

ENTRANCE EXAMINATION FOR ADMISSION, MAY 2011.

M.Sc. (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 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. Macula densa is located in
 - (A) Proximal convoluted tubule
 - (B) Distal convoluted tubule
 - (C) Thick ascending limb
 - (D) Afferent arteriole
2. Apart from Glucose, which of the following is completely reabsorbed from the proximal convoluted tubule?
 - (A) Water
 - (B) Sodium
 - (C) Chloride
 - (D) Amino acids
3. The two substances that can be used to determine filtration fraction are
 - (A) Inulin & para aminohippuric acid
 - (B) Phenol red & para aminohippuric acid
 - (C) Urea & diodrast
 - (D) Inulin & manitol
4. The osmolar concentration (mOsm/L) of the fluid in proximal convoluted tubule is about
 - (A) 25
 - (B) 300
 - (C) 900
 - (D) 1200
5. In extracellular fluid, the predominant osmotically active substance is
 - (A) Sodium
 - (B) Potassium
 - (C) Chloride
 - (D) Bicarbonate
6. One feels hotter on hot humid day because
 - (A) Of high ambient temperature
 - (B) Rate of sweating is high
 - (C) Heat loss by radiation decreases
 - (D) Rate of evaporation from body decreases
7. Growth hormone stimulates I increases the following EXCEPT
 - (A) Protein synthesis
 - (B) Blood glucose
 - (C) Free fatty acids
 - (D) B cells of pancreas
8. In adults, total thyroidectomy produces
 - (A) Dwarfism
 - (B) Mental retardation
 - (C) Poor resistance to cold
 - (D) Decrease in cholesterol

9. Insulin facilitates glucose uptake in
 - (A) Red blood cells
 - (B) Skeletal muscle
 - (C) Brain
 - (D) Renal tubules
10. Prostaglandin responsible for initiation of labour is
 - (A) PGF_{2a}
 - (B) PGE₁
 - (C) PGE₂
 - (D) PGE₃
11. Sertoli cells secrete the following EXCEPT
 - (A) Inhibin
 - (B) Somatomedin
 - (C) Androgen binding protein
 - (D) Mullerian inhibiting substance
12. Maximum production of hCG occurs during
 - (A) First trimester
 - (B) Second trimester
 - (C) Third trimester
 - (D) Parturition
13. The rate of discharge of SA node is decreased by all the following EXCEPT
 - (A) Thyroxine
 - (B) Acetylcholine
 - (C) Digitalis
 - (D) Hypothermia
14. The following are associated with vasodilatation of blood vessels
 - (A) Decrease in pO₂ and pH
 - (B) Increase in pO₂ and pH
 - (C) Decrease in pO₂ and increase in pH
 - (D) Decrease in osmolality & increase in pO₂
15. Movement of oxygen from alveoli to blood occurs by
 - (A) Passive diffusion
 - (B) Facilitated diffusion
 - (C) Active transport
 - (D) Secondary active transport
16. The following are synthetic sensations EXCEPT
 - (A) Stereognosis
 - (B) Itching
 - (C) Vibration
 - (D) Two point discrimination
17. The fluidity of a cell membrane depends on its
 - (A) Phospholipid-Glycolipid ratio
 - (B) Phospholipid-Glycoprotein ratio
 - (C) Phospholipid-Cholesterol ratio
 - (D) Phospholipid-Polysaccharide ratio

