

D 102521

(Pages : 16)

Name.....

Reg. No.....

P.G. ENTRANCE EXAMINATION, APRIL 2024

HUMAN PHYSIOLOGY

Time : Two Hours

Maximum : 400 Marks

Each question carries 4 marks.

1 mark will be deducted for each wrong answer.

1. Antibodies which can easily cross the placenta :
 - (a) IgG.
 - (b) IgA.
 - (c) IgD.
 - (d) Ig M.
2. Normal total plasma protein ranges from
 - (a) 4.3g %.
 - (b) 4.4 -6.3g %.
 - (c) 6.4 -8.0g %.
 - (d) 8.0 - 10 g %.
3. The most T cell population consists of
 - (a) Helper T cell.
 - (b) Memory T cell.
 - (c) Suppressor T cell.
 - (d) Cytotoxic T cell T cells.
4. Intravascular clotting is prevented by :
 - (a) Heparin.
 - (b) Plasmin.
 - (c) Antithrombin C
 - (d) All of the above.
5. Mother-fetus Rh blood type incompatibility problems can occur if the mother is ———— and her fetus is ————.
 - (a) Rh positive ; Rh positive.
 - (b) Rh positive ; Rh negative.
 - (c) Rh negative ; Rh positive.
 - (d) Rh negative ; Rh negative.
6. An 18-year-old male with pernicious anaemia lacks an intrinsic factor, which is necessary for the absorption of cyanocobalamin. Vitamin B12 is absorbed primarily in which portion of the GI tract ?
 - (a) Stomach.
 - (b) Jejunum.
 - (c) Ileum.
 - (d) Colon.

Turn over

7. In steatorrhea which of the following best accounts for the appearance of excess fat in stool ?
- (a) Decreased bile salt pool size.
 - (b) Delayed gastric emptying.
 - (c) Decreased gastric acid secretion.
 - (d) Decreased gastric accommodation.
8. After secretion of trypsinogen into the duodenum, the enzyme is converted into its active form, trypsin, by which of the following ?
- (a) Enteropeptidase.
 - (b) Procarboxypeptidase.
 - (c) Pancreatic lipase.
 - (d) Chymotrypsin.
9. Which of the following has the lowest partial pressure of Oxygen (pO_2) ?
- (a) Atmospheric air.
 - (b) Alveolar air.
 - (c) Expired air.
 - (d) Arterial blood.
10. In the lungs the gas exchange is the function of :
- (a) Type I alveolar cells.
 - (b) Type II alveolar cells.
 - (c) Type III alveolar cells.
 - (d) All of the above are correct.
11. Normally, the ventilation-perfusion (P/Q) ratio of the whole lungs is about
- (a) 0.4.
 - (b) 0.8.
 - (c) 1.6.
 - (d) 2.8.
12. Which of the following is filtered in the glomerular capillary and reabsorbed but not secreted in the renal tubule ?
- (a) Creatinine.
 - (b) Sodium.
 - (c) Inulin.
 - (d) Uric acid.
13. Hypothyroidism is usually associated with :
- (a) Hypercholesterolemia.
 - (b) Bradycardia.
 - (c) Abnormal tendon jerk reflex.
 - (d) All of the above.

14. All are true statements regarding parathyroid hormone except :
- (a) Decrease serum phosphate level.
 - (b) Stimulate osteoclast activity.
 - (c) Its primary function is to keep normal blood Ca^{2+} level.
 - (d) Increases serum phosphate.
15. The Mullerian regression factor is secreted by :
- (a) Sertoli cells.
 - (b) Leydig cells.
 - (c) Granulosa cells of ovary.
 - (d) All of the above.
16. The main source of fructose in semen :
- (a) Prostrate.
 - (b) Seminal vesicle.
 - (c) Seminiferous tubules.
 - (d) Leydig Cells.
17. Growth hormone has a synergistic effect on growth with :
- (a) Insulin.
 - (b) ACTH.
 - (c) Glucagon.
 - (d) Melatonin.
18. A 37-year-old woman undergoes a CT scan of the abdomen, which reveals a large peritoneal mass. A subsequent magnetic resonance angiography study showed that the abdominal aorta was constricted to one-half of its resting diameter. As a result, resistance to blood flow through the vessel would be which of the following ?
- (a) Decreased in half.
 - (b) Increased by 50 %.
 - (c) Doubled.
 - (d) Increased 16-fold.
19. Angiotensinogen is produced by :
- (a) Liver.
 - (b) Kidney.
 - (c) Hypothalamus.
 - (d) Atrium.

