

ENTRANCE EXAMINATION FOR ADMISSION, MAY 2012.

M.Sc. (MEDICAL PHYSIOLOGY)

COURSE CODE : 505

Register Number :

*Signature of the Invigilator
(with date)*

COURSE CODE : 505

Time : 2 Hours

Max : 400 Marks

Instructions to Candidates :

1. Write your Register Number within the box provided on the top of this page and fill in the page 1 of the answer sheet using pen.
2. Do not write your name anywhere in this booklet or answer sheet. Violation of this entails disqualification.
3. Read each of the question carefully and shade the relevant answer (A) or (B) or (C) or (D) in the relevant box of the ANSWER SHEET using HB pencil.
4. Avoid blind guessing. A wrong answer will fetch you -1 mark and the correct answer will fetch 4 marks.
5. Do not write anything in the question paper. Use the white sheets attached at the end for rough works.
6. Do not open the question paper until the start signal is given.
7. Do not attempt to answer after stop signal is given. Any such attempt will disqualify your candidature.
8. On stop signal, keep the question paper and the answer sheet on your table and wait for the invigilator to collect them.
9. Use of Calculators, Tables, etc. are prohibited.

1. Pinocytosis occurs
 - (A) for large protein molecule
 - (B) by formation of pinocytic vesicle
 - (C) at sites of membrane called coated pits
 - (D) all of the above

2. Phagocytosis
 - (A) is preceded by opsonization
 - (B) occurs mainly in leucocytes
 - (C) requires presence of Ca^{2+} ions in extracellular fluid
 - (D) all of the above

3. Human mitochondria

(A) contain DNA	(B) can replicate
(C) store energy	(D) all of the above

4. Na^+ - K^+ pump acts as electrogenic pump because
 - (A) its carrier possesses ATPase activity
 - (B) it pumps three Na^+ ions outward and two K^+ ions inward
 - (C) it is an active transport mechanism
 - (D) all of the above

5. Secondary active transport is different from the primary active transport in the following aspects
 - (A) it does not require energy
 - (B) its carrier does not possess ATPase activity
 - (C) it occurs only for glucose
 - (D) all of the above

6. Glucose is transported in tissue cells by

(A) Simple diffusion	(B) Primary active transport
(C) Facilitated diffusion	(D) None of the above

7. Competitive inhibition occurs between

(A) Glucose and galactose	(B) Glucose and amino acids
(C) Glucose and fatty acids	(D) Fatty acids and amino acids

8. Positive feedback mechanism
- (A) regulates level of a substance in the body fluids
 - (B) is useful in maintaining hormonal level in the blood
 - (C) can lead to vicious cycle
 - (D) all of the above
9. Gain of control system
- (A) determines its degree of effectiveness
 - (B) is less if error is more
 - (C) is equal to correction/error
 - (D) all of the above
10. Extracellular fluid
- (A) has a greater concentration of K^+ ions as compared to the intracellular fluid
 - (B) is 80% of total water
 - (C) has a lesser concentration of calcium ions than that in the intracellular fluid
 - (D) includes plasma of blood
11. Evaporation of 1 g of water causes approximate head loss of
- (A) 200 cal
 - (B) 10 cal
 - (C) 600 cal
 - (D) 1000 cal
12. Following mechanism is not under physiological control for regulating temperature
- (A) Sweating
 - (B) Vasodilation of skin vessels
 - (C) Insensible perspiration
 - (D) Shivering
13. When core temperature falls below the hypothalamic set point temperature there occurs
- (A) sweating
 - (B) decrease in BMR
 - (C) vasodilation of skin vessels
 - (D) vasoconstriction of skin vessels
14. Exposure to cold causes
- (A) vasoconstriction of skin vessels
 - (B) abolition of sweating
 - (C) increase in BMR
 - (D) all of the above
15. Shivering is initiated by stimulation of
- (A) Anterior hypothalamus
 - (B) posterior hypothalamus
 - (C) Paraventricular nucleus
 - (D) Preoptic area

