

ENTRANCE EXAMINATION FOR ADMISSION, MAY 2013.

Ph.D. (CARDIOVASCULAR BIOLOGY)

COURSE CODE : 163

Register Number :

Signature of the Invigilator
(with date)

COURSE CODE : 163

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. Blood volume
 - (A) Is measured by using RBCs labeled with radioactive chromium (^{51}Cr)
 - (B) Varies from 5 to 5.51 in adult person
 - (C) Is regulated by capillary fluid shift mechanism
 - (D) All of the above
2. Edema
 - (A) Is caused when plasma protein level increases
 - (B) Is collection of excess fluid in tissues
 - (C) Occurs when permeability of capillaries is less
 - (D) All of the above
3. Volume of lymph returning back to circulation is
 - (A) 20 ml/min
 - (B) 120ml/h
 - (C) 2 ml/min
 - (D) 500 ml/h
4. Lymph flow is determined by
 - (A) Interstitial fluid pressure
 - (B) External compression of lymphatics
 - (C) Functional activity of the tissue
 - (D) All of the above
5. Factor causing increase in outward flow of fluid from capillaries is
 - (A) Increase in colloid osmotic pressure of blood
 - (B) Increase in hydrostatic pressure of blood in capillaries
 - (C) Decrease in colloid osmotic pressure of interstitial fluid
 - (D) Decrease in hydrostatic pressure of blood in capillaries
6. Following is true about lymphatic system, EXCEPT
 - (A) Lymphatic vessels absorb fat from GI tract
 - (B) Lymph nodes act as filters
 - (C) Lymph returns proteins, water, and electrolytes back to circulation
 - (D) 20 ml/h of lymph flows back to circulation
7. Erythropoiesis
 - (A) Is a process of formation of RBCs
 - (B) Is stimulated when person is exposed to hypoxia
 - (C) Is regulated by erythropoietin
 - (D) All of the above

8. In erythropoiesis
- (A) Size of the cells increases in subsequent stages
 - (B) Hemoglobin appears at early normoblast stage
 - (C) Mitosis occurs in late normoblast at the fastest rate
 - (D) Folic acid is useful as a maturation factor
9. Site of erythropoiesis
- (A) Is liver and spleen in early embryonic life
 - (B) Is bone marrow after 20th week of intrauterine life
 - (C) Is confined to axial skeleton and proximal ends of femur and humerus in adults
 - (D) All of the above
10. Iron-deficiency anemia is characterized by
- (A) Large pale red blood cells
 - (B) Increased MCH
 - (C) Decrease in MCV
 - (D) None of the above
11. When the body temperature is higher than normal, following mechanisms are initiated, EXCEPT
- (A) Vasoconstriction of skin vessels
 - (B) Sweating
 - (C) Seeking cooler surrounding
 - (D) Decreased appetite
12. When the body temperature is below normal, following mechanisms set in
- (A) Sweating
 - (B) Vasoconstriction of skin vessels
 - (C) Tendency to seek cooler surrounding
 - (D) All of the above
13. Stimulation of peripheral thermoreceptors
- (A) Can change set point of hypothalamus
 - (B) Is responsible for behavioral response
 - (C) Causes local reflexes causing effects like vasodilation, sweating, etc.
 - (D) All of the above
14. Acclimatization of sweating mechanism
- (A) Increases loss of NaCl in sweat
 - (B) Occurs due to decreased aldosterone secretion
 - (C) Increase rate of sweating
 - (D) Occurs on chronic exposure to hot weather