18. Which of the following is NOT a feature of osmosis?
- (A) Net flux of solvent through a semipermeable membrane from a solution of higher solute concentration to a solution of lower solute concentration
 - (B) Does not exhibit competitive inhibition
 - (C) Energy utilized for transport is not derived from the breakdown of ATP
 - (D) Can be prevented by applying pressure to the solution with higher solute concentration
19. Which of the following is the major factor for genesis of resting membrane potential?
- (A) Permeability of the membrane to Na^+
 - (B) Permeability of the membrane to K^+
 - (C) Permeability of the membrane to Cl^-
 - (D) $\text{Na}^+ - \text{K}^+$ ATPase
20. Erythrocyte sedimentation rate is decreased in all of the following conditions EXCEPT
- (A) Iron deficiency anemia
 - (B) Sickle cell anemia
 - (C) Polycythemia
 - (D) Hypofibrinogenemia
21. Which of the following is NOT true for graded (electrotonic) potentials?
- (A) Shows decremental conduction
 - (B) Can be summated
 - (C) Can not be hyperpolarizing
 - (D) Does not follow all-or-none law
22. Gastric acid secretion is increased by all of the following chemicals EXCEPT
- (A) Glucagon
 - (B) Gastrin
 - (C) Histamine
 - (D) Epinephrine
23. Which of the following is NOT true for cortisol?
- (A) Increases mitotic activity of lymphocyte precursors
 - (B) Stimulates apoptosis of eosinophil
 - (C) Causes mild erythrocytosis
 - (D) Causes mild thrombocytosis

24. The oocyte completes the second meiotic division
 - (A) During 8th week of pregnancy
 - (B) Just before ovulation
 - (C) During the bleeding phase
 - (D) Following penetration by the sperm
25. All of the following are renal vasodilators EXCEPT
 - (A) Histamine
 - (B) Dopamine
 - (C) Adenosine
 - (D) Atrial natriuretic factor
26. Which of the following is NOT true for isovolumetric contraction phase of cardiac cycle?
 - (A) Starts with closure of mitral valve
 - (B) Left ventricular pressure rises abruptly from 0 to 80 mm Hg
 - (C) Aortic blood flow increases
 - (D) First heart sound appears in phonocardiogram
27. The following cardiovascular responses are activated by decreased blood pressure EXCEPT
 - (A) Activation of vasomotor center
 - (B) Inhibition of nucleus tractus solitarius
 - (C) Increased discharge of 9th and 10th cranial nerve
 - (D) Increased myocardial contractility
28. The partial pressure of oxygen is less than 100 mm of Hg in
 - (A) Alveolar air
 - (B) Arterial blood
 - (C) Inspired air
 - (D) Expired air
29. Which of the following sensation does NOT travel in the dorsal column pathways?
 - (A) Temperature
 - (B) Tactile localization
 - (C) Proprioception
 - (D) Stereognosis
30. All of the following can produce muscle contraction EXCEPT
 - (A) Increased discharge of δ motor neurons
 - (B) Increased discharge of α motor neurons
 - (C) Increased discharge of Ia afferent fibers
 - (D) Increased discharge of Ib afferent fibers

31. Which of the following reflex is present in a decerebrate animal?
- (A) Hopping and placing reactions (B) Conditioned reflexes
(C) Antigravity reflexes (D) Righting reflexes
32. Sleep spindle and K-complex are seen in
- (A) Stage I of NREM sleep (B) Stage II of NREM sleep
(C) Stage IV of NREM sleep (D) REM sleep
33. Total body water as percentage of body weight in a male aged 30 years is about
- (A) 67% (B) 60%
(C) 52% (D) 45%
34. Type 2 helper cells assist in
- (A) Innate immunity (B) Cellular immunity
(C) Humoral immunity (D) Complement-mediated immunity
35. The length of the muscle at which maximal isometric active tension is generated, known as
- (A) Resting length (B) Initial length
(C) Maximal length (D) Minimal length
36. Pacemaker potential in nodal tissues of the heart is due to
- (A) Decreased K^+ conductance
(B) Increased K^+ conductance
(C) Opening of long-acting Ca^{++} channel
(D) Closure Transient Ca^{++} channel
37. PR interval in ECG represents
- (A) Atrial depolarization alone
(B) Atrial depolarization and conduction through AV node
(C) Ventricular depolarization alone
(D) Depolarization of bundle branches and ventricular depolarization
38. Partial pressure of O_2 of venous blood in normal condition is
- (A) 40 mm Hg (B) 46 mm Hg
(C) 60 mm Hg (D) 100 mm Hg

