. Clotting time increases in -
  - (1) Peptic ulcer
  - (2) Obstruction of bile duct
  - (3) Xerostomia
  - (4) Hirschsprung's disease
6. The level of arousal during competitive sport is indicated by following physiological parameters, EXCEPT -
  - (1) Dilation of pupils
  - (2) A high resting heart rate
  - (3) Increased muscle tone
  - (4) Decreased sweating

7. Mineralocorticoids play a critical role in fluid and electrolyte balance in the body. A normal response to aldosterone is to increase acid secretion in the kidney. The hyper-aldosteronism that occurs with some adrenal tumors has interesting and profound effects on acid-base balance as a result of increased renal  $H^+$  secretion and the following best describes the subsequent result of hyper-aldosteronism -
- (1) Excretion of excess bicarbonate
  - (2) Generation of metabolic alkalosis
  - (3) Hyperkalemia caused by renal  $K^+$  resorption
  - (4) Increased  $H^+$  reabsorption by renal tubular cells
8. The occurrence of hypocalcemia can have dire consequences for numerous physiologic processes. The kidney plays a major role in maintaining calcium balance during hypocalcemic state by decreasing calcium excretion. The major mechanism underlying the response of kidney during hypocalcemia is -
- (1) Parathyroid hormone-induced stimulation of calcium reabsorption by the thick ascending limb
  - (2) Fluid flow-induced stimulation of calcium reabsorption by the collecting duct
  - (3) Calcitonin-induced inhibition of calcium secretion by the distal convoluted tubule
  - (4) Vitamin D-induced activation of calcium reabsorption by the proximal tubule
9. Which of the following processes prevent gastric pressures to rise above the levels that breach the lower esophageal sphincter, even when the stomach is filled with a meal?
- (1) Peristalsis
  - (2) Segmentation
  - (3) Stimulation of the vomiting center
  - (4) Receptive relaxation
10. Bitter taste is due to -
- (1)  $Ca^{2+}$  channels
  - (2)  $Na^+$  channels
  - (3) G - protein
  - (4) Guanylyl cyclase
11. In a healthy adult, the volume of fluid presented to the intestine daily is approximately 8 liters. Which of the following primarily drives reabsorption of the bulk of fluid in the small intestine after consuming a regular diet?
- (1) Nutrient-coupled electrogenic sodium absorption
  - (2) Electroneutral NaCl absorption
  - (3) Nutrient-coupled proton absorption
  - (4) Electrogenic sodium absorption via ENaC channels
12. Sweating is a result of exertion is mediated through -
- (1) Adrenal hormones
  - (2) Sympathetic cholinergic
  - (3) Sympathetic adrenergic
  - (4) Parasympathetic cholinergic

13. Dexamethasone is a synthetic analogue of cortisol. Therapeutically, it can be used to block the effects of conditions with excessive cortisol secretion. The following statement best describes the physiological mechanism of action of dexamethasone -
- (1) Binds to cortisol
  - (2) Binds to the adrenal gland
  - (3) Competes for cortisol-binding sites
  - (4) Inhibits ACTH secretion
14. Injections of ACTH decrease the size of -
- (1) Adrenal medulla
  - (2) Zona glomerulosa
  - (3) Zona fasciculata
  - (4) Zona reticularis
15. Which photoreceptor responds to the broadest spectrum of wavelengths of light?
- (1) Rod receptors
  - (2) Green cone receptors
  - (3) Blue cone receptors
  - (4) Red cone receptors
16. Neurons located in which area release serotonin as their neurotransmitter?
- (1) Periaqueductal gray area
  - (2) Interneurons of the spinal cord
  - (3) Periventricular area
  - (4) Nucleus raphe magnus
17. The Hormone Replacement Therapy (HRT) essentially with oestrogen-like compounds is usually advised for post-menopausal women for effective prevention of progression of osteoporosis and the neuroendocrine rationale for such a therapeutic protocol is -
- (1) Stimulation of activity of osteoblasts
  - (2) Enhanced absorption of calcium from gastrointestinal tract
  - (3) Stimulation of calcium reabsorption from renal tubules
  - (4) Stimulation of Parathormone (PTH) secretion by parathyroid gland
18. An infant born prematurely in gestational week 25 has neonatal respiratory distress syndrome. Which of the following would be expected in this infant?
- (1) Arterial  $PO_2$  of 100 mm Hg
  - (2) Collapse of the small alveoli
  - (3) Increased lung compliance
  - (4) Lecithin: sphingomyelin ratio of greater than 2:1 in amniotic fluid

19. Motility recordings in a patient with signs of bacterial overgrowth of the small intestine indicate an abnormal pattern of motility in fasting state that is characterised by lack of normal periodic bursts of gastric and intestinal contractions (house-keeping contractions) and in such instances an abnormal secretion of the following hormones would be observed -
- (1) Cholecystokinin (CCK)
  - (2) Gastrin
  - (3) Motilin
  - (4) Secretin
20. A young adult male of 26 years of age complains of shortness of breath and difficulty with moderate exercise. Pulmonary function tests indicate a reduced Functional Residual Capacity (FRC), and his Forced Expiratory Volume in 1 second (FEV<sub>1</sub>) was 2.6 L (78%). His Forced Vital Capacity (FVC) was 3.1 L (70%). The spirometric profile of above clinical symptomatology is most likely representative of -
- (1) Small-diameter airways
  - (2) Pulmonary congestion
  - (3) Dynamic compression of airway
  - (4) Pulmonary fibrosis
21. The following is the most common action of the neurotransmitter transmitted,  $\gamma$ -aminobutyric acid (GABA) -
- (1) Opening channels permeable to Cl<sup>-</sup>
  - (2) Opening channels permeable to Ca<sup>2+</sup>
  - (3) Opening channels permeable to Na<sup>+</sup> and K<sup>+</sup>
  - (4) Closing channels permeable to Na<sup>+</sup>
22. True regarding excitation contraction coupling in smooth muscles is -
- (1) Presence of troponin is essential
  - (2) Sustained contraction occurs with high calcium concentration
  - (3) Phosphorylation of actin is required for contraction
  - (4) Presence of cellular calcium is essential to cause muscle contraction
23. In which of the following situations is pulmonary blood flow greater than aortic blood flow?
- (1) Fetus
  - (2) Left-to-right ventricular shunt
  - (3) Right-to-left ventricular shunt
  - (4) Right ventricular failure
24. The resting transmembrane potential (V<sub>m</sub>) of a nerve axon is essential for signal generation. The instantaneous elimination of the following would most rapidly bring V<sub>m</sub> close to 0 mV-
- (1) Active transport of K<sup>+</sup> out of the cell
  - (2) Active transport of Na<sup>+</sup> out of the cell
  - (3) Concentration gradient for Na<sup>+</sup>
  - (4) High membrane permeability to K<sup>+</sup>