15. Human being is
- (A) Homeothermic (B) Poikilothermic
(C) Cold blooded (D) None of the above
16. Conversion from degree "C" to degree "F"
- (A) Multiply by (5/9) and add 32 (B) Multiply by (9/5) and add 32
(C) Add 32 and multiply by (9/5) (D) None of the above
17. Oral temperature
- (A) Is an accurate index of core temperature of the body
(B) Remains fairly constant under different conditions
(C) Is 0.5-1°C lesser than rectal temperature
(D) All of the above
18. Site of recording core temperature is
- (A) Axilla (B) Mouth
(C) Rectum (D) All of the above
19. Core temperature of the body
- (A) Changes least with changes in environmental temperature
(B) Is the one to which hypothalamic thermostat is sensitive
(C) Is normally 37°C
(D) All of the above
20. Thermogenesis occurs by all of the following, EXCEPT
- (A) Contraction of skeletal muscles (B) Assimilation of food
(C) Shivering (D) Vasoconstriction of skin vessels
21. Pulmonary eosinophilia is seen in the following parasitic infections except:
- (A) Babesiosis (B) Hook worm infection
(C) Strongyloidiasis (D) Visceral larva migrans
22. A child from Bihar comes with fever, Blood examination shows sheathed microfilaria with nuclei upto tail tip. The diagnosis is:
- (A) B.malayi (B) W.bancrofti
(C) Loa loa (D) Oncocerca volvulus

23. Autoinfection is a mode of transmission in:
- (A) *Trichinella* (B) *Cycticercosis*
 (C) *Ancylostoma* (D) *Ascaris*
24. Pigs are reservoir for:
- (A) *T.Solium* (B) *T.Saginata*
 (C) *Trichinella spiralis* (D) *Ancyclostoma*
25. Prokaryotes are characterized by:
- (A) Absence of nuclear membrane
 (B) Presence of microvillie on its surface
 (C) Presence of smooth endoplasmic reticulum
 (D) All of the above
26. Which of the following immunoglobulins can crosses placenta:
- (A) IgA (B) IgM (C) IgG (D) IgD
27. Type of graft, best suited for renal transplantation
- (A) Allograft (B) Autograft
 (C) Xenograft (D) Isograft
28. True statement regarding non-coagulase staphylococci is:
- (A) They are non-pathogenic
 (B) They commonly infect indwelling prosthesis
 (C) They may cause scarlet fever
 (D) They are seperated by gram staining
29. True statement regarding Pneumococcus is:
- (A) Virulence is due to polysaccharide capsule
 (B) Capsule is protein in nature
 (C) Antibodies against capsule are not protective
 (D) Resistance to antibodies has not yet been reported
30. True statement about diphtheria toxin is:
- (A) Phage toxin is mediated
 (B) Toxin is required for local infection
 (C) Endotoxaemia causes systemic manifestation
 (D) Toxin Acts by inhibiting synthesis of capsule

31. In a patient of orbital cellulitis, micro organism on culture show greenish colonies and optochin sensitivity. The most likely organism is:
- (A) Strep. Viridans (B) Staphylococcus
(C) Pseudomonos (D) Pneumococcus
32. True regarding pseudomembranous colitis are all except:
- (A) It is caused by clostridium difficile
(B) The organism is a normal commensal of gut
(C) It is due to production of phospholipase A
(D) It is treated by vancomycin
33. E.coli gets attached to a surface with the help of:
- (A) Fucose (B) Concavatin
(C) Phytohaemagglutinin (D) Lactin
34. Chlamydia does not cause:
- (A) Q-fever (B) Non gonococcal urethritis
(C) Trachoma (D) Salpingitis
35. Which is true about arboviral disease:
- (A) Yellow fever is endemic in India
(B) Dengue virus have only one serotype
(C) KFD is transmitted by ticks
(D) Japanese encephalitis is transmitted by Action
36. Rotavirus infection is diagnosed by the presence of
- (A) Antigen in stool by ELISA (B) Virus in stool
(C) Antigen in blood (D) Antibody in stool
37. A patient with sore throat has a positive Paul Bunnell test the causative organism is:
- (A) EBV (B) Herpes virus
(C) Adeno virus (D) Cytomegalovirus
38. A patient presents with diarrhoea. Analysis of stool on wet mount shows mobile protozoa without RBCs and pus cells. The diagnosis is:
- (A) Balantidium coli (B) Giardiasis
(C) Trichomonas homirtis (D) Entamoeba histolytica