39. The sensation of fine touch from body parts is carried to the sensory cortex via
- | | |
|----------------------------------|----------------------------------|
| (A) Anterior spinothalamic tract | (B) Lateral spinothalamic tract |
| (C) Dorsal column pathway | (D) Dorsal spinocerebellar tract |
40. Visual acuity is maximum at
- | | |
|-----------------|---------------------|
| (A) Optic disc | (B) Limbus |
| (C) Nodal point | (D) Fovea centralis |
41. During menstrual cycle, secretion of LH is maximum
- | | |
|------------------------------------------|--------------------------------------|
| (A) In the middle of proliferative phase | (B) Just prior to ovulation |
| (C) In the middle of secretory phase | (D) Just prior to menstrual bleeding |
42. All of the following are functions of insulin EXCEPT
- | |
|---------------------------------------------|
| (A) Increased glucose entry into adipocytes |
| (B) Glycogen synthesis in skeletal muscle |
| (C) Increased plasma potassium level |
| (D) Increased protein synthesis in liver |
43. Surfactant in the lung is mainly synthesized by
- | | |
|--------------------------------|--------------------------|
| (A) Type I alveolar cells | (B) Type II pneumocytes |
| (C) Bronchial epithelial cells | (D) Alveolar macrophages |
44. Which of the following is NOT a component of limbic system
- | | |
|---------------------|---------------------|
| (A) Mamillary body | (B) Cingulate gyrus |
| (C) Globus pallidus | (D) Hippocampus |
45. Which of the following cells perceive the sensation of hearing?
- | |
|----------------------------------------|
| (A) Hair cells in organ of Corti |
| (B) Cells of tympanic membrane |
| (C) Cells of endolymphatic sac |
| (D) Hair cells in membranous labyrinth |
46. The normal reticulocyte count in adults is
- | | |
|------------|-----------|
| (A) 15-20% | (B) 5-10% |
| (C) 2-6% | (D) 0-1% |

47. Which of the following increases GFR?
- (A) Increase in plasma oncotic pressure
 - (B) Decrease in glomerular hydrostatic pressure
 - (C) Increase in glomerular hydrostatic pressure
 - (D) Standing posture
48. Most potent vasoconstrictor is
- (A) Angiotensin I
 - (B) Angiotensin II
 - (C) Aldosterone
 - (D) Renin
49. Most of the sodium is reabsorbed in
- (A) Proximal tubule
 - (B) Distal tubule
 - (C) Ascending limb
 - (D) Collecting duct
50. Pulmonary hypertension is produced by
- (A) Hypoxia
 - (B) Hypercapnia
 - (C) Acidosis
 - (D) Alkalosis
51. Medial geniculate body is concerned with
- (A) Touch
 - (B) Smell
 - (C) Vision
 - (D) Hearing
52. Heavy water is used for the estimation of
- (A) Plasma volume
 - (B) Extracellular fluid
 - (C) Intracellular fluid
 - (D) Total body water
53. Alveolar PO_2 is about
- (A) 40 mm Hg
 - (B) 97 mm Hg
 - (C) 105 mm Hg
 - (D) 125 mm Hg
54. Site of action of ADH is
- (A) Proximal convoluted tubule
 - (B) Ascending limb of Henle
 - (C) Descending limb of Henle
 - (D) Collecting duct
55. Somatostatin is produced by which cells of the pancreas?
- (A) Alpha
 - (B) Beta
 - (C) Delta
 - (D) Acinar

56. Calcitonin is produced by
(A) Kidney (B) Thyroid
(C) Parathyroid (D) Lungs
57. Satiety centre is located in
(A) Dorsomedial nucleus of hypothalamus
(B) Ventromedial nucleus of hypothalamus
(C) Lateral area of hypothalamus
(D) Posterior area of hypothalamus
58. Frequency of alpha waves of EEG is about
(A) 5 cycles / sec (B) 10 cycles / sec
(C) 25 cycles / sec (D) 8-13 cycles / min
59. Vagal stimulation causes the following EXCEPT
(A) Bronchoconstriction (B) Bronchodilatation
(C) Gastric contraction (D) Intestinal secretion
60. Enzyme rich pancreatic secretion is produced by
(A) Secretin (B) Cholecystokinin
(C) Substance P (D) Decreased pH in duodenum
61. Highest concentration of vitamin C is found in
(A) Liver (B) Spleen
(C) Kidney (D) Adrenal
62. Which of the following decreases with advancing age?
(A) Residual volume (B) Functional residual capacity
(C) Alveolar-arterial gradient (D) Maximum voluntary ventilation
63. P-R interval represents
(A) Time taken for depolarization of the ventricle
(B) Time taken for depolarization of atria
(C) Time taken for repolarization of the ventricle
(D) Time taken for the depolarization wave to travel from atria to the IV septum

