

C 41696

(Pages : 16)

Name.....

Reg. No.....

**P.G./INTEGRATED P.G. ENTRANCE EXAMINATION, APRIL 2023**

**HUMAN PHYSIOLOGY**

Time : Two Hours

Maximum : 400 Marks

*Each question carries 4 marks.*

*1 mark will be deducted for each wrong answer.*

**Section A**

1. Normal platelets count is :
  - (a) 4,000 – 11,000/ cumm.
  - (b) 1,50,000 – 4,00,000/cum.
  - (c) 1 – 2 million.
  - (d) More than 2 million.
2. The hematocrit of 45 % means :
  - (a) 45 % haemoglobin is in the plasma.
  - (b) 45 % of the total blood volume is made up of blood plasma.
  - (c) 45 % of the total blood volume is made up of formed elements.
  - (d) 45 % of the haemoglobin is in red blood cells.
3. The most typical site of erythropoiesis in adults is :
  - (a) Liver.
  - (b) Spleen.
  - (c) Bone marrow.
  - (d) Gut.
4. Which of the following is correct about the breakdown of haemoglobin ?
  - (a) Hemoglobin - Haem - Bilirubin - Biliverdin.
  - (b) Haem- Hemoglobin - Biliverdin - Bilirubin.
  - (c) Hemoglobin- Haem- Biliverdin-Bilirubin.
  - (d) None of the above.

**Turn over**

5. Which has the greatest renal clearance ?
- (a) PAH. (b) Glucose.  
(c) Urea. (d) Inulin.
6. Which of the following concerning average lung volumes and capacities of a person at rest is TRUE ?
- (a)  $TLC > VC > TV > FRC$ . (b)  $TLC > FRC > VC > TV$ .  
(c)  $TLC > VC > FRC > TV$ . (d)  $TLC > FRC > TV > VC$ .
7. In which phase of the cardiac cycle ventricular volume is highest ?
- (a) Isometric relaxation phase. (b) Rapid filling phase.  
(c) Reduced ejection phase. (d) Atrial contraction.
8. Propagation of the action potential through the heart is fastest in which of the following ?
- (a) SA node (b) Atrial muscle  
(c) Purkinje fibers. (d) Ventricular muscle.
9. Oxygen toxicity :
- (a) Is caused by superoxide dismutase.  
(b) Causes CNS toxicity at ever 100 kPa.  
(c) Is caused by absorption atelectasis.  
(d) Is due to the formation of superoxide radicals.
10. Which of the following does NOT happen during inspiration ?
- (a) The ribs move upward.  
(b) The diaphragm lifts up.  
(c) The anteroposterior dimensions of the chest are increased.  
(d) The transverse dimensions of the thorax are increased.

11. At which of the following site is the highest systolic blood pressure recorded :
- (a) Femoral artery. (b) Aorta.  
(c) Renal artery. (d) Pulmonary artery.
12. Carbon-dioxide regulates blood flow which is one of the following :
- (a) Heart. (b) Brain.  
(c) Kidney. (d) Skin.
13. ADH secretion increases in all conditions except :
- (a) Hypertonic ECF. (b) Decreased blood volume.  
(c) Stress. (d) Hypotonic ECF.
14. 1,25 DHCC increases serum calcium and phosphates by its action on :
- (a) GIT. (b) Bones.  
(c) Kidney. (d) All of the above.
15. The optimal temperature for spermatogenesis is :
- (a) 43 – 45°C. (b) 39 – 42°C.  
(c) 32°C. (d) 36.3 – 37.1°C.
16. An 18-year-old college student living in a dormitory contracts meningitis, which causes a centrally mediated increase in his respiratory rate. The basic respiratory rhythm is generated in which of the following regions of the brain ?
- (a) Cerebral cortex. (b) Hypothalamus.  
(c) Reticular activating system. (d) Medulla.
17. A group of second-year life sciences students accompanied a para-medical mission team to the Himalayas. After arriving at the airport in Srinagar, they hiked to a remote mountain village nearby. At this elevation of 9,000 ft, the barometric pressure was 580 mmHg, resulting in a PO<sub>2</sub> of the dry-inspired air of what ?
- (a) 116 mmHg. (b) 152 mmHg.  
(c) 80 mmHg. (d) 70 mmHg.