39. Latex agglutination study of the antigen in CSF helps in the diagnosis of:
- (A) Cryptococcus (B) Candidiasis
(C) Aspergillosis (D) Histoplasmosis
40. A company executive, who travels world-wide, presents with upper abdominal mass and +ve casoni's test. The organism is:
- (A) Echinococcus (B) Entamoeba histolytica
(C) Hepatitis (D) Ascariasis
41. Sutures present between various bones of skull are
- (A) Cartilaginous joints (B) Synovial joints
(C) Fibrous joints (D) Hinge joints
42. An acromian process is characteristically found in the
- (A) Pelvic girdle of mammals (B) Skull of frog
(C) Pectoral girdle of mammals (D) Sperm of mammals
43. Which type of cartilage is the precursor to endochondrial bone?
- (A) Costal (B) Hyaline
(C) Fibroelastic (D) Articular
44. Which suture extends from the anterior fontanel to the anterolateral fontanel?
- (A) Coronal suture (B) Lambdoidal suture
(C) Squamous suture (D) Longitudinal suture
45. Cartilaginous joints
- (A) Permit slight movements (B) Are found in symphysis
(C) Are found in the bodies of vertebrae (D) All of the above
46. Hinge joints
- (A) Are synovial joints (B) Permit movement in one direction
(C) Are found in knee (D) All of the above
47. Which of the following is not the part of os coxae?
- (A) Acetabulum (B) Ischium
(C) Pubis (D) Capitulum
48. Which of the following is not a function of the skeletal system?
- (A) Production of blood cells (B) Storage of carbohydrates
(C) Storage of minerals (D) Protection of vital organs

49. Mitosis resulting in elongation of bone occurs at the
- (A) Articular cartilage (B) Peristeum
(C) Epiphyseal plate (D) Dipole
50. Which one of the following pairs is correctly matched?
- (A) Cartilaginous joint-skull bones
(B) Hinge joint-between vertebrae
(C) Fibrous joint-between phalanges
(D) Gliding joint-between zygapophyses of the successive vertebrae
51. The mastoid process is a structural prominence of
- (A) Sphenoid bone (B) Parietal bone
(C) Occipital bone (D) Temporal bone
52. An example of a gliding joint is
- (A) Intercarpal joint (B) Radiocarpal joint
(C) Intervertebral joint (D) Phalangeal joint
53. The mandibular fossa is a feature of which part of the temporal bone?
- (A) Squamous part (B) Petrous part
(C) Tympanic part (D) Articular part
54. The superior and middle conchae are bony structures of which bone?
- (A) Palatine bone (B) Nasal bone
(C) Ethmoid bone (D) Maxilla
55. A cricket player is fast chasing a ball in the field. Which one of the following groups of bones are directly contributing in this movement?
- (A) Femur, malleus, tibia, metatarsals (B) Pelvis, ulna, patella, tarsals
(C) Sternum, femur, tibia, fibula (D) Tarsals, femur, metatarsals, tibia
56. Which of the following bones does not contain a paranasal sinus?
- (A) Frontal bone (B) Ethmoid bone
(C) Vomer (D) Sphenoid bone