25. A 29-year-old man who lives at sea level drives up a mountain to high altitude (17,000 feet) for over 3 hours and the physiological response to the elevation climb (ascent) is?
- (1) Increased arterial  $PO_2$
  - (2) Decreased arterial  $PCO_2$
  - (3) Decreased arterial pH
  - (4) Decreased respiratory rate
26. After a rapid ascent to very high altitude, one begins to hyperventilate because of hypoxic drive. The hyperventilation will cause a decrease in the arterial  $PCO_2$  and the compensatory renal response to this condition would be -
- (1) Increased rate of acid excretion
  - (2) Decreased rate of acid excretion
  - (3) Increased rate of bicarbonate reabsorption
  - (4) Diuresis to eliminate excess fluid
27. A man falls into deep sleep with one arm under his head. After awakening the arm is paralysed but tingling sensation and pain sensation persists. This loss of motor function without the loss of sensory function is due to -
- (1) 'A' fibers are more susceptible to hypoxia than 'B' fibers
  - (2) 'A' fibers are more sensitive to pressure than 'C' fibers
  - (3) 'C' fibers are more sensitive to pressure than 'A' fibers
  - (4) Sensory nerves are nearer bone and hence affected by pressure
28. In nonfluent aphasia, the lesion is in -
- (1) Angular gyrus
  - (2) Arcuate fasciculus
  - (3) Broca's area
  - (4) Wernicke's area
29. Following changes are seen in Renal system in old age, EXCEPT -
- (1) Decreased number of Nephrons
  - (2) Decreased renal blood flow
  - (3) Increased ability to conserve sodium
  - (4) Decreased ability to concentrate the urine
30. If muscle strength is increased with resistive training, which condition will most likely occur -
- (1) A decrease in the number of myofibrils
  - (2) An increase in mitochondrial enzymes
  - (3) A decrease in the components of the phosphagen energy system
  - (4) A decrease in stored triglycerides

31. A 34-year-old man with schizophrenia has had chronic fatigue for last 6 months. He has a good appetite been unable to eat any vegetables for last 1 year as he hears voices that vegetables are poisoned. On examination, his general appearance was unkempt hair with dishevelled appearance with other features of neurological and physical evaluation being within normal limits. The complete blood counts were run with following observations namely, haemoglobin level of 9.1 d/dl, total leucocyte count of  $10,000/\mu\text{L}^3$ , and Mean Corpuscular Volume (MCV) of 122-fl. The most probable diagnosis of type of anaemia that the patient is suffering from is -
- (1) Sickle cell anaemia
  - (2) Aplastic anaemia
  - (3) Haemolytic anaemia
  - (4) Folic acid deficiency anaemia
32. A hospitalized patient has an ejection fraction of 0.4, a heart rate of 95 beats/min , and cardiac output of 3.5 L/min. What is the patient's end diastolic volume?
- (1) 14 mL
  - (2) 37 mL
  - (3) 55 mL
  - (4) 92 mL
33. A 35-year-old woman undergoes a thyroidectomy for papillary serous thyroid cancer. The surgeon suspects that the parathyroid glands may have been removed and the most likely clinical finding at 1 week postoperatively to be observed in such and eventuality is -
- (1) Coma
  - (2) Constipation
  - (3) Esophagitis
  - (4) Muscle spasms and tetany
34. In response to the loss of blood, compensatory mechanisms come into play at various times to blunt decreases in Mean Arterial Pressure (MAP) and restore blood volume to normal. The following compensatory physiological chanin of events most accurately depicts the temporal order of effectiveness of three of these mechanisms, from earliest to latest -
- (1) Angiotensin II, aldosterone, sympathetic nerves
  - (2) Angiotensin II, sympathetic nerves, aldosterone
  - (3) Sympathetic nerves, aldosterone, angiotensin II
  - (4) Sympathetic nerves, angiotensin II, aldosterone
35. A 67-year-old man has a stroke. One week later, he experiences sudden and uncontrolled flailing, ballistic movements of his limbs. Which part of the man's brain is most likely to have been damaged by the stroke -
- (1) Globus pallidus
  - (2) Lateral hypothalamus
  - (3) Red nucleus
  - (4) Subthalamic nucleus

36. During chewing of a bolus of food, but before swallowing, salivary secretion, gastric secretion and pancreatic secretion are stimulated by the following neurocrine, endocrine and paracrine mediators -
- (1) ACh, Gastrin, Histamine
  - (2) ACh, CCK, Nitric Oxide
  - (3) Nitric Oxide, Vasoactive Intestinal Polypeptide, Histamine
  - (4) Vasoactive Intestinal Polypeptide, Gastrin, Somatostatin
37. The placenta is incapable of synthesizing which hormones?
- (1) Estrogen
  - (2) Progesterone
  - (3) Androgens
  - (4) Estriol
38. The earliest sign of iron deficiency anemia is -
- (1) Increased TIBC
  - (2) Decreased S. iron
  - (3) Decreased S. ferritin
  - (4) Decreased % saturation
39. Baroreceptors are most sensitive to -
- (1) Systolic pressure
  - (2) Diastolic pressure
  - (3) Pulsatile pressure
  - (4) Mean pressure
40. The Cardiac Output (CO) of a well trained athlete is 5.5 L/min. On exercise CO reaches to -
- (1) 12 L/min
  - (2) 23 L/min
  - (3) 30 L/min
  - (4) 55 L/min
41. During practical class of hearing examinations; one of the subjects had following results: Weber tests-sound from a vibrating tuning fork was louder than normal; Schwabach test-bone conduction was better than normal; and Rinne-air conduction did not outlast bone conduction. What is the probable condition?
- (1) Sensorineural deafness in both ears
  - (2) Conduction deafness in both ears
  - (3) Normal hearing
  - (4) Both sensorineural and conduction deafness
42. The following clinical entity is most closely related to slow-wave sleep -
- (1) Dreaming
  - (2) Atonia
  - (3) Bed wetting
  - (4) High-frequency EEG waves



43. A 66-year-old man, who has had a sympathectomy, experiences a greater than-normal fall in arterial pressure upon standing up. The explanation for this occurrence is -
- (1) an exaggerated response of the renin-angiotensin-aldosterone system
  - (2) a suppressed response of the renin-angiotensin-aldosterone system
  - (3) an exaggerated response of the baroreceptor mechanism
  - (4) a suppressed response of the baroreceptor mechanism
44. A group of undergraduate students made a trip to visit pangong lake at Leh to avoid acute sickness -
- (1) They should be instructed to ascend very slow
  - (2) They must increase their physical activity
  - (3) They could get a blood transfusion done before starting
  - (4) They should take medicine for improving blood pressure
45. A 25-year-old otherwise healthy patient is involved in a motor vehicle accident, and suffers appreciable blood loss. The cardiac output is falling because of a loss of blood. As a compensatory mechanism, the total peripheral resistance increases to attempt to maintain Mean Arterial Pressure (MAP). The following vasculature corresponding to the listed organ would be contributing the least to the elevated Total Peripheral Resistance (TPD) -
- (1) Brain
  - (2) Small intestine
  - (3) Kidney
  - (4) Skeletal muscle
46. In isometric exercise all are increased, EXCEPT -
- (1) Heart rate
  - (2) Cardiac output
  - (3) Mean arterial pressure
  - (4) Systemic vascular resistance
47. The following is true regarding healthy recreational scuba diver at a depth of 70 feet in Arabian Sea -
- (1) Lungs are smaller than normal
  - (2) Scuba diver has elevated arterial  $PO_2$  and normal  $PCO_2$
  - (3) All partial pressure gases in blood ( $O_2$ , Nitrogen [ $N_2$ ],  $CO_2$  and water vapour) are elevated
  - (4) Increase in fraction of inspired Oxygen ( $FiO_2$ ) and Inspired Nitrogen ( $FiN_2$ )
48. The first physiological response to high environmental temperature is -
- (1) Sweating
  - (2) Vasodilatation
  - (3) Decreased heat production
  - (4) Non-shivering thermogenesis
49. A 56-year-old physician who has had a recent episode of unstable angina is advised by his cardiologist to take one "baby aspirin" a day because of the antithrombotic effect of aspirin. What is the mechanism by which aspirin acts as an antithrombotic agent?
- (1) Acetylation and activation of both cyclooxygenase-1 (COX-1) and cyclooxygenase-2 (COX-2)
  - (2) Acetylation and inhibition of both COX-1 and COX-2
  - (3) Selective inhibition of COX-1
  - (4) Selective inhibition of COX-2