Turn over

18. A patient with parotid gland cancer has damage to the glossopharyngeal nerve. As a result, which of the following respiratory reflexes will be impaired ?
- (a) Hering-Breuer inflation reflex.
  - (b) Juxta pulmonary capillary (J) receptor reflex.
  - (c) Aortic chemoreceptor reflex.
  - (d) Carotid body chemoreceptor reflex.
19. The most sensitive index of myocardial infarction is a rise in the plasma level of this enzyme :
- (a) Tissue creatine kinase.
  - (b) Creatine kinase BB.
  - (c) Creatine kinase MM.
  - (d) Creatine kinase MB.
20. The last and final stage of formation of erythrocytes :
- (a) Late normoblast.
  - (b) Erythroblast.
  - (c) Pronormoblast.
  - (d) Reticulocyte.
21. The presence of antibodies already bound to red blood cells as in hemolytic disease of the newborn :
- (a) Direct Coombs test.
  - (b) Indirect Coombs's test.
  - (c) Major cross-matching.
  - (d) Eliza.
22. The main source of heat loss from the body is by :
- (a) Vaporization of sweat.
  - (b) Radiation and conduction.
  - (c) Urination and defecation.
  - (d) Respiration.
23. The following are seen in Huntington's disease *except* :
- (a) Hypokinetic movements.
  - (b) Slurred speech.
  - (c) Dementia.
  - (d) Death usually within 10 to 15 years after the onset of the symptom.

24. The aphasias are due to :
- (a) Abnormalities of language functions that are not due to defects of vision or hearing or to motor paralysis.
  - (b) Caused by lesions in the Categorical hemisphere.
  - (c) The lesion is in Wernicke's area.
  - (d) All of the above.
25. Which of the following is not a risk factor for Alzheimer's disease ?
- (a) Age.
  - (b) Presenilin 1 mutation.
  - (c) Loss of GABAergic pathway to the Globus pallidus.
  - (d) Trisomy 21.
26. The presence of non-diffusible ions on one side of the membrane leads to the distribution of diffusible ions in a predictable way. This is explained by :
- (a) Nernst equation.
  - (b) Gibbs Donnan equation.
  - (c) Hassel Balch equation.
  - (d) Goldman-hodgkin-Katz equation.
27. Which of the following is true about spliceosomes ?
- (a) Composed of RNAs, DNAs and proteins.
  - (b) Eliminates introns of some genes.
  - (c) Segments of DNA which determines the formation of proteins.
  - (d) Segments of RNA that are not translated.
28. In true hermaphroditism :
- (a) Genetic females are exposed to androgens.
  - (b) Has gonads of one sex and genitalia of the other.
  - (c) Individuals have both ovaries and testes.
  - (d) Can turn out as Turner syndrome or Klinefelter syndrome.

Turn over

29. Milk ejection is the function of :
- (a) Oxytocin.
  - (b) Vasopressin.
  - (c) Prolactin.
  - (d) Oestrogen.
30. Insulin-stimulated glucose uptake in adipose tissue take place through :
- (a) GLUT 2.
  - (b) GLUT 4.
  - (c) GLUT 6.
  - (d) GLUT 7.
31. The serum level of calcium is :
- (a) 10 mg/dl.
  - (b) 2.5 mmol/L.
  - (c) 5 meq/L.
  - (d) All of the above are correct.
32. Anaerobic bacteria are often cultured from infected deep tissue abscesses. If you were a neutrophil recruited to an anaerobic site to kill such a bacterium, which of the following substances would you most likely use ?
- (a) IL-12.
  - (b) Nitric oxide.
  - (c) Respiratory burst oxidase.
  - (d) Cathelicidin.
33. A patient presents with lymphocytosis and enlarged lymph nodes, and a biopsy of the bone marrow is performed. Ninety per cent of the patient's bone marrow cells stain with a fluorescent antibody specific for CD3. Which of the following is a reasonable differential diagnosis ?
- (a) AIDS.
  - (b) T cell leukaemia.
  - (c) Cytomegalovirus infection.
  - (d) This is a normal laboratory finding.
34. In DiGeorge syndrome :
- (a) Thymus is defective.
  - (b) Parathyroid hormone production is decreased.
  - (c) Cardiac outflow blood is defective.
  - (d) All of the above.