57. Teeth are supported by
 (A) Maxillae and mandible
 (B) Mandible and palatine bones
 (C) Maxillae and palatine bones
 (D) Maxillae, mandible and palatine bones
58. The number of tarsals per limb of human beings is
 (A) 5 (B) 6 (C) 7 (D) 8
59. The only movable bone in the skull is
 (A) Maxilla (B) Frontoparietal
 (C) Mandible (D) Nasal
60. Elbow joint is
 (A) Ball and socket joint (B) Hinge joint
 (C) Suture joint (D) Gliding joint
61. Process of digestion
 (A) Is a process of hydrolysis
 (B) Converts insoluble large molecules into simple soluble molecules
 (C) Converts food into absorbable form
 (D) All of the above
62. Total length of gastrointestinal tract in adults is
 (A) 15 m (B) 15 feet (C) 4 feet (D) 30 m
63. Mastication
 (A) Though voluntary, is coordinated by chewing reflex
 (B) Causes grinding of food
 (C) Is a stretch reflex initiated by the presence of bolus in the mouth
 (D) All of the above
64. Incisors
 (A) Help in grinding the food (B) Are two in number
 (C) Are four in number in children (D) Help in cutting of food
65. GI tract muscle wall
 (A) Is formed of multiunit type of smooth muscle
 (B) Contracts on sympathetic stimulation
 (C) Relaxes on parasympathetic stimulation
 (D) None of the above

66. Following is true about salivary glands
- (A) Parotid glands mainly cause mucoid secretion
 - (B) Submandibular glands cause serous salivary secretion with high ptyalin content
 - (C) Parasympathetic supply to parotid glands arises
 - (D) Sympathetic stimulation causes large amount of serous secretion from submandibular glands
67. Sympathetic stimulation of salivary glands
- (A) Causes secretion of watery saliva
 - (B) Causes secretion of saliva, which is rich in ptyalin
 - (C) Causes vasoconstriction
 - (D) None of the above
68. Cephalic phase of salivary secretion
- (A) Is unconditioned reflex
 - (B) Occurs by presence of food in mouth
 - (C) Occurs on sight and smell of food
 - (D) All of the above
69. Which of the following statements regarding function of saliva is false?
- (A) Saliva helps in swallowing
 - (B) Ptyalin of saliva digests boiled starch up to a stage of glucose
 - (C) Saliva excretes thiocyanate ions
 - (D) Saliva reduces risks of buccal infections
70. Oral phase of salivary secretion
- (A) Occurs when food is present in mouth
 - (B) Is not controlled by nerves
 - (C) Is a conditioned reflex
 - (D) All of the above
71. Total blood volume in 70 kg man
- (A) Volume tends to rise when fluid is lost
 - (B) Is 7% of body weight
 - (C) Does not vary with surface area
 - (D) Is 7-8L
72. Specific gravity of
- (A) Red blood cells is lesser than that of plasma
 - (B) Plasma is related to its protein content
 - (C) Blood is 1010
 - (D) Plasma is related to its electrolyte content

73. Viscosity of blood
- (A) Rises when plasma protein concentration rises
 - (B) Is more when measured *in vivo* than *in vitro*
 - (C) Increases in severe anemia
 - (D) None of the above
74. Hematocrit
- (A) Is determined by Wintrobe's method
 - (B) Is 55%
 - (C) Measured by Wintrobe's method is same as true hematocrit
 - (D) Of arterial blood is higher than that of venous blood
75. Specific gravity
- (A) Of RBC's is 1000
 - (B) Of plasma is 1030
 - (C) Of plasma is 1090
 - (D) None of above
76. Albumin
- (A) Is mainly responsible for colloid osmotic pressure
 - (B) Has a lesser concentration in plasma than globulin
 - (C) Is synthesized in lymph nodes
 - (D) None of the above
77. Fibrinogen level of blood is
- (A) 500-600 mg/100ml
 - (B) 10-20 mg/100ml
 - (C) 150-300 mg/100ml
 - (D) 1000-2000 mg/100ml
78. Viscosity of blood depends on
- (A) Amount of plasma proteins
 - (B) Number of cells in blood
 - (C) Temperature
 - (D) All of the above
79. Total body water is determined by using
- (A) Radio isotope of sodium
 - (B) Deuterated water (D₂O)
 - (C) ¹²⁵I-labeled albumin
 - (D) None of the above
80. Plasma volume
- (A) Is 55%
 - (B) Is measured by using ¹³¹I-labeled albumin
 - (C) Is 3 l
 - (D) All of the above