50. A female young adult of 22 years has adult-onset diabetes with high levels of glucose in urine and with complaints of brisk diuresis and repeated micturition. The appearance of glucose in the urine is a consequence of the following processes taking place in the proximal tubule -
- (1) Inhibition of  $\text{Na}^+ - \text{K}^+ - \text{ATPase}$  ( $\text{Na}^+$  pump)
  - (2) Saturation of the  $\text{Na}^+$ - glucose co-transporter
  - (3) Saturation of the  $\text{Na}^+ - \text{H}^+$  exchanger
  - (4) Stimulation of glucose secretion
51. Function of Phospholamban is -
- (1) Regulates Na-K pump
  - (2) Transports calcium out of the mitochondria
  - (3) Binds actin with myosin
  - (4) Collects calcium into the sarcoplasmic reticulum
52. Alignment of fibers in Dorsal columns from medial to lateral side is -
- (1) CTLS
  - (2) CTSL
  - (3) SLTC
  - (4) SLCT
53. Sneezing and coughing are similar in all aspect, EXCEPT -
- (1) Concerned with cleaning of air passage by removing secretions or inhaled materials
  - (2) Afferents pass in the 5<sup>th</sup> cranial nerve to the medulla
  - (3) Pressure in the lungs rises rapidly to as much as 100 mm Hg or more
  - (4) Air is trapped by shutting off the exit following by sudden release of trapped air at high pressure
54. In an epidemic of widespread watery diarrhea, ORS has been used on a large scale to control mortality. To reduce fluid losses, increased activity of which of the following transport proteins might be exploited therapeutically?
- (1) SGLT-1
  - (2) CFTR
  - (3) Na-K-ATPase
  - (4) NKCC1
55. Which step in steroid hormone biosynthesis, if inhibited, blocks the production of all androgenic compounds but does not block the production of glucocorticoids?
- (1) Cholesterol  $\rightarrow$  pregnenolone
  - (2) Progesterone  $\rightarrow$  11-deoxycorticosterone
  - (3) 17-Hydroxypregnenolone  $\rightarrow$  dehydroepiandrosterone
  - (4) Testosterone  $\rightarrow$  dihydrotestosterone
56. A man has a disease that destroyed only the motor neurons of the spinal cord below the thoracic region. Which aspect of sexual function would not be possible?
- (1) Arousal
  - (2) Erection
  - (3) Lubrication
  - (4) Ejaculation

57. Earliest change in ECG in Hyperkalaemia is -
- (1) Tall peaked T wave
  - (2) Prolonged QRS complex
  - (3) Prolonged PR interval
  - (4) Prominent U waves
58. Ten minutes after being stung by a wasp, a 30-year-old male develops multiple patches of red, irregular skin lesions over his entire body and the lesions (urticaria) are pruritic with new crops of lesions occurring daily. Such a response is primarily the result of liberation of specific vasoactive substances by action of the following -
- (1) Activated T Lymphocytes on Smooth Muscle Cells
  - (2) IgA on Basophils and Mast Cells
  - (3) IgE on Basophils and Mast Cells
  - (4) IgE on Lymphocytes and Eosinophils
59. Among the ions, which is completely absorbed in tubules -
- (1)  $\text{Na}^+$
  - (2)  $\text{K}^+$
  - (3)  $\text{Cl}^-$
  - (4)  $\text{HCO}_3^-$
60. A standing subject looking over her left shoulder suddenly rotates her head to look over her right shoulder. The vestibular system would detect this motion through the stereotypical mechanism of -
- (1) The Utricle goes from vertical to Horizontal position, and otoliths stimulate stereocilia
  - (2) Stretch receptors in neck muscles send action potentials to vestibular apparatus which relays them to brain
  - (3) Fluid within semicircular canals remains stationary, Bending cupula and stereocilia as Head rotates
  - (4) The movement causes endolymph in cochlea to rotate from right to left, stimulating Inner hair cells
61. A 45-year-old woman develops severe diarrhea while on vacation. She has the following arterial blood values:  $\text{pH} = 7.25$ ,  $\text{PCO}_2 = 24$  mm Hg,  $[\text{HCO}_3^-] = 10$  mEq/L. Venous blood samples show decreased blood  $[\text{K}^+]$  and a normal anion gap. The correct diagnosis for this patient is -
- (1) Metabolic acidosis
  - (2) Metabolic alkalosis
  - (3) Respiratory acidosis
  - (4) Respiratory alkalosis
62. A pulmonary physiologist notes that lung characteristics of individuals who lack surfactant and those with pulmonary fibrosis are similar and the following differential characteristic could be appreciated in patients who lack surfactant and is not seen in patients with pulmonary fibrosis?
- (1) Collapse of small alveoli and expansion of large alveoli
  - (2) Decreased lung compliance
  - (3) Decreased total lung capacity
  - (4) Increased work of breathing

63. The physical fitness of an athlete is more closely correlated with -
- (1) Maximal Oxygen uptake,  $VO_{2\max}$
  - (2) Maximal Pulse Rate than Resting Pulse Rate
  - (3) Maximal minute ventilation than maximal cardiac output
  - (4) Blood Oxygen saturation than blood lactate level during strenuous exercise
64. Retinal ganglion cells in the on and off pathways show opposite responses to a narrowly focused beam of light because of the following neurodynamical reasons -
- (1) On bipolar cells are hyper-polarised by glutamate released from photoreceptors, whereas off bipolar cells are depolarised
  - (2) On bipolar cells excite horizontal cells, whereas off bipolar cells inhibit horizontal cells
  - (3) On bipolar cells excite retinal ganglion cells, whereas off bipolar cells inhibit retinal ganglion cells
  - (4) On photoreceptors are hyper-polarised by light, whereas off photoreceptors are depolarised by light
65. IPSPs can be produced by which of the following alterations in ion channels in the neuron?
- (1) opening  $K^+$  channels
  - (2) with the movement of  $K^+$  out of the postsynaptic cell
  - (3) by the closure of  $Na^+$  or  $Ca^{2+}$  channels
  - (4) All of the above
66. An 80 year old man comes into the emergency department and faints. Within five minutes, he gains consciousness. An electrocardiogram shows 75 P waves and 35 QRS waves per minute. The QRS width is normal. Which of the following is most likely diagnosis?
- (1) First degree atrioventricular block
  - (2) Stokes Adam Syndrome
  - (3) Atrial paroxysmal tachycardia
  - (4) Atrial premature contractions
67. A drug is noted to cause a selective change in resting membrane potential only of intestinal epithelial cells from  $-60\text{ mV}$  to  $-50\text{ mV}$  and such a cellular process is most likely to result in -
- (1) Decreased rate of diffusion of Potassium into Cells.
  - (2) Increased rate of diffusion of Potassium into Cells.
  - (3) Decreased rate of diffusion of Sodium into Cells.
  - (4) Increased rate of diffusion of Sodium into Cells.
68. In which vascular bed does hypoxia cause vasoconstriction -
- (1) Coronary
  - (2) Pulmonary
  - (3) Cerebral
  - (4) Muscle