35. Superoxide dismutase-containing bacteria :
- (a) Need superoxide to grow.
  - (b) Are frequently obligate anaerobes.
  - (c) Grow slowly in the presence of CO<sub>2</sub>.
  - (d) Produce hydrogen peroxide from hydrogen ion and the superoxide free radical.
36. The expression of the lac operon :
- (a) Must be initiated by the binding of an inducer protein.
  - (b) Involves the release of allolactose from a repressor protein.
  - (c) Does not involve the expression of structural genes.
  - (d) Necessitates the finding of RNA polymerase followed by transcription.
37. Bacteriophage containing host-cell DNA is involved in which of the following processes ?
- (a) Conjugation.
  - (b) Transduction.
  - (c) Transcription.
  - (d) Recombination.
38. The First life on earth was :
- (a) Cyanobacteria.
  - (b) Chemoheterotrophs.
  - (c) Autotrophs.
  - (d) Photoautotrophs.
39. The Five kingdom system of classification suggested by R. H. Whittaker is not based on :
- (a) Presence or absence of a well-defined nucleus.
  - (b) Mode of reproduction.
  - (c) Mode of nutrition.
  - (d) Complexity of body organization.
40. A mutation which rarely disrupts gene product function is a :
- (a) Deletion.
  - (b) Insertion.
  - (c) Nonsense.
  - (d) Nucleotide substitution.

Turn over

41. Passive immunization is available for protection from :
- (a) Influenza A virus.
  - (b) Hepatitis A virus.
  - (c) Parainfluenza type 2 virus.
  - (d) Rubella virus.
42. A killed virus vaccine is :
- (a) Jeryl Lynn mumps vaccine.
  - (b) Enders' measles vaccine.
  - (c) Salk poliovirus vaccine.
  - (d) Oka varicella-zoster vaccine.
43. The exchange of homologous segments of RNA between two different influenza type A viruses is called :
- (a) Complementation.
  - (b) Genetic reassortment.
  - (c) Phenotypic masking.
  - (d) Phenotypic mixing.
44. The nanogram level of antigen in serum is detected by :
- (a) Dot blot tests.
  - (b) Enzyme-linked immunosorbent assay.
  - (c) Fluorescent antibody staining.
  - (d) Protein-protein hybridization tests.
45. A commercial vaccine consisting of virion subunits prepared by recombinant technology exists for :
- (a) Hepatitis B virus.
  - (b) Rabies virus.
  - (c) Rotavirus.
  - (d) Varicella-zoster virus.
46. The normal flora of the large intestine consists mainly of :
- (a) Bacteria.
  - (b) Fungi.
  - (c) Protozoa.
  - (d) No microbial agents.
47. A cell that secretes antibodies that recognize polysaccharides is a
- (a) B-1 cell.
  - (b) Naive mature B cell.
  - (c) Memory B cell.
  - (d) Plasma cell.

48. A cell performing somatic hypermutation is a :
- (a) B-1 cell. (b) Naive mature B cell.  
(c) Centrocyte. (d) Memory B cell.
49. A cell that secretes large quantities of antibody but does not express surface immunoglobulin:
- (a) B-1 cell. (b) Naive mature B cell.  
(c) Memory B cell. (d) Plasma cell.
50. A cell that expresses both IgM and IgD on the cell surface is a :
- (a) B-1 cell. (b) Naive mature B cell  
(c) Centrocyte. (d) Memory B cell.
51. A short-lived phagocytic cell recruited to inflammatory sites by macrophage secretion of CCL8 is a :
- (a) Neutrophil. (b) Basophil.  
(c) Eosinophil. (d) Mast cell.
52. Guttation is mainly due to :
- (a) Root pressure. (b) Osmosis.  
(c) Transpiration. (d) Imbibition.
53. Acid rain is caused by increase in the atmospheric concentration of :
- (a) SO<sub>3</sub> and CO. (b) CO<sub>2</sub> and CO.  
(c) O<sub>3</sub> and dust. (d) SO<sub>2</sub> and NO<sub>2</sub>.
54. Bidirectional translocation of minerals takes place in :
- (a) Xylem. (b) Phloem  
(c) Parenchyma. (d) Cambium.

Turn over

55. Water soluble pigments found in plant cell vacuoles are :
- (a) Xanthophylls. (b) Chlorophylls.  
(c) Carotenoids. (d) Anthocyanin.
56. Cyclic photophosphorylation results in the formation of :
- (a) ATP and NADPH. (b) ATP, NADPH and O<sub>2</sub>.  
(c) ATP. (d) NADPH.
57. Most hazardous metal pollutant of automobile exhausts is :
- (a) Mercury. (b) Cadmium.  
(c) Lead. (d) Copper.
58. Biochemical Oxygen Demand (BOD) in river water
- (a) Has no relationship with concentration of oxygen in the water.  
(b) Gives a measure of salmonella in the water.  
(c) Increases when sewage gets mixed with river water.  
(d) Remains unchanged when algal bloom occurs.
59. The first carbon-dioxide acceptor in C<sub>4</sub> plants is :
- (a) Phosphoenol-pyruvate. (b) Ribulose 1, 5-diphosphate.  
(c) Oxalo-acetic acid. (d) Phosphoglyceric acid.
60. The highest number of species in the world is represented by :
- (a) Fungi. (b) Mosses.  
(c) Algae. (d) Lichen.
61. Fertility of soil is measured by its ability to :
- (a) Retain nutrients. (b) Hold organic materials.  
(c) Hold water. (d) Support life.