16. If body temperature rises above the set point, following is stimulated
- (A) Posterior hypothalamus
 - (B) Anterior hypothalamus
 - (C) Median eminence of hypothalamus
 - (D) None of the above
17. Heat acclimatization in normal person occurs by
- (A) increase in renal blood flow
 - (B) reduced cortisol secretion
 - (C) reduction in excretion of sodium in urine
 - (D) reduction in plasma volume
18. Infection causes fever as pyrogens cause
- (A) increased heat production
 - (B) decreased heat loss
 - (C) pyrogens act on hypothalamic center
 - (D) none of the above
19. Following area of hypothalamus acts as a thermostal
- (A) Preoptic
 - (B) Paraventricular
 - (C) Supraoptic
 - (D) Ventromedial
20. In a person acclimatized to heat there is
- (A) increased secretion of epinephrine
 - (B) increased secretion of aldosterone
 - (C) increased secretion of thyroxine
 - (D) all of the above
21. Vitamin B₁₂ deficiency
- (A) results due to deficiency of intrinsic factor
 - (B) leads to demyelination of nerves
 - (C) leads to anemia with larger size RBCs
 - (D) all of the above
22. Daily loss of small quantity of blood will lead to
- (A) Megaloblastic anemia
 - (B) Iron-deficiency anemia
 - (C) Aplastic anemia
 - (D) Normoblastic anemia

23. Reticulocytes
(A) are stained by supra-vital staining (B) do not enter peripheral blood
(C) contain pyknotic nucleus (D) none of the above
24. Increase in reticulocytes in peripheral blood occurs in
(A) hypoxia
(B) high levels of erythropoietin
(C) after treating anemia with proper drug
(D) all of the above
25. Hemoglobin
(A) is a protein containing heme and iron
(B) is synthesized mainly from acetic acid and glycine
(C) synthesis of hemoglobin occurs mainly in mitochondria
(D) all of the above
26. Following statement is not true about hemoglobin
(A) Adult hemoglobin contains two gamma and two beta chains
(B) Fetal hemoglobin contains two alpha and two gamma chains
(C) Hemoglobin A contain two alpha and two beta chains
(D) Hemoglobin combines with carbon monoxide to form carboxyhemoglobin
27. Fetal hemoglobin
(A) contains two beta and two delta chains
(B) has O₂ dissociation curve shifted to right as compared to adult hemoglobin
(C) has greater affinity for O₂ than adult hemoglobin
(D) contains two beta and two alpha chains
28. Following is true about iron
(A) daily requirement is 5-10 g in males
(B) is better absorbed from GI tract when in ferric state
(C) is better absorbed from GI tract when amount of phosphate is high in food
(D) deficiency is common in India
29. Mean corpuscular volume (MCV)
(A) is 82-92 cubic microns
(B) is lesser than normal in B₁₂ deficiency anemia
(C) is greater in aplastic anemia
(D) remains normal in iron-deficiency anemia

30. MCHC
- (A) varies from 32% to 38% normally
 - (B) can never be above 38%
 - (C) is less in hypochromic anemia
 - (D) all of the above
31. Emptying wave of stomach
- (A) creates pressure of above 50-70 cm of water
 - (B) is a peristaltic wave
 - (C) begins at incisura angularis
 - (D) all of the above
32. Emptying of stomach
- (A) depends on intensity of mixing waves
 - (B) is inhibited by gastrin
 - (C) is stimulated by enterogastric reflex
 - (D) all of the above
33. Enterogastric reflex
- (A) is initiated on distension of stomach
 - (B) is initiated due to distension of duodenum
 - (C) increases rate of stomach emptying
 - (D) all of the above
34. Stomach emptying time
- (A) is reduced when amount of fat is more in food
 - (B) is reduced when volume of food in stomach is more
 - (C) is increased due to cholecystokinin
 - (D) is increased when chyme is fluid
35. Enterogastric reflex
- (A) occurs due to passage of impulses through myenteric plexus
 - (B) is initiated by the presence of protein digestion products in duodenum
 - (C) delays stomach emptying
 - (D) all of the above