69. A 33-year-old chemist takes L-thyroxine 1mg orally each day and the mechanism of action of thyroxine at cellular level is -
- (1) It binds onto Membrane Surface Receptor and Activates Protein Synthesis.
  - (2) It binds onto Membrane Surface Receptor and Activates Secondary Messenger System.
  - (3) It binds onto Cytoplasmic Receptor and Hormone-Receptor Complex Diffuses to Nucleus to Affect Transcription.
  - (4) It has Direct Effect on Hypothalamic Nuclei Affecting Metabolism.
70. His bundle electrogram records the electrical events in all, Except -
- (1) SA Node
  - (2) AV Node
  - (3) Bundle of His
  - (4) Purkinje System
71. Partial pressure of Oxygen ( $PO_2$ ) in expired air is -
- (1) Greater than alveolar  $PO_2$
  - (2) Lesser than alveolar  $PO_2$
  - (3) Equal to alveolar  $PO_2$
  - (4) Depends upon diffusion of  $O_2$  from alveoli to blood
72. A 45-year-old woman is noted to have fatigue and cold intolerance and is diagnosed with hypothyroidism. Her physician suspects a pituitary aetiology and the following laboratory findings would be most consistent with this condition -
- (1) Low Thyroid Stimulating Hormone (TSH), low free thyroxine
  - (2) Elevated TSH, low thyroxine
  - (3) Elevated TSH, elevated thyroxine
  - (4) Low Thyroid Releasing Hormone (TRH)
73. A saccade, controlled cortically by frontal eye fields, has the following characteristic properties -
- (1) It induces lens to become more spherical
  - (2) It has a primal function of foveal protection from extreme illumination
  - (3) It is evoked by the release of acetylcholine (ACh) from parasympathetic post-ganglionic fibers
  - (4) It is a ballistic movement designed for rapid visual exploration
74. Gamma motor neurons are mainly influenced by -
- (1) Tectospinal tract
  - (2) Vestibulospinal tract
  - (3) Reticulospinal tract
  - (4) Corticospinal tract
75. Patients with elevated Mean Arterial Pressure (MAP) often are prescribed drugs that inhibit Angiotensin-Converting Enzyme (ACE) that subsequently would lead to the following observation -
- (1) A further increase in Total Peripheral Resistance (TPR)
  - (2) Increased plasma renin levels
  - (3) Decreased sympathetic nerve activity
  - (4) Decreased plasma angiotensin I levels

76. Herring-Breuer inflation reflex in human being -
- (1) Decreases the Rate of Respiration
  - (2) Is not activated until the tidal volume increases above 1.5 Litres
  - (3) Is an important factor in normal control of ventilation
  - (4) Is activated only when tidal volume is less than 1 Litre
77. The Russian astronaut, on completion of 21 days in space on the space station, returns to earth. The following physiological adaptation mechanism response would be observed -
- (1) Raised blood pressure
  - (2) Increased urine output
  - (3) Decreased muscle tone
  - (4) Elevated cardiac output
78. If a patient suffers a stroke that destroys the optic tract on right side of the brain, the following visual defects will ensue -
- (1) Complete blindness will result
  - (2) There will be no vision in left eye, but vision will be normal in right eye
  - (3) The patient will not perceive images of objects striking left half of retinal in left eye
  - (4) The patient will not perceive images of objects striking right half of retina in right eye
79. The ageing process influences memory system of humans and the memory network that is affected initially is -
- (1) Semantic memory
  - (2) Declarative memory
  - (3) Recent/Short-Term memory
  - (4) None of the above
80. A patient is suspected of suffering from myocardial infarction is being monitored in coronary care unit and following haemodynamical parameters were recorded -

S.No.	Variable	Value
1	Arterial Systolic Blood pressure	121 mm Hg
2	Arterial Diastolic Blood Pressure	82 mm Hg
3	Venous Blood Pressure	2 mm Hg
4	Cardiac output	4185 mL/min
5	Radius of Aorta	1.2 cm

The above monitored data could conclude the following -

- (1) The patient's Mean Arterial Pressure (MAP) is 95 mm Hg
  - (2) The Pulse Pressure is 80 mm Hg
  - (3) The Total Resistance to flow is around 45 resistance units
  - (4) The patient's blood flow in carotid artery must be turbulent
81. Transport protein involved in sodium transport in the proximal tubule is -
- (1) Na/glucose co-transporter
  - (2) Na - K- 2Cl co-transporter
  - (3) ENaC
  - (4) NaCl co-transporter

82. A balloon catheter is advanced from the superior vena cava into the heart and inflated to increase atrial pressure by 5 mm Hg and an elevated atrial pressure would lead to an increase in the following physiological parameter -
- (1) Atrial natriuretic peptide
  - (2) Angiotensin II,
  - (3) Aldosterone
  - (4) Renal sympathetic nerve activity
83. Which of the following parameters is not recorded in blood pressure variability analysis?
- (1) Cardiac output
  - (2) Baroreceptor sensitivity
  - (3) Peripheral vascular resistance
  - (4) Cardiac chamber size
84. The  $Cl^-$  concentration in red cells of venous blood, compared to the  $Cl^-$  concentration in red cells of arterial blood, is -
- (1) Lower due to the loss of  $Cl^-$  during capillary transit
  - (2) Lower due to the increase in red cell volume
  - (3) Unchanged
  - (4) Higher due to an exchange with  $HCO_3^-$
85. Which of the following characteristics is shared by simple and facilitated diffusion of glucose?
- (1) Occurs down an electrochemical gradient
  - (2) Is saturable
  - (3) Requires metabolic energy
  - (4) Requires a  $Na^+$  gradient
86. A mother of 4-year-old boy visits her paediatrician that her child has been having repeated swollen knees on minor trauma and falls. The mother informs the paediatrician that the boy's cousin brother also had similar complaints in his childhood. The paediatrician orders the hemostatic functions tests and observed that clotting time and activated partial thromboplastin time were raised with normal bleeding time and prothrombin time. The next physiologically rationale investigative hemostatic analysis to supplement the clinical picture would be -
- (1) Platelet Count
  - (2) Platelet Function Test
  - (3) Factor VIII Assay
  - (4) Factor VII Assay
87. A patient has a goiter associated with high plasma levels of both TRH and TSH. Her heart rate is elevated. This patient most likely has which condition?
- (1) An endemic goiter
  - (2) A hypothalamic tumor secreting large amounts of TRH
  - (3) A pituitary tumor secreting large amounts of TSH
  - (4) Graves' disease