62. Dark reactions of photosynthesis occur in :
- (a) Granal thylakoid membranes.
  - (b) Stromal lamella membranes.
  - (c) Stroma outside photosynthetic lamellae.
  - (d) Periplastidial space.
63. The most important feature of all living systems is to :
- (a) Utilize oxygen to generate energy.
  - (b) Replicate the genetic information.
  - (c) Produce gametes.
  - (d) Utilize solar energy for metabolic activities.
64. The sequence of taxonomic categories is :
- (a) Class - Phylum - Tribe - Order - Family - Genus - Species.
  - (b) Division - Class - Family - Tribe - Order - Genus - Species.
  - (c) Division - Class - Order - Family - Tribe - Genus - Species.
  - (d) Phylum - Order - Class - Tribe - Family - Genus - Species.
65. Alleles are :
- (a) True breeding homozygotes.
  - (b) Different molecular forms of a gene.
  - (c) Heterozygotes.
  - (d) Different phenotype.
66. Sickle cell anaemia is induced by :
- (a) Change of amino acid in a chain of haemoglobin.
  - (b) Change of amino acid in the b-chain of haemoglobin.
  - (c) Change of amino acid in both a- and b-chain of haemoglobin.
  - (d) Change of amino acid in either a- or b-chain of haemoglobin.

Turn over

67. A cell derived from monocytes that attach to the arterial intima and accumulate lipids is a :
- (a) M1 macrophage.
  - (b) M2 macrophage.
  - (c) Foam cell.
  - (d) Giant cell.
68. Parthenogenesis is :
- (a) Development of embryo without fertilization.
  - (b) Development of fruit without fertilization.
  - (c) Development of fruit without hormones.
  - (d) Development of embryo from egg without fertilization.
69. Nucellar embryo is :
- (a) Amphimictic haploid.
  - (b) Amphimictic diploid.
  - (c) Apomictic haploid.
  - (d) Apomictic diploid.
70. Double fertilization is fusion of :
- (a) Two eggs.
  - (b) Two eggs and polar nuclei with pollen nuclei.
  - (c) One male gamete with egg and other with synergid.
  - (d) One male gamete with egg and other with secondary nucleus.
71. Micropyle of seed is involved in the passage of :
- (a) Male gamete.
  - (b) Pollen tube.
  - (c) Water.
  - (d) Gases.
72. Study of fossils is :
- (a) Palaeontology.
  - (b) Herpetology.
  - (c) Saurology.
  - (d) Organic evolution.
73. A test cross is carried out to :
- (a) Determine the genotype of a plant at F<sub>2</sub>.
  - (b) Predict whether two traits are linked.
  - (c) Assess the number of alleles of a gene.
  - (d) Determine whether two species or varieties will breed successfully.

74. Inheritances of skin colour in humans is an example of :
- (a) Point mutation.
  - (b) Polygenic inheritance.
  - (c) Codominance.
  - (d) Chromosomal aberration.
75. How many different kinds of gametes will be produced by a plant having the genotype AABbCC ?
- (a) Four.
  - (b) Nine.
  - (c) Two.
  - (d) Three.
76. Independent assortment of genes does not take place when ?
- (a) Genes are located on homologous chromosomes.
  - (b) Genes are linked and located on same chromosomes.
  - (c) Genes are located on non-homologous chromosomes.
  - (d) All the above.
77. The dimensions of pressure are the same as that of :
- (a) Force per unit volume.
  - (b) Energy per unit volume
  - (c) Force.
  - (d) Energy.
78. The molecular weight of  $O_2$  and  $SO_2$  are 32 and 64 respectively. At  $15^\circ C$  and 150 mmHg pressure, one litre of  $O_2$  contains 'N' molecules. The number of molecules in two litres of  $SO_2$  under the same conditions of temperature and pressure will be :
- (a)  $N/2$ .
  - (b) N.
  - (c)  $2N$ .
  - (d)  $N/7$ .
79. The number of water molecules is maximum in :
- (a) 1.8 gram of water.
  - (b) 18 gram of water.
  - (c) 18 moles of water.
  - (d) 18 molecules of water.