20. Myocardial oxygen demand is :
- (a) Inversely proportional to heart rate.
 - (b) Directly proportional to heart rate.
 - (c) Increased by digitalis.
 - (d) Not related to heart rate.
21. Philadelphia chromosome is seen in the following disease :
- (a) Acute myeloid leukaemia
 - (b) Polycythemia rubra vera
 - (c) Chronic myeloid leukaemia
 - (d) Reticulocytosis.
22. The heterotrimeric G protein-coupled receptors that span the cell membrane 7 times are called :
- (a) Nuclear receptors.
 - (b) Tyrosine kinase receptors.
 - (c) Serpentine receptors.
 - (d) Orphan receptors.
23. The Nernst potential of sodium and potassium is :
- (a) - 89 mv and + 61 mv.
 - (b) + 61 mv and - 85 mv.
 - (c) + 61 mv and - 61 mv.
 - (d) - 45 mv and + 45 mv.
24. The smallest filamentous structure that forms the cytoskeleton of cell :
- (a) Desmosomes.
 - (b) Kinines.
 - (c) Microfilaments.
 - (d) Keratines.
25. The mechanism of action of Colchicine is by :
- (a) Genomic action by which P53 protein is produced.
 - (b) Producing Fas which is present in NK cells and T Lymphocytes.
 - (c) By producing capases which are activated by cytochrome C.
 - (d) By destroying mitotic spindle and arresting mitosis.

26. Respiratory acidosis is compensated by the kidneys by :
- (a) Increased H^+ ion secretion.
 - (b) Decreased reabsorption of HCO_3^- .
 - (c) Increased reabsorption of H^+ .
 - (d) All of the above.
27. Which of the following statement is true about 'Histotoxic Hypoxia' ?
- (a) The O_2 carrying capacity of blood is reduced.
 - (b) pO_2 of arterial blood is decreased.
 - (c) A - V pO_2 difference is low.
 - (d) Percentage saturation of Hb is decreased.
28. Oxyntic cells in the stomach secrete :
- (a) Pepsinogen.
 - (b) Mucous.
 - (c) Histamine.
 - (d) Hydrochloric acid.
29. The two primary bile acids formed in the liver are :
- (a) Deoxycholic acid and lithocholic acid.
 - (b) Cholic acid and chenodeoxycholic acid.
 - (c) Cholic acid and lithocholic acid.
 - (d) Deoxycholic acid and chenodeoxycholic acid.
30. Na^+ is reabsorbed in the proximal tubule via :
- (a) Na-K-2Cl cotransporter.
 - (b) Na-H exchanger.
 - (c) Na-Cl cotransporter.
 - (d) Via the ENaC channels.
31. Volume of urine in the bladder that normally initiates reflex contraction is :
- (a) 50-100 ml.
 - (b) 100-200 ml.
 - (c) 200-300 ml.
 - (d) 300-400 ml.

32. The end product of anaerobic glycolysis is :
- (a) Pyruvate.
 - (b) Acetyl CoA
 - (c) Lactate.
 - (d) Phosphoenolpyruvate.
33. In some plants thalamus contributes to fruit formation. Such fruits are termed as :
- (a) Parthenocarpic fruit.
 - (b) Aggregate fruits.
 - (c) True fruits.
 - (d) False fruits.
34. The GGATATCGCAT is a sequence from the coding strand of a gene. What will be the corresponding sequence of the transcribed mRNA ?
- (a) GGAUAUCGCAU.
 - (b) UGGTUTCGCAT.
 - (c) UCCAUAGCGUA.
 - (d) ACCUAUGCGAU.
35. Among the following sets of examples for divergent evolution, select the incorrect option :
- (a) Forelimbs of man, bat and cheetah.
 - (b) Heart of bat, man and cheetah.
 - (c) Eye of octopus, bat and man.
 - (d) Brain of bat, man and cheetah.
36. Which of the following fertilizers has the highest nitrogen percentage ?
- (a) Ammonium sulphate.
 - (b) Calcium cyanamide.
 - (c) Urea.
 - (d) Ammonium nitrate.
37. The flow of biological information ultimately results in the formation of :
- (a) DNA.
 - (b) tRNA.
 - (c) RNA.
 - (d) Proteins.
38. Most of the body glycogen stores are present in :
- (a) Liver.
 - (b) Skeletal muscle.
 - (c) Brain.
 - (d) Adipose tissue.