88. Which brain stem structure plays a major role in determining the direction from which a sound originates?
- (1) Cochlear nucleus
  - (2) Inferior colliculus
  - (3) Lateral lemniscus
  - (4) Superior olivary nucleus
89. The placenta -
- (1) Transports Glucose from Maternal to Foetal Blood by Facilitated Diffusion
  - (2) Can Synthesis Glycogen
  - (3) Actively Transports Oxygen from Maternal to Foetal Blood
  - (4) Allows Protein Molecules to pass from Maternal to Foetal Blood by Pinocytosis
90. According to the common view held by most gerontologists, Primary aging is referred to -
- (1) Intrinsic changes occurring with age, unrelated to disease or environmental influences
  - (2) Changes caused by the interaction of primary aging with environmental influences or disease processes
  - (3) The age-related changes that are not pathological and those that are pathological are not a fundamental distinction
  - (4) Changes due to hostile environment that increases the fraction of energy expended in reproduction and leaves a smaller fraction for somatic maintenance
91. Substances help in linking cytoskeleton of the cell to plasma membrane -
- (1) Tubulin
  - (2) Spectrin
  - (3) Laminin
  - (4) Ankyrin
92. Gastric distention leads to relaxation of the ileocecal sphincter by way of which reflex?
- (1) Enterogastric reflex
  - (2) Gastroileal reflex
  - (3) Gastrocolic reflex
  - (4) Rectosphincteric reflex
93. The movement of glucose or amino acid from the gastrointestinal tract (GIT) in the cells lining the GIT occurs when they bind to a cellular membrane transport protein that has already sodium (Na) ion bound to it and movement of Na ion entering the cell takes place along its concentration gradient. The underlying cellular physiological process of such a movement of glucose or amino acid has been termed as -
- (1) Facilitated Diffusion
  - (2) The Sodium-Potassium (Na-K) Pump
  - (3) Active transport
  - (4) Secondary active transport



94. Rapid axonal flow in the neurons is mediated by all, except -
- (1) Dynein
  - (2) Kinesin
  - (3) Neurofilaments
  - (4) Microtubules
95. Which of the following is both synthesized and stored in the hypothalamus?
- (1) ADH
  - (2) Thyroid-Stimulating Hormone (TSH)
  - (3) Somatomedin
  - (4) Somatostatin
96. Which of the following cytoskeletal components is associated with Kinesin?
- (1) Neurofilament
  - (2) Lamin A
  - (3) Microfilament
  - (4) Microtubule
97. Transport of carbon dioxide is facilitated by which RBC enzyme?
- (1) Myeloperoxidase
  - (2) Carbonic anhydrase
  - (3) Superoxide dismutase
  - (4) Globin reductase
98. The following is essentially the rank order, from greatest to least, of areas of water absorption in Gastrointestinal Tract (GIT) in a normal individual -
- (1) Colon, small intestine, stomach
  - (2) Colon, stomach, small intestine
  - (3) Small intestine, colon, stomach
  - (4) Small intestine, stomach, colon
99. The observed basal body temperature chart is a reflection of ongoing neuroendocrine process of ovulation that incidentally happens to represent the ongoing neurophysiological variability/change in terms of -
- (1) Increased basal body temperature with LH (Luteinizing Hormone) surge
  - (2) Decreased basal body temperature with LH surge
  - (3) Increased basal body temperature with decreased progesterone level
  - (4) Increased basal body temperature with elevated progesterone level
100. Muscle stretch leads to a direct increase in firing rate of which type of nerve -
- (1)  $\alpha$ -Motor neurons
  - (2)  $\gamma$ -Motor neurons
  - (3) Group 1a fibers
  - (4) Group 1b fibers

101. A female young patient of 30 years has complaints of frequent micturition during day-time and is forced to get up multiple times throughout the night. Her diet has not changed, but she complains of being fatigued throughout the day (and frustrated with her shortened sleep periods). When she moves from a supine to an erect position, her blood pressure is observed to decrease modestly and her heart rate increases slightly. Blood chemistries reveal that she is modestly hypernatremic and plasma arginine, vasopressin and renin levels are markedly elevated. Urinalysis revealed copious diluted urine. The patient could most likely be suffering from the following condition -
- (1) Central diabetes insipidus
  - (2) Nephrogenic diabetes insipidus
  - (3) Psychogenic polydipsia
  - (4) Excessive consumption of alcohol
102. Lymph coming from which organ has highest concentration of protein?
- (1) Lung
  - (2) Heart
  - (3) Liver
  - (4) Skin
103. Transfer of which gas occurs across the alveolocapillary membrane?
- (1) Nitrous oxide ( $N_2O$ )
  - (2) Oxygen (under normal condition)
  - (3) Carbon dioxide ( $CO_2$ )
  - (4) Oxygen (during strenuous exercise)
104. Which of the following is the correct statement?
- (1) Catecholamines inhibit insulin secretion via  $\alpha_2$ -adrenergic receptors and stimulate insulin secretion via  $\beta$ -adrenergic receptors.
  - (2) Catecholamines stimulate insulin secretion via  $\alpha_2$ -adrenergic receptors and  $\beta$ -adrenergic receptors.
  - (3) Catecholamines inhibit insulin secretion via  $\alpha_2$ -adrenergic receptors and  $\beta$ -adrenergic receptors.
  - (4) Catecholamines stimulate insulin secretion via  $\alpha_2$ -adrenergic receptors and inhibit insulin secretion via  $\beta$ -adrenergic receptors.
105. Which of the following has a much lower concentration in the Cerebrospinal fluid (CSF) than in cerebral capillary blood?
- (1)  $Na^+$
  - (2)  $K^+$
  - (3) Protein
  - (4) Mg
106. Which of the following statement is true about parathormone (PTH)?
- (1) PTH increases phosphate reabsorption and increases plasma phosphate concentration.
  - (2) PTH increases bone resorption and mobilizes  $Ca^{2+}$ .
  - (3) PTH decreases bone deposition and increases plasma  $Ca^{2+}$  levels.
  - (4) PTH decreases calcium absorption from the gut.

107. Depolarisation of hair cells during bending of stereocilia occurs because bending causes following electrochemical response -
- (1) Closing channels that carry an outward  $K^+$  current
  - (2) Closing channels that carry an inward  $Na^+$  current
  - (3) Opening channels that carry an inward  $Na^+$  current
  - (4) Opening channels that carry an inward  $K^+$  current
108. Bilateral lesions involving the ventromedial hypothalamus will lead to which of the following deficits?
- (1) Decreased eating and drinking
  - (2) Loss of sexual drive
  - (3) Excessive eating, rage and aggression, hyperactivity
  - (4) Uterine contractility, mammary gland enlargement
109. The following procedures are instituted when the body is too cold due to environmental conditions, EXCEPT -
- (1) Skin vasoconstriction throughout the body
  - (2) Piloerection
  - (3) Increase in thermogenesis
  - (4) Sweating
110. The patch-clamp technique is used to study -
- (1) Diffusion
  - (2) Osmoregulation
  - (3) Voltage/current change in cell
  - (4) Ion transport across the membrane
111. Following changes can be observed in Nervous system with increase in age, EXCEPT -
- (1) Increased blood brain barrier permeability
  - (2) Increased arterial wall thickness
  - (3) Increased cerebral metabolic rate
  - (4) Decreased dopamine level
112. Which of the following is transported in intestinal epithelial cells by a  $Na^+$  - dependent cotransport process?
- (1) Fatty acids
  - (2) Triglycerides
  - (3) Fructose
  - (4) Alanine
113. A pregnant woman is able to transfer oxygen to her foetus because fetal haemoglobin has a greater affinity for oxygen than does adult haemoglobin. The physiological basis of higher affinity of fetal haemoglobin for oxygen is -
- (1) Tense form of Haemoglobin is more prevalent in Circulation of Foetus.
  - (2) Less 2,3-DPG (Diphosphoglycerate) is present in Fetal circulation as compared to that observed in maternal circulation.
  - (3) Fetal Haemoglobin binds 2,3-DPG with fewer ionic bonds than adult form.
  - (4) Bohr effect is more pronounced in Foetus.