Turn over

80. DDT residues are rapidly passed through food chain causing bio-magnification because DDT is :
- (a) Moderately toxic.
  - (b) Non-toxic to aquatic animals.
  - (c) Water soluble.
  - (d) Lipo soluble.
81. A major component of Gobar gas is :
- (a) Ammonia.
  - (b) Methane.
  - (c) Ethane.
  - (d) Butane.
82. Which has maximum molecules ?
- (a) 7g  $N_2$ .
  - (b) 2g  $H_2$ .
  - (c) 16g  $NO_2$ .
  - (d) 16g  $O_2$ .
83. Hemoglobin contains 0.334 % of iron by weight. The molecular weight of hemoglobin is approximately 67,200. The number of iron atoms (Atomic weight of Fe is 56) present in one molecule of hemoglobin is :
- (a) 4.
  - (b) 6.
  - (c) 3.
  - (d) 2.
34. The number of moles of hydrogen molecules required to produce 20 moles of ammonia through Haber's process is :
- (a) 40.
  - (b) 10.
  - (c) 20.
  - (d) 30.
85. When 22.4 litres of  $H_2(g)$  is mixed with 11.2 litres of  $Cl_2(g)$ , each at STP, the moles of  $HCl(g)$  formed is equal to :
- (a) 1 mol of  $HCl$ .
  - (b) 2 mol of  $HCl(g)$ .
  - (c) 0.5 mol of  $HCl(g)$ .
  - (d) 1.5 mol of  $HCl(g)$ .
86. 10 g. of hydrogen and 64 g. of oxygen were filled in a steel vessel and exploded. Amount of water produced in this reaction will be :
- (a) 3 mol.
  - (b) 4 mol.
  - (c) 1 mol.
  - (d) 2 mol.

87. The zone of atmosphere in which the ozone layer is present is called :
- (a) Ionosphere. (b) Mesosphere.  
(c) Stratosphere. (d) Troposphere.
88. Which of the following is a secondary pollutant ?
- (a) CO. (b) CO<sub>2</sub>.  
(c) PAN. (d) Aerosol.
89. Which gas contributes most to greenhouse effect ?
- (a) CFC. (b) Freon.  
(c) CO<sub>2</sub>. (d) CH<sub>4</sub>.
90. A species facing extremely high risk of extinction in the immediate future is called :
- (a) Vulnerable. (b) Endemic.  
(c) Critically endangered. (d) Extinct.
91. Which organization publishes the Red Data Book ?
- (a) GEF. (b) IUCN.  
(c) UNEP. (d) WWF.
92. Maximum nutritional diversity is found in the group.
- (a) Fungi. (b) Animalia.  
(c) Monera. (d) Plantae.
93. What is common about Trypanosoma, Noctiluca, Monocystis and Giardia ?
- (a) They have flagella.  
(b) They produce spores.  
(c) These are all parasites.  
(d) These are all unicellular protists.

Turn over

94. Single-celled eukaryotes are included in :

- (a) Protista.
- (b) Fungi.
- (c) Archaea.
- (d) Monera.

95. Mycorrhiza is :

- (a) A symbiotic association of plant roots and certain fungi.
- (b) An association of algae with fungi.
- (c) A fungus parasitising root system of higher plants.
- (d) An association of rhizobium with the roots of leguminous plants

96. Special character of Coelenterates is :

- (a) Polymorphism.
- (b) Nematocysts.
- (c) Flame cells.
- (d) Hermaphroditism.

97. One of the representatives of phylum Arthropoda is :

- (a) Silverfish.
- (b) Pufferfish.
- (c) Flying fish.
- (d) Cuttlefish.

98. All vertebrates possess :

- (a) Renal portal system.
- (b) Dorsal hollow central nervous system.
- (c) Four chambered ventral heart.
- (d) Pharyngeal gill slits.

99. A pro-inflammatory cytokine with a major role in asthma is a :

- (a) IL-4.
- (b) IL-6.
- (c) IL-10.
- (d) IL-17.

100. A cytokine that promotes cell-mediated immunity and is produced by Th1 cells is a :

- (a) INF- $\gamma$ .
- (b) IL-4.
- (c) IL-6.
- (d) IL-10.