64. All statements are TRUE about glucagons EXCEPT
- (A) Hormone of feasting
 - (B) Has a direct negative feedback with insulin
 - (C) Increase in glucagon decreases blood aminoacids
 - (D) Increase in aminoacids in blood increases glucagons
65. The protein synaptobrevin is present in the
- (A) Cytoplasm
 - (B) Postsynaptic membrane
 - (C) Presynaptic membrane
 - (D) Vesicle membrane
66. Vasopressin secretion is decreased by
- (A) Pain
 - (B) Alcohol
 - (C) Clofibrate
 - (D) Carbamazepine
67. Hypoxia induces vasoconstriction in
- (A) Cerebral arteries
 - (B) Coronary arteries
 - (C) Pulmonary arteries
 - (D) Systemic arteries
68. Which of the following is least absorbed (in percentage) by the renal tubules?
- (A) HCO_3^-
 - (B) Urea
 - (C) Uric acid
 - (D) Glucose
69. Which one causes effective inhibition of gastric emptying?
- (A) Alcohol
 - (B) Fatty meal
 - (C) Proteinmeal
 - (D) Carbohydrate meal
70. Disruption of pancreatic tissue in acute pancreatitis is due to activation of in pancreatic ducts
- (A) Phospholipase A2
 - (B) Carboxypeptidase B
 - (C) Pancreatic lipase
 - (D) Cholesterol ester hydroxylase
71. Pain sensation of phantom limb is due to
- (A) Psychological cause
 - (B) Law of projection
 - (C) Bell-Megendie law
 - (D) Weber-Fechner law

72. Development of carpopedal spasm in individuals with voluntary hyperventilation is due to
- | | |
|-----------------------------------------------|-----------------------------------------------|
| (A) Respiratory alkalosis | (B) Respiratory acidosis |
| (C) Decrease in total plasma Ca^{2+} | (D) Increase in total plasma Ca^{2+} |
73. Nitrogen narcosis in deep divers can be avoided by breathing a mixture of
- | | |
|------------------------------|-------------------------|
| (A) Oxygen and helium | (B) Oxygen and nitrogen |
| (C) Oxygen and carbondioxide | (D) Oxygen and argon |
74. Clot retraction is mainly the function of
- | | |
|--------------------------------|----------------------|
| (A) Vascular endothelial cells | (B) Red cells |
| (C) Platelets | (D) Clotting factors |
75. Thyroid hormones increase cardiac output by all of the following mechanisms EXCEPT
- | | |
|---------------------------|-----------------------------------------|
| (A) Producing tachycardia | (B) Increasing myocardial contractility |
| (C) Decreasing afterload | (D) Increasing venous return |
76. Progesterone causes
- | | |
|-----------------------------------|---------------------------|
| (A) Myometrial quiescence | (B) Myometrial activation |
| (C) Oxytocin receptor stimulation | (D) Cervical ripening |
77. In which of the following the amount of oxygen delivered to the tissues is adequate?
- | | |
|----------------------|------------------------|
| (A) Hypoxic hypoxia | (B) Anemic hypoxia |
| (C) Ischemic hypoxia | (D) Histotoxic hypoxia |
78. Removal of hippocampal structures is associated with
- | |
|------------------------------------------------------------------|
| (A) Impairment of non declarative memory |
| (B) Impairment of spinal reflex |
| (C) Inability to transform short term memory to long term memory |
| (D) Kluver-Bucy syndrome |
79. The principal steroid secreted by the fetal adrenal cortex is
- | | |
|-----------------------------|------------------|
| (A) Dehydro epiandrosterone | (B) Progesterone |
| (C) Corticosterone | (D) Pregnenolone |