114. The maintenance of corpus luteum during first 8 weeks of pregnancy is dependent on following hormones -
- (1) Estrogen
  - (2) Human Chorionic Gonadotropin (hCG)
  - (3) Progesterone
  - (4) Dehydro-epiandrosterone Sulfate (DHEA-S)
115. Professor Autar Singh Paintal discovered the following, EXCEPT -
- (1) Juxta capillary receptors in lung
  - (2) Type B atrial receptors
  - (3) Ventricular pressure receptors
  - (4) Pain receptors
116. The activation of gamma motor neurones during active contraction of extrafusal muscle fibers induces the following -
- (1) Increased force developed by the extrafusal muscle fibers
  - (2) Increased sensitivity of Ib afferents
  - (3) Increased summation of motor units
  - (4) Maintained sensitivity of the Ia afferents during unexpected stretch
117. Osmotic diuresis is seen in -
- (1) Type 1 diabetes mellitus and Central diabetes insipidus
  - (2) Type 2 diabetes mellitus and Peripheral diabetes insipidus
  - (3) Type 1 diabetes mellitus and Type 2 diabetes mellitus
  - (4) Central diabetes insipidus and Peripheral diabetes insipidus
118. A 17-year-old male develops pneumonia, diabetic ketoacidosis, and metabolic acidosis. Respiratory compensation to a metabolic acidosis consists of hyperventilation to lower the arterial  $PCO_2$  and physiological cause of the compensatory hyperventilation can best be ascribed to -
- (1)  $CO_2$  produced from the reaction of the acid with bicarbonate stimulates central chemoreceptors
  - (2) A decrease in the bicarbonate concentration stimulates ventilation
  - (3)  $H^+$  stimulates central chemoreceptors
  - (4)  $H^+$  stimulates peripheral chemoreceptors
119. The Olympic level endurance fitness is associated with an exceptionally high -
- (1) Hemoglobin level
  - (2) Oxygen saturation of blood
  - (3) Cardiac vagal tone during maximal exercise
  - (4) Resting stroke volume
120. A 30-year-old lady fell from her balcony in first floor and sustained an injury in upper cervical region on left side. Investigations and imaging give an impression of damage in dorsal horn area. All of the following is incorrect about patient's sensory modalities, EXCEPT -
- (1) Loss of touch, pressure and vibration in left upper limb
  - (2) Loss of touch, pressure and vibration in left lower limb
  - (3) Loss of pain and temperature in left lower limb
  - (4) No change in pain and temperature sensitivity

121. A 59-year-old man is admitted to intensive cardiac care unit for an episode of myocardial infarction and immediately started on  $\beta$ -adrenergic antagonist and strictly instructed to avoid any emotional turmoil to decrease sympathetic outflow to the heart. The cellular and molecular basis of sympathetic stimulation of the heart result in the following -
- (1) Decreases adenylyl cyclase activity in ventricular muscle
  - (2) Decreases  $\text{Ca}^{2+}$  pump activity in the sarcoplasmic reticulum of atrial muscle
  - (3) Decreases  $\text{I}_{\text{Ca}}$  in the AV node
  - (4) Increases depolarisation-activated  $\text{I}_{\text{K}}$  in the SA node
122. What is the osmolarity of a solution containing 10 millimolar NaCl, 5 millimolar KCl and 10 millimolar  $\text{CaCl}_2$  (in mOsm/L)?
- (1) 20
  - (2) 40
  - (3) 60
  - (4) 80
123. A 25-year-old student studies for a test in medical physiology. The visual contrast of the subject matter is enhanced due to lateral inhibition of the visual input by which cell type in the retina?
- (1) Amacrine cells
  - (2) Bipolar cells
  - (3) Ganglion cells
  - (4) Horizontal cells
124. A 70-year-old male presented to the neurologist with rigidity in limbs, akinesia and tremors. Investigations revealed that the lesion is the region of basal ganglia. Most likely this is the case of -
- (1) Huntington's disease
  - (2) Athetosis
  - (3) Parkinsonism
  - (4) Hemiballismus
125. Which of the following abolishes "receptive relaxation" of the stomach?
- (1) Parasympathetic stimulation
  - (2) Sympathetic stimulation
  - (3) Vagotomy
  - (4) Administration of Vasoactive Intestinal Peptide (VIP)
126. Layers of the Blood Gas Barrier or alveolar-capillary membrane are all, EXCEPT -
- (1) Alveolar epithelium
  - (2) Interstitial fluid
  - (3) Capillary endothelium
  - (4) Inter-alveolar septum
127. Which interleukin promotes maturation of B cells into plasma cells?
- (1) Interleukin 1
  - (2) Interleukin 2
  - (3) Interleukin 3
  - (4) Interleukin 5

128. A 17-year-old male sustains serious head and neck trauma during a football game. Physical examination shows a positive Babinski's sign that suggests the site of underlying lesion within the brain to be -
- (1) Anterior motor neurons
  - (2) Cerebellum
  - (3) Corticospinal tract
  - (4) Premotor cortex
129. Jared and Adam both weigh 70kg. Jared drinks 2L of distilled water and Adam drinks 2L of isotonic NaCl. As a result of these ingestions, Adam will have a -
- (1) greater change in intracellular fluid (ICF) volume
  - (2) higher positive free-water clearance ( $-CH_2O$ )
  - (3) greater change in plasma osmolarity
  - (4) higher urine osmolarity
130. Which hormone helps in adaptation to cold in mammals?
- (1) Thyroxine
  - (2) Growth hormone
  - (3) Androgens
  - (4) Somatostatin
131. Which hormones antagonize the effect of Nitric Oxide (NO) and cause the penis to become flaccid after orgasm?
- (1) Endothelin and norepinephrine
  - (2) Estrogen and progesterone
  - (3) Luteinizing hormone (LH) and Follicle-Stimulating Hormone (FSH)
  - (4) Progesterone and LH
132. On mental status examination, a 72-year-old woman is noted to have some difficulty with explicit (declarative) memory whose representative features include -
- (1) Conscious memory of personal experiences
  - (2) Habituation
  - (3) Memories acquired during operant conditioning
  - (4) Neural alterations underlying new skills
133. Which hormone is not stored in its endocrine-producing gland?
- (1) T4
  - (2) PTH
  - (3) Aldosterone
  - (4) Insulin