36. Movements of stomach
- (A) are studied by passing a rubber tube with balloon and recording pressure changes in balloon
 - (B) are inhibited by gastrin
 - (C) are stimulated by presence of fat in duodenum
 - (D) all of the above
37. Vomiting
- (A) is projectile when not accompanied by nausea
 - (B) is caused due to increased intracranial pressure
 - (C) is caused when chemoreceptor trigger zone is activated
 - (D) all of the above
38. Main gastric glands are present in mucosa of
- (A) Fundus of stomach
 - (B) Pylorus of stomach
 - (C) Body and fundus of stomach
 - (D) Incisuraangularis
39. Main gastric glands
- (A) are present in pylorus
 - (B) contain only mucous cells
 - (C) contain mucous cells, chief cells, and oxyntic cells
 - (D) constitute 50% of gastric glands
40. Cardiac glands of stomach
- (A) secrete mainly mucus
 - (B) secrete acid
 - (C) secrete both mucus and acid
 - (D) secrete only pepsin
41. Proximal tubules
- (A) absorb 50% of filtered glucose
 - (B) absorb 65% of filtered sodium
 - (C) absorb amino acids by passive mechanism
 - (D) none of the above
42. Plasma clearance
- (A) is expressed as volume of plasma completely cleared off the substance per minute
 - (B) is expressed in ml/min
 - (C) of inulin gives GFR
 - (D) all of the above

43. Proximal convoluted tubules absorb
- (A) 65% of water
 - (B) 10% of water
 - (C) 20% of water
 - (D) water according to the needs of the body
44. In loop of Henle
- (A) descending limb is impermeable to water
 - (B) thick ascending limb is permeable to water
 - (C) thick ascending limb absorbs sodium actively
 - (D) descending limb actively absorbs sodium
45. Potassium
- (A) is absorbed in distal tubules
 - (B) secretion in distal nephron is modified by the levels of aldosterone
 - (C) is absorbed in distal convoluted tubules
 - (D) is secreted by proximal tubules
46. Water reabsorption
- (A) is obligatory type in proximal tubules
 - (B) in proximal tubules is controlled by hormone ADH
 - (C) in distal nephron is not under control of any hormone
 - (D) is called obligatory in distal nephron
47. Countercurrent multiplier mechanism
- (A) multiplies concentration of NaCl in descending limb of loop of Henle of juxtamedullary nephrons
 - (B) results into highest osmolarity at the tip of loop of Henle
 - (C) results because of active absorption of Na^+ and passive absorption of Cl^- in thick ascending limb of loop of Henle
 - (D) all of the above
48. Inulin
- (A) clearance is greater than PAH clearance
 - (B) is reabsorbed in distal nephron
 - (C) is filtered easily, but is neither secreted nor reabsorbed by renal tubules
 - (D) clearance gives rate of blood flow to kidney

49. Substance which is filtered easily at glomeruli, not secreted but reabsorbed to some degree in tubules will have
- (A) Plasma clearance equal to that of inulin
 - (B) Plasma clearance greater than GFR
 - (C) Plasma clearance lesser than GFR
 - (D) None of the above
50. Substance which is easily filtered by glomeruli and actively secreted by renal tubules is
- (A) Inulin
 - (B) Glucose
 - (C) Phosphate
 - (D) PAH
51. Volume of gas in the lungs at the end of a normal expiration is referred to as
- (A) Residual volume
 - (B) Functional residual capacity
 - (C) Inspiratory reserve volume
 - (D) Expiratory reserve volume
52. Residual volume of lung increases
- (A) in chronic obstructive lung disease
 - (B) in restrictive lung disease
 - (C) in fibrosis of lungs
 - (D) all of the above
53. A patient with obstructive lung disease has
- (A) increased FEV₁
 - (B) decreased FEV₁
 - (C) decreased residual volume
 - (D) none of the above
54. A patient with restrictive lung disease typically has
- (A) reduced vital capacity
 - (B) reduced lung compliance
 - (C) reduced residual volume
 - (D) all of the above
55. A timed vital capacity (FEV₁) is used to evaluate
- (A) flow resistance properties of the airways
 - (B) compliance properties of the lungs
 - (C) elastic properties of the lungs
 - (D) ventilation-perfusion ratio
56. Volume of gas in the lungs at the end of forceful expiration
- (A) is called as residual volume
 - (B) is increased in obstructive lung disease
 - (C) is responsible for allowing continuous gaseous exchange
 - (D) all of the above