39. A woman has an X-linked condition on one of her X chromosomes. This chromosome can be inherited by :
- (a) Only daughters. (b) Only sons.
(c) Both sons and daughters. (d) Only grandchildren.
40. The final common pathway for the oxidation of foodstuff is
- (a) Glycolysis. (b) Krebs cycle.
(c) HMP shunt. (d) Beta oxidation.
41. The following carbohydrate is not digested by human digestive enzymes ?
- (a) Cellulose. (b) Hemicelluloses.
(c) Pectins. (d) All of the above.
42. All the following are considered stop codons except :
- (a) AUG. (b) UAA.
(c) UGA. (d) UAG.
43. Bacteria are engulfed by the following process :
- (a) Phagocytosis. (b) Pinocytosis.
(c) Exocytosis. (d) All the above.
44. The total number of atomic orbitals in the fourth energy level of an atom is :
- (a) 8. (b) 16.
(c) 32. (d) 4.
45. The chromosomal theory of inheritance was proposed by :
- (a) T. H. Morgan. (b) Bateson and Punnet.
(c) Sutton and Boveri. (d) Watson and Crick.

46. Which of the following statements is incorrect about gymnosperms ?
- (a) They are heterosporous.
 - (b) Most of them have narrow leaves with thick cuticles.
 - (c) Male and female gametophytes are free living.
 - (d) Their seeds are not covered.
47. The similarity of bone structure in the forelimbs of many vertebrates is an example of :
- (a) Homology.
 - (b) Analogy.
 - (c) Adaptive radiation.
 - (d) Convergent evolution.
48. The RQ. (respiratory quotient) of fats is low because of the :
- (a) Low hydrogen content.
 - (b) Low carbon dioxide content.
 - (c) Low oxygen content.
 - (d) All of the above.
49. Iodine deficiency in humans causes :
- (a) Goiter.
 - (b) Wilson's disease.
 - (c) Hyperparathyroidism.
 - (d) All the above.
50. DNA replication occurs during the following phase of the cell cycle.
- (a) S phase.
 - (b) M phase.
 - (c) gap 1 phase.
 - (d) gap 2 phase.
51. The spatial distribution of electron cloud and angular momentum are described by :
- (a) Principal quantum number.
 - (b) Azimuthal quantum number.
 - (c) Spin quantum number.
 - (d) Magnetic quantum number.
52. Which of the cellular organelle serve as the site of protein synthesis ?
- (a) Golgi complex.
 - (b) Endoplasmic reticulum.
 - (c) Mitochondria.
 - (d) Lysosomes.

53. Predict the correct order among the following :

- (a) bond pair - bond pair > lone pair - bond pair > lone pair - lone pair.
- (b) lone pair - bond pair > bond pair - bond pair > lone pair - lone pair.
- (c) lone pair - lone pair > lone pair - bond pair > bond pair - bond pair.
- (d) lone pair - lone pair > bond pair - bond pair > lone pair - bond pair.

54. Enzyme that links amino acids to the tRNA is :

- (a) Peptidyl transferase.
- (b) Telomerase.
- (c) Aminoacyl t RNA synthetase.
- (d) Aminotransferase.

55. Enzymes synthesized in the inactive form are called :

- (a) Coenzymes.
- (b) Apoenzymes.
- (c) Lysozymes.
- (d) Proenzymes.

56. Which is the nonreducing sugar ?

- (a) Maltose.
- (b) Sucrose.
- (c) Lactose.
- (d) Isomaltose.

57. Which contains a beta glycosidic linkage :

- (a) Heparin.
- (b) Glycogen.
- (c) Cellulose.
- (d) Starch.

58. Northern blotting technique is used for the detection of :

- (a) RNA.
- (b) DNA
- (c) Proteins.
- (d) All of the above.