80. Mature red blood cells are distinguished from most body cells by their
- (A) Reliance on anaerobic glycolysis
 - (B) Sphericity
 - (C) Lack of plasticity
 - (D) High permeability to plasmacations
81. Red Frost Model is a mathematical model of
- (A) Infectious disease transmission and herd immunity
 - (B) Health insurance and community premium
 - (C) Infant mortality rate and life expectancy
 - (D) Consanguinity and congenital abnormalities
82. Allocation concealment is related to
- (A) Cross sectional surveys
 - (B) Case control studies
 - (C) Prospective studies
 - (D) Randomized controlled trials
83. Berkson's Bias is a form of
- (A) Selection Bias
 - (B) Observer Bias
 - (C) Classification Bias
 - (D) Recall Bias
84. Data cleaning is usually done
- (A) At every data entry
 - (B) Before Master Chart preparation
 - (C) After Master Chart preparation
 - (D) If analysis points to outliers
85. One of the following is NOT an effect measure
- (A) Attributable fractions
 - (B) Risk differences
 - (C) Rate ratios
 - (D) Exposure association
86. The distribution used to describe the occurrence of rare events in a large population is
- (A) Log normal distribution
 - (B) Skewed distribution
 - (C) Geometric distribution
 - (D) Poisson distribution
87. Control group is used in experiments to reduce the impact of
- (A) Randomization
 - (B) Methodological flaws
 - (C) Small sample size
 - (D) Extraneous variables

88. Which one is a measure of variation?
- (A) Median (B) Mode
(C) Mean (D) Standard Deviation
89. What does 'P' in "P value" mean?
- (A) Proportionate (B) Probability
(C) Percentile (D) Predetermined
90. Random allocation refers to assigning animals to different
- (A) Groups alternatively (B) Treatments randomly
(C) Cages randomly (D) Experiments hapazardly
91. Power of a study is calculated from
- (A) Level of significance (B) Type 2 error
(C) Confidence interval (D) Type 1 error
92. Frequency polygon is obtained by joining the mid-points of
- (A) Pie chart (B) Simple bar chart
(C) Multiple bar chart (D) Histogram
93. The following statements are true of null hypothesis EXCEPT
- (A) It states that the relationship predicted in the experimental hypothesis does not exist
(B) The results obtained are not due to consistent relationship between two variables
(C) The experimenter has to support this hypothesis to prove his prediction
(D) The null hypothesis is different from experimental hypothesis
94. All of the following conditions should be met before applying 't' test EXCEPT
- (A) The data should follow normal distribution
(B) Populations should have equal SD
(C) Samples must be chosen randomly
(D) The data must be nominal type

95. Incidental sampling technique
- (A) Is the same as random sampling
 - (B) Is difficult to do
 - (C) Easily accessible subjects are not selected
 - (D) Mayor may not be representative of the population
96. Which of the following is NOT a principle of medical ethics?
- (A) Ambiguity
 - (B) Beneficence
 - (C) Non malfeasance
 - (D) Justice and equality
97. In a single blind study of a drug
- (A) The examiner does not know the treatment allocation
 - (B) The participant does not know the treatment allocation
 - (C) The principal investigator does not know the treatment allocation
 - (D) The funding agency does not know the treatment allocation
98. Which of the following is true regarding a case-control study?
- (A) A group of study subjects are followed up after recruiting
 - (B) Confounding factors can be controlled and there is no chance for bias
 - (C) Usually retrospective
 - (D) Very expensive and time consuming
99. How many genes constitute the human genome?
- (A) More than 1 million
 - (B) 4 Mb
 - (C) About 30,000
 - (D) 23 pairs
100. A discrete collection of gene fragments on a stamp-sized chip is called
- (A) Reference sequence
 - (B) SNP profile
 - (C) Gene micro array
 - (D) Semiconductor
-