57. Alveolar ventilation is equal to
 (A) Tidal volume \times the respiratory rate
 (B) Minute ventilation
 (C) Minute ventilation – dead space ventilation
 (D) 7 l/min in normal young adult
58. A reduction in local alveolar ventilation is associated with
 (A) increase in regional blood flow
 (B) decrease in regional PCO_2
 (C) decrease in regional PO_2
 (D) increase in regional tissue pH
59. Spirometry is not useful in measuring
 (A) Residual volume
 (B) Functional residual capacity
 (C) Total lung capacity
 (D) All of the above
60. Composition of alveolar air is different than that of inspired air because
 (A) Air is humidified as it passes through the airways
 (B) There is continuous gas exchange between air in alveoli and pulmonary capillary blood
 (C) Air in alveoli is only partially replaced with each breath
 (D) All of the above
61. Light adaptation
 (A) occurs due to breaking down of light-sensitive pigment in the receptors
 (B) takes very long time
 (C) mostly occurs due to adaptation in rods
 (D) increases the sensitivity of retina to light
62. Protanopia
 (A) is red blindness
 (B) is treated by cylindrical lens
 (C) is green blindness
 (D) is more common in females
63. Color weakness
 (A) is due to absence of color cones
 (B) is due to absence of rods
 (C) is denoted by suffix "anomaly"
 (D) none of the above

64. Rhodopsin
- (A) consists of scotopsin and 11-cis retinal
 - (B) concentration in rods decreases during dark adaptation
 - (C) is responsible for color vision
 - (D) concentration increases in rods on exposure to light
65. Negative after image
- (A) occurs due to dark and light adaptation
 - (B) remains on retina for 17h
 - (C) occurs only in darkness
 - (D) none of the above
66. Peak spectral sensitivity
- (A) for blue cones is 500 nm
 - (B) for red cones is 575 nm
 - (C) for green cones is 350 nm
 - (D) for rods is 600 nm
67. Optic tract
- (A) contains fibers from nasal half of ipsilateral retina and temporal half of opposite retina
 - (B) contains fibers from temporal half of ipsilateral retinal and nasal half of opposite retina
 - (C) damage causes heteronymous hemianopia
 - (D) damage leads to loss in peripheral fields of vision in both the eyes
68. Fovea
- (A) is represented bilaterally on the visual cortex
 - (B) has highest acuity of vision
 - (C) contains only cones
 - (D) all of the above
69. Damage to crossed fibers at optic chiasm causes
- (A) Bitemporal hemianopia
 - (B) Binasal hemianopia
 - (C) Homonymous hemianopia
 - (D) None of the above

70. Following statements are true about eye muscles, EXCEPT
- (A) Medial rectus muscle is supplied by abducent nerve
 - (B) Superior oblique is supplied by trochlear nerve
 - (C) Superior rectus causes elevation, adduction, and medial rotation of eye
 - (D) Inferior oblique muscle causes elevation, abduction, and lateral rotation
71. Acromegaly
- (A) occurs in children
 - (B) causes enlargement of membranous bones
 - (C) causes a person to become a giant
 - (D) causes reduction in blood glucose level
72. Dwarfism
- (A) occurs in adults
 - (B) leads to decreased mental and physical growth
 - (C) causes stunted physical growth
 - (D) leads to disproportional development of different parts of the body
73. Panhypopituitarism
- (A) is due to decreased secretion of all the hormones of anterior pituitary
 - (B) is only due to decreased growth hormone
 - (C) is due to decreased gonadotropins only
 - (D) none of the above
74. ADH
- (A) is secreted by magnocellular neurosecretory neurons of supraoptic nuclei of hypothalamus
 - (B) is a polypeptide containing 190 amino acids
 - (C) is due to decreased gonadotropins only
 - (D) none of the above
75. ADH
- (A) is released when plasmaosmolarity is decreased
 - (B) is a polypeptide containing 190 amino acids
 - (C) causes dilation of arterioles
 - (D) decrease in release causes diabetes insipidus

76. ADH increases water reabsorption in
- (A) proximal tubules
 - (B) collecting ducts
 - (C) descending limb of loop of Henle
 - (D) all of the above
77. Diabetes insipidus
- (A) occurs due to lack of ADH secretion
 - (B) causes excessive water absorption
 - (C) inhibits or suppresses thirst
 - (D) is due to lack of insulin
78. Oxytocin
- (A) causes secretion of milk from lactating mammary glands
 - (B) is released during labor when there is stretch on cervix
 - (C) is regulated by negative feedback mechanism during labor
 - (D) is a polypeptide containing 145 amino acids
79. About oxytocin following is true, EXCEPT
- (A) causes contraction of myoepithelial cells of lactating mammary glands
 - (B) level increases during labor by positive feedback mechanism
 - (C) level increases by emotional stress
 - (D) used for induction of labor
80. Oxytocin
- (A) is synthesized by cells of paraventricular nuclei of hypothalamus
 - (B) is stored in posterior pituitary
 - (C) contains nine amino acids
 - (D) all of the above
81. About male fetus all is true, EXCEPT
- (A) Testosterone is not secreted
 - (B) Testosterone is responsible for development of penis, scrotum, prostate gland
 - (C) Testosterone suppresses formation of female genital organ
 - (D) Testosterone is responsible for descent of testes