59. The order of filling of electron in the orbital is :

- (a) 3d, 4s, 4p, 4d, 5s.
- (b) 4s, 3d, 4p, 5s, 4d.
- (c) 5s, 4p, 3d, 4d, 5s.
- (d) 3d, 4p, 4s, 4d, 5s.

60. Which of the following amino acids has a hydroxyl group ?
- (a) Valine. (b) Threonine.
(c) Leucine. (d) Histidine.
61. Which of the following elements has the maximum electron affinity ?
- (a) I. (b) Br.
(c) Cl. (d) F.
62. The force maintaining the primary structure of a protein :
- (a) Peptide bond (b) Hydrophobic bond
(c) Hydrogen bond (d) Disulphide bond
63. Which statement is not correct ?
- (a) A sigma bond is weaker than a pi bond
(b) A sigma bond is stronger than a pi bond
(c) A double bond is stronger than a single bond
(d) A double bond is shorter than a single bond
64. The strongest hydrogen bond is shown by :
- (a) Water. (b) Ammonia.
(c) Hydrogen fluoride. (d) Hydrogen sulphide.
65. Which one of the following has a maximum number of atoms ?
- (a) 2 g of Ag(s) [Atomic mass of Ag = 108].
(b) 2 g of Mg(s) [Atomic mass of Mg = 24].
(c) 2 g of O₂(g) [Atomic mass of O = 16].
(d) 2 g of Li(s) [Atomic mass of Li = 7].
66. According to Hugo de Vries, the mechanism of evolution is :
- (a) Multiple step mutations. (b) Saltation.
(c) Minor mutations. (d) Phenotypic variations.

67. Which one of the following is a dietary essential ?
- (a) Oleic acid. (b) Palmitic acid.
(c) Stearic acid. (d) Linolenic acid.
68. Which of the following characteristics represent 'Inheritance of blood groups' in humans ?
(A) Dominance (B) Co-dominance (C) Multiple allele (D) Incomplete dominance (E) Polygenic inheritance.
- (a) B, C and E. (b) A, B and C.
(c) A, C and E. (d) B, D and E.
69. 10% NaOH solution is equal to :
- (a) 1 molar NaOH solution. (b) 2.5 molar NaOH solution.
(c) 10 molar NaOH solution. (d) 1.5 molar NaOH solution.
70. Which of the following cellular organelle has DNA ?
- (a) Lysosomes. (b) Peroxisomes.
(c) Mitochondria. (d) Microsomes.
71. Conversion of milk to curd improves its nutritional value by increasing the amount of :
- (a) Vitamin D. (b) Vitamin A.
(c) Vitamin E. (d) Vitamin B12.
72. What is the working principle of Colorimeter ?
- (a) Beer's law. (b) Lambert's law.
(c) Raoult's law. (d) Both (a) and (b)
73. Which of the following is not an autoimmune disease ?
- (a) Psoriasis. (b) Rheumatoid arthritis.
(c) Vitiligo. (d) Alzheimer's disease.

74. The excretory end product of protein metabolism in human is :
- (a) Uric acid
 - (b) Ammonia.
 - (c) Urea.
 - (d) Creatinine.
75. In which disease does mosquito transmitted pathogen cause chronic inflammation of lymphatic vessels ?
- (a) Elephantiasis.
 - (b) Ascariasis.
 - (c) Amoebiasis.
 - (d) Ringworm disease.
76. All the following mineral are considered to be trace elements, except :
- (a) Selenium.
 - (b) Iodine.
 - (c) Fluorine.
 - (d) Magnesium.
77. Which one of the following population interactions is widely used in medical science for the production of antibiotics ?
- (a) Commensalism.
 - (b) Mutualism.
 - (c) Amensalism.
 - (d) Parasitism.
78. All of the following activities are taking place inside mitochondria except :
- (a) TCA cycle.
 - (b) Electron transport chain.
 - (c) Beta oxidation.
 - (d) De novo fatty acid synthesis.
79. The K_m value of an enzyme is :
- (a) The substrate concentration at half maximal velocity.
 - (b) Half the substrate concentration at maximal velocity.
 - (c) Dissociation constant of enzyme substrate complex.
 - (d) The total enzyme concentration.