134. A 41-year-old woman has hypocalcemia, hyperphosphatemia and decreased urinary phosphate excretion. Injection of parathyroid hormone (PTH) causes an increase in urinary cyclic Adenosine Monophosphate (cAMP). The most likely diagnosis is -
- (1) pseudohypoparathyroidism
  - (2) vitamin D intoxication
  - (3) vitamin D deficiency
  - (4) hypoparathyroidism after thyroid surgery
135. Which of the following substances is released from neurons in the GI tract and produces smooth muscle relaxation?
- (1) Secretin
  - (2) Gastrin
  - (3) Gastric Inhibitory Peptide (GIP)
  - (4) Vasoactive Intestinal Peptide (VIP)
136. Which of the following HRV index is a sympathetic marker?
- (1) TP
  - (2) HF
  - (3) LF
  - (4) HFnu
137. Spermatids mature into spermatozoa in deep folds of the cytoplasm of the Sertoli cells. Apart from this, these cells also secrete all, EXCEPT -
- (1) androgen-binding protein
  - (2) mullerian inhibiting substance
  - (3) androgen
  - (4) inhibin
138. A 21-year-old man with gastroenteritis develops severe vomiting with a loss of stomach acids leading to metabolic alkalosis that would result in a physiological compensatory mechanism of -
- (1) The plasma bicarbonate concentration will decrease
  - (2)  $H^+$  will move from the plasma into the cells
  - (3) Peripheral chemoreceptors will stimulate pulmonary ventilation
  - (4) Renal  $H^+$  excretion will decrease
139. Parathyroid hormone plays a critical role in regulating plasma calcium levels, as is evident in individuals with hyperparathyroidism, in which persistent hypercalcemia is evident. Under normal conditions, low plasma calcium stimulates PTH secretion, which in turn activates and/ or inhibits calcium-handling processes at a number of different sites. High PTH levels stimulate and /or inhibit the following processes in order to revert plasma calcium levels within normal range -
- (1) Inhibit calcium secretion by Gastrointestinal tract
  - (2) Reduce expression of plasma calcium-binding proteins
  - (3) Stimulate bone resorption, leading to release of calcium into plasma
  - (4) Stimulate calcium reabsorption by renal proximal tubule

140. In the presence of the antidiuretic hormone, which part of the nephron allows maximum water reabsorption?
- (1) Proximal tubule
  - (2) Loop of Henle
  - (3) Distal tubule
  - (4) Collecting tubule
141. A 32-year-old man has lived for many years in Jaisalmer, Rajasthan, mostly outdoors. The following physiological adaptations are most likely to be exhibited because of such a hot environment -
- (1) A large increase in the maximal rate of sweating
  - (2) Decreases in the mass of brown adipose tissue
  - (3) Decreases in plasma aldosterone levels
  - (4) Facilitation of the stretch reflex
142. Which one of the following characteristics is most similar in the system and pulmonary circulations?
- (1) Stroke work
  - (2) Preload
  - (3) Afterload
  - (4) Peak systolic pressure
143. A 49-years-old male patient with severe Crohn disease has been unresponsive to drug therapy and undergoes ileal resection. After the surgery, he will have steatorrhea because -
- (1) the liver bile acid pool increases
  - (2) chylomicrons do not form in the intestinal lumen
  - (3) micelles do not form in the intestinal lumen
  - (4) dietary triglycerides cannot be digested
144. In an experimental study on monkeys that had used ablation of limbic cortical areas, what change would be observed in animals' behavior if the bilateral posterior orbital frontal cortex was ablated?
- (1) Subjected to frequent fits of rage
  - (2) Have insomnia with intense motor restlessness
  - (3) Have intense sex drive and consummatory behavior
  - (4) Not afraid of anything
145. Which of the following test may help in differentiating hemophilia A from Von Willebrand's Disease (VWD)?
- (1) PT
  - (2) APTT
  - (3) BT
  - (4) Platelet Count
146. Total peripheral resistance is most affected by -
- (1) Cardiac contractility
  - (2) Pressure in Vena cava
  - (3) Arteriolar radius
  - (4) Pressure in Aorta



147. The electrocardiographic danger sign during incremental treadmill exercise testing include -
- (1) Heart rate equal to maximal predicted for person's age
  - (2) An R-R interval of about 500 milliseconds
  - (3) R waves amplitude of more than one millivolt
  - (4) Ventricular tachycardia
148. A 30-years-old lady complaining of fatigue consulted her physician; the investigations ordered revealed TRBC-4.5 million/ cubic mm; Hemoglobin-9 g/dL; PCV-42%; MCD-6.8 micrometer. What is her Mean Corpuscular Haemoglobin (MCH) (in pg.)?
- (1) 20
  - (2) 30
  - (3) 40
  - (4) 50
149. A 24-year-old male has been lacking production of testosterone since early childhood and has not been treated since then. He is likely to exhibit the following signs -
- (1) Be somewhat taller than average
  - (2) Have a deep voice
  - (3) Have abundant chest hair
  - (4) Have no pubic or axillary hair
150. Inhibitory cells of the olfactory bulb are known as -
- (1) Hair cells
  - (2) Granule cells
  - (3) Mitral cells
  - (4) Amacrine cells
151. A 45-year-old woman has a cerebrovascular accident that causes necrosis of posterior pituitary that would most likely result in -
- (1) Inability to lactate
  - (2) Hypothyroidism
  - (3) Hypoglycaemia
  - (4) Hypernatremia
152. In a patient with diarrhoea, the oral administration of a solution containing NaCl and glucose is more effective in preventing dehydration than is the administration of a solution containing only NaCl. The following cellular and molecular phenomenon best explains this observation -
- (1) Administration of NaCl and Glucose solution reduces stool output.
  - (2) Glucose is used as fuel to effect co-transport of Na and Cl across apical membrane of intestinal epithelial cells.
  - (3) The co-transport of Glucose and Na across apical membrane of intestinal epithelial cells facilitates Na and water absorption.
  - (4) The NaCl and Glucose solution empties from stomach at a faster rate than does a solution containing NaCl alone.

153. Major functions of cerebellar cortex are representative of and include -
- (1) Directly exciting alpha motor neurons
  - (2) Exciting deep cerebellar nuclei
  - (3) Generating motor patterns that subserve the scratch reflex
  - (4) Learning and controlling novel movement patterns
154. Thecal cells in the follicle are not able to produce which sex steroid -
- (1) Estradiol
  - (2) Testosterone
  - (3) Progesterone
  - (4) Dihydrotestosterone
155. What is the usual percentage of the cells in the marrow that belong to the white blood cell-producing myeloid series?
- (1) 25%
  - (2) 50%
  - (3) 75%
  - (4) 100%
156. Following changes can be observed in endocrine system of a 52-year-old woman, EXCEPT -
- (1) Decreased Estrogen and estradiol
  - (2) Moderate rise in female luteinizing hormone
  - (3) Decreased female follicular stimulating hormone
  - (4) Decreased glucose metabolism
157. A 28-year-old athlete is noted to have a baseline heart rate of 55 bpm, which his trainer attributes to excellent parasympathetic (vagal) tone. This parasympathetic effect, among other things, increases the ACh released in Sinoatrial (SA) and Atrioventricular (AV) nodes. ACh released into the AV node increases the following electrophysiological parameter in the atrioventricular (AV) fibers -
- (1) Action potential amplitude
  - (2) Conduction velocity
  - (3)  $K^+$  equilibrium potential
  - (4) Probability of conduction failure (AV block)
158. The phenomenon of menstruation has been termed as withdrawal bleeding because of an abysmal fall in blood levels of the following hormone -
- (1) Estradiol
  - (2) Follicle Stimulating Hormone (FSH)
  - (3) Progesterone
  - (4) Luteinizing Hormone (LH)