82. At puberty following effects occur due to testosterone, EXCEPT
- (A) cracking of voice
 - (B) increase in size of muscle mass
 - (C) decrease in BMR
 - (D) growth of hair over the pubis, along linea alba, on face, and on chest
83. Testosterone causes
- (A) increase in bone thickness
 - (B) increase in bone matrix due to protein anabolic effect
 - (C) epiphysis of long bones to unite with the shafts
 - (D) all of the above
84. Testosterone
- (A) causes salt and water retention
 - (B) has protein catabolic effect
 - (C) inhibits erythropoiesis
 - (D) none of the above
85. Testosterone secretion
- (A) is controlled by LH secretion
 - (B) has a negative feedback effect on secretion of LH
 - (C) has a negative feedback effect on release of gonadotropin releasing hormone
 - (D) all of the above
86. Chronaxie is minimum in
- (A) Large myelinated nerve fiber
 - (B) Skeletal muscle fiber
 - (C) Unmyelinated nerve fiber
 - (D) Cardiac muscle
87. Which of the following is true regarding myelination of nerve fibres?
- (A) Schwann cells do the function of myelination in the peripheral nerves
 - (B) Oligodendrites myelinated the nerves present within CNS
 - (C) If the nerve is cut and degenerates, it takes 1 year for myelination of the nerve
 - (D) All of the above
88. Which of the following statements is true?
- (A) Sensory tracts are myelinated after birth
 - (B) Myelination of motor tracts is complete when child starts walking
 - (C) Motor tracts are myelinated before birth
 - (D) None of the above

89. Director of propagation of action potential in the nerve fiber is determined by
(A) Type of nerve fiber (B) Rate of propagation
(C) Presence of synapse (D) None of the above
90. Channels present on the end plate membrane of muscle at neuromuscular junction
(A) allow sodium ions to pass inwards
(B) allow calcium ions also to pass inwards
(C) open by acetylcholine
(D) all of the above
91. Ventricular end systolic volume in normal adult is
(A) 50 ml (B) 110 ml
(C) 20 ml (D) None of the above
92. In cardiac cycle
(A) pressure in left ventricle rises from 7 to 80 mmHg during isovolumic contraction
(B) opening of AV valves produces first heart sound
(C) duration of atrial systole is 0.3 s
(D) contraction of atria is very essential for filling of ventricles
93. The closure of AV valves is initiated by
(A) Atrial contraction
(B) Backward flow of blood at the beginning of ventricular contraction
(C) Ventricular relaxation
(D) None of the above
94. Rate of ventricular filling
(A) is maximum during atrial systole
(B) is minimum during first third of diastole
(C) is maximum during first third of diastole
(D) is same throughout ventricular diastole
95. First heart sound differs from the second as
(A) it has higher frequency
(B) it has a lesser duration than the second sound
(C) it corresponds with the carotid pulse
(D) it caused by opening of AV valves

96. All of the following about receptors is true, EXCEPT
- (A) Merkel's disc receptors are important in causing localization of touch
 - (B) Hair-end organ receptors help in detecting the movement of object on the body surface
 - (C) Meissner's corpuscles are present in hairy part of skin
 - (D) Pacinian corpuscles adapt quickly
97. Meissner's corpuscles
- (A) are encapsulated receptors
 - (B) are abundant to finger tips
 - (C) can detect low-frequency vibration
 - (D) all of the above
98. Merkel's discs
- (A) are innervated by large single myelinated fiber
 - (B) are slowly adapting receptors
 - (C) help in localization of sensation
 - (D) all of the above
99. Dorsal column-medial lemniscal pathway
- (A) carries sense of temperature to the cortex
 - (B) carries sense of crude touch and pain to the cortex
 - (C) carries sensation of fine touch, vibration and proprioception
 - (D) does not help in detecting the movements of different parts
100. Dorsal column-medial lemniscal pathway
- (A) helps in tactile localization
 - (B) helps in detecting the positions of different parts
 - (C) helps in detecting the intensity of stimulus
 - (D) all of the above
-