81. Heat loss mechanisms are initiated by
- (A) Posterior hypothalamus
 - (B) Preoptic area of hypothalamus
 - (C) Thalamus
 - (D) Mamillary bodies
82. Homeothermic animal is the one
- (A) In whom temperature of the body changes with change in the atmospheric temperature
 - (B) In whom temperature of the body is maintained within narrow limits
 - (C) In whom heat loss is greater than the heat gain
 - (D) In whom heat gain is greater than heat loss
83. BMR
- (A) Increased in cold season
 - (B) Increases on reducing the levels of T_3 , T_4
 - (C) Is more in females than in males of same age
 - (D) All of the above
84. Mechanism of heat loss when the surrounding temperature is higher than the body temperature is
- (A) Radiation
 - (B) Conduction
 - (C) Convection
 - (D) Evaporation
85. Blood supply to the skin
- (A) Has arteriovenous anastomoses in the exposed areas of the body
 - (B) Can change from 2% of cardiac output to 30% of cardiac output
 - (C) Is under control of hypothalamus
 - (D) All of the above
86. Subcutaneous fat
- (A) Is heat insulator
 - (B) Is helpful in maintaining core temperature
 - (C) Conducts heat less readily
 - (D) All of the above

87. Radiation
- (A) Causes heat loss in the form of electromagnetic waves
 - (B) Causes heat loss from the body of high temperature to the body of low temperature
 - (C) Loss depends on temperature difference between surface of the skin and environment
 - (D) All of the above
88. Convection
- (A) Aids conductive heat loss
 - (B) Is increased when hypothalamus is stimulated
 - (C) Is increased when fans are off
 - (D) None of the above
89. Following are behavioral responses for altering heat loss, EXCEPT
- (A) Curling up in bed
 - (B) Use of woolen clothes
 - (C) Seeking warmer or colder surroundings
 - (D) Sweating
90. Hypothalamic thermostat is the set point at
- (A) 37°C (B) 38°C (C) 90°C (D) 39°C
91. Simple diffusion
- (A) Is a downhill process where no energy is required
 - (B) Possesses maximum rate beyond which the rate cannot be increased
 - (C) Requires energy
 - (D) None of the above
92. Na⁺-K⁺ pump
- (A) Is an example of secondary active transport
 - (B) Does not require energy
 - (C) Pumps two Na⁺ ions outward and three K⁺ ions inward with each cycle
 - (D) Is an example of primary active transport mechanism

93. Simple diffusion through lipid bilayer of cell membrane involves
- (A) Water-soluble substances (B) Lipid-soluble substances
(C) Glucose (D) Amino acids
94. Facilitated diffusion
- (A) Required energy
(B) Is an uphill process
(C) Occurs with the help of a protein carrier and does not require energy
(D) None of the above
95. Gibbs-Donnan effect state that the presence of non-diffusible ions on one side of semipermeable membrane
- (A) Causes unequal distribution of diffusible ions across the membrane
(B) Is responsible for the development of transmembrane potential
(C) Causes solutions of both the compartments to be electrically neutral at equilibrium
(D) All of the above
96. Water molecules pass through
- (A) Pores of cell membrane (B) Lipid bilayer
(C) Both of the above (D) None of the above
97. Rate of diffusion through cell membrane is directly proportional to
- (A) Concentration gradient (B) Molecular weight
(C) Supply of energy (D) Thickness of membrane
98. Function of endoplasmic reticulum of cell is
- (A) To produce energy (B) Store granules
(C) Synthesis of proteins (D) None of the above
99. Total number of chromosomes in somatic cells is
- (A) 48 (B) 46 (C) 22 (D) 26
100. In the following types of cell division, the number of chromosomes is halved
- (A) Mitosis (B) Meiosis
(C) Division of neuron (D) None of the above