159. A 27-year-old woman presents with double vision (diplopia), muscle weakness inclusive of ptosis, slurred speech and difficulty swallowing and has been on management for gram negative infection with amikacin. A battery of investigations were ordered inclusive of thyroid function assay, serum creatine kinase levels, an electromyogram and muscle biopsy that gave observations within normal range. An edrophonium (tensilon) challenge test was ordered, observing all precautions to combat cholinergic crisis (with 2 mg atropine syringe prepared) and the patient showed dramatic improvement in clinical symptomatology. The deranged physiological profile represent most probable diagnosis in the present clinical scenario as -
- (1) Duchenne Muscular Dystrophy
  - (2) Toxic drug myopathy
  - (3) Myasthenia gravis
  - (4) Myoadenylate deaminase deficiency
160. After falling down from a staircase a young woman is found to have partial loss of voluntary movement on the right side of the body and loss of pain and temperature sensation on the left side below the mid-thoracic region. The probable site of lesion is -
- (1) Transection of right half of spinal cord in upper thoracic region
  - (2) Transection of left side of spinal cord in upper thoracic region
  - (3) Transection of sensory and motor pathways on right side of pons
  - (4) Transection of left half of the spinal cord in lumbar region
161. Which of the following is a better predictor of vagal tone?
- (1) Basal Heart Rate
  - (2) Ejection fraction
  - (3) Stroke volume
  - (4) Left Ventricular Ejection Time
162. A man-aged-20 is diagnosed for incomplete development of seminiferous tubules. Which of the following is required for its full development and functioning?
- (1) Somatostatin
  - (2) FSH and LH
  - (3) Androgen and FSH
  - (4) LH and androgen

163. All of the following contribute to the resting membrane potential, except -
- (1) The potassium diffusion potential
  - (2) Sodium diffusion through the membrane
  - (3) Chloride diffusion through the membrane
  - (4) The activity of the sodium-potassium pump
164. Local or regional anesthesia is used to block the conduction of action potentials in sensory and motor nerve fibers. Anesthesia causes a gradual increase in the threshold for electrical excitability of the nerve, a reduction in the rate of rise of the action potential and a slowing of axonal conduction velocity. Blockage of the conduction of action potentials usually occurs due to the -
- (1) blockade of  $K^+$  leak channels on the nerve cell membrane
  - (2) blockade of  $Na^+ - K^+$  pump on the nerve cell membrane
  - (3) blockade of voltage-gated  $Na^+$  channels on the nerve cell membrane
  - (4) blockade of voltage-gated  $Ca^{2+}$  channels on the nerve cell membrane
165. A patient with a bleeding duodenal ulcer arrives at emergency of hospital with a markedly low mean arterial pressure. Considering the history, the patient would most likely exhibit the following in addition to the low Mean Arterial Pressure (MAP) -
- (1) Decreased Heart Rate (HR)
  - (2) Decreased Myocardial Contractility
  - (3) Decreased Total Peripheral Resistance (TPR)
  - (4) Decreased Venous Pressure (VP)
166. A hypertensive male of 60 years age has been prescribed the diuretic Lasix (furosemide) to increase urinary output. Furosemide, a "high-ceiling diuretic", is a potent agent because it binds to and inhibits the following transport processes -
- (1) The  $Na^+$  - Glucose Co-transporter in Proximal Tubule
  - (2) The  $Na^+ - K^+$  exchange pump in all Nephron Segments
  - (3) The  $Na^+ - K^+ - Cl^-$  Co-transporter in Thick Ascending Limb
  - (4) The  $Na^+ - Cl^-$  Co-transporter in Distal Convoluted Tubule
167. Patients with cystic fibrosis have a defect in apical chloride channels in many epithelial cells. Such patients essentially have a major deficit in the following membrane physiological process -
- (1) Colonic sodium chloride and water absorption
  - (2) Ileal bile acid absorption
  - (3) Jejunal glucose absorption
  - (4) Small intestinal sodium chloride and water secretion

168. In a normal individual, liver is the main regulator of the plasma glucose concentration. When there is an increase in plasma glucose concentration, liver extracts glucose from blood and converts it into glycogen and, to a lesser extent, triglycerides. When plasma glucose concentration falls, the liver will begin to produce glucose and release it into blood to maintain its concentration. In an untreated patient of Type 1 Diabetes Mellitus (T1DM), liver fails to extract glucose and continues to produce glucose regardless of its plasma concentration and the most likely cellular and molecular mechanism contributing to the failure is -
- (1) Increased glucokinase activity
  - (2) Decreased phosphorylase activity
  - (3) Increased gluconeogenesis
  - (4) Diminished muscle protein catabolism
169. Insulin is the major hypoglycaemic endogenous neuroendocrine chemical that tends to maintain glucose homeostasis within the range permissible for human organ system. The cellular and molecular mechanism of action of insulin happens to be -
- (1) Activation of a tyrosine kinase
  - (2) Activation of adenylyl cyclase
  - (3) Increased glucagon secretion
  - (4) Increased gluconeogenesis
170. Following are the autonomic function test for assessing sympathetic functions, EXCEPT -
- (1) Cold pressure test
  - (2) BP response to standing
  - (3) 30:15 ratio
  - (4) Isometric hand grip test
171. A 61-year-old woman with pancytopenia, mild jaundice and peripheral neuropathy is found to have decreased serum levels of vitamin B12 and peripheral blood smear would characteristically document the following -
- (1) Hyper-segmented Polymorphoneutrophils (PMNs)
  - (2) Large granular lymphocytes
  - (3) Oval microcytes
  - (4) Pelger-Huet neutrophils

172. A 35-year-old woman experiences anterior pituitary hemorrhagic necrosis (Sheehan syndrome) after a postpartum haemorrhage. She feels light-headed, dizzy, and weak and the following hormone is most likely responsible for her symptoms complex -
- (1) Adrenocorticotropic Hormone (ACTH)
  - (2) Gonadotropin Releasing Hormone (GnRH)
  - (3) Prolactin
  - (4) Thyroid Stimulating Hormone (TSH)
173. A 5-year-old child has frequent ear infections with decreased immunoglobulins levels in plasma and is unresponsive to vaccination with tetanus toxoid, though the child has normal skin test reactivity (delayed redness and induration). The immune cell lineage that is not functioning normally is -
- (1) Macrophages
  - (2) Helper T cells
  - (3) Cytotoxic T cells
  - (4) B cells
174. The cell cycle phase that takes longest to complete is -
- (1) Anaphase
  - (2) Interphase
  - (3) Prophase
  - (4) Metaphase
175. Which hormone is largely unbound to plasma proteins?
- (1) Cortisol
  - (2) T<sub>4</sub>
  - (3) ADH
  - (4) Estradiol
176. A 36-year-old blind person came to the neurologist with complaint of tingling and numbness in his both arms. He was concerned about his increasing difficulty in reading his Braille books. Neurological examination revealed the loss/difficulty in two-point discrimination threshold. Which of the following pathway is most likely to be affected?
- (1) Dorsal column pathway
  - (2) Ventrolateral spinothalamic pathway
  - (3) Corticospinal pathway
  - (4) Spinoreticular pathway
177. Horner's syndrome consists of all the following, EXCEPT -
- (1) Ptosis
  - (2) Anhidrosis
  - (3) Flushing
  - (4) Anisocoria

178. During moderate exercise like jogging, which of the following show an increase?
- (1) Stroke volume
  - (2) Diastolic pressure
  - (3) Venous Compliance
  - (4) Pulmonary arterial resistance
179. Which of the following is a group of neurons in the pain suppression pathway that uses enkephalin as a neurotransmitter?
- (1) Postcentral gyrus
  - (2) Nucleus raphe magnus
  - (3) Periaqueductal gray area
  - (4) Type AB sensory fibers
180. A 23-year-old basketball player mentally rehearses free throw shots while lying in bed. The area of the brain that is involved in generating a motor image of this action in the absence of actual movement has been labelled as -
- (1) Basal ganglia
  - (2) Cerebellum
  - (3) Limbic system
  - (4) Premotor cortex

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# Space for Rough Work

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