80. Patients with deficiencies in antibody production can often present with the same types of infections as are seen in patients with phagocytic cell deficiencies. Which of the following statements best explains this observation ?
- (a) Autoantibodies can remove phagocytic cells from blood circulation.
 - (b) Plasma cells are the direct progenitors of certain phagocytic cells.
 - (c) Macrophages can differentiate into antibody-producing plasma cells.
 - (d) Antibodies are important opsonin that promote microbe recognition by phagocytes.
81. Which is the most suitable method to measure the titer of serum antibodies to the foreign protein ?
- (a) Flow cytometry.
 - (b) ELISA.
 - (c) Immunofluorescence.
 - (d) Immunoblotting (Western blotting).
82. Infection of cells with certain herpes viruses leads to a decrease in the expression of class I MHC molecules by the infected cells. For which of the following cytotoxic cells would this decrease its ability to recognize the virus-infected cell ?
- (a) CD4 + T cell.
 - (b) CD8 + T cell.
 - (c) NK cell.
 - (d) NKT cell.
83. 50S ribosomal subunits are found in :
- (a) Bacteria.
 - (b) Fungi.
 - (c) Protozoa.
 - (d) Viruses.
84. The minimal concentration of alcohol necessary to kill bacteria and enveloped viruses is :
- (a) 70%.
 - (b) 40%.
 - (c) 50%.
 - (d) 60%.
85. Dimorphism is a characteristic of :
- (a) Bacteria.
 - (b) Fungi.
 - (c) Rickettsia species.
 - (d) Viruses.

86. A new infectious agent has been isolated from deer ticks. It lacks a cell wall but has 70S ribosomes. This agent is most likely a :
- (a) Bacterium.
 - (b) Chlamydia species.
 - (c) Mycoplasma species.
 - (d) Rickettsia species.
87. The infectious agent associated with Creutzfeldt-Jakob disease is extremely hardy, but can be inactivated by :
- (a) Catalases.
 - (b) Hyaluronidases.
 - (c) Nucleases.
 - (d) Proteases.
88. A bacterial toxin with superantigen activity is produced by :
- (a) Clostridium tetani.
 - (b) Bordetella pertussis.
 - (c) Escherichia coli.
 - (d) Staphylococcus aureus.
89. A phage that is not inactivated by proteases is called a :
- (a) Prophage.
 - (b) Virulent phage.
 - (c) Temperate phage.
 - (d) Filamentous phage.
90. Bacteria that synthesize organic compounds from inorganic compounds are :
- (a) Heterotrophs.
 - (b) Aerobes.
 - (c) Facultative anaerobes.
 - (d) Autotrophs.
91. A bacterial structure involved in adherence is :
- (a) Capsule.
 - (b) Lipopolysaccharide.
 - (c) Common pili.
 - (d) Teichoic acid.
92. Bacteria lacking superoxide dismutase are :
- (a) Heterotrophs.
 - (b) Obligate anaerobes.
 - (c) Aerobes.
 - (d) Facultative anaerobes.

93. What is a mass of fungal filaments called ?
- (a) Pseudohyphae.
 - (b) Hyphae.
 - (c) Mycelium.
 - (d) Septum.
94. A filamentous fungus subunit is a :
- (a) Coenocyte.
 - (b) Hypha.
 - (c) Septum.
 - (d) Mycelium.
95. Which of the following stains allows differentiation of fungus from human tissue by staining the fungus a pink-red color ?
- (a) Calcofluor white stain.
 - (b) Gomori methenamine-silver stain.
 - (c) Periodic acid-Schiff stain.
 - (d) Hematoxylin and eosin stain.
96. Which of the following features differentiates fungal cells from human cells ?
- (a) 80S ribosomes.
 - (b) Presence of an endoplasmic reticulum.
 - (c) Ergosterol as the major membrane sterol.
 - (d) Enzymes that allow them to use carbon dioxide as their sole carbon source.
97. Which of the following protozoans is free living and is such that acquisition does not generally indicate fecal contamination ?
- (a) Acanthamoeba
 - (b) Dientamoeba fragilis.
 - (c) Entamoeba histolytica
 - (d) Entamoeba coli.

98. A 26-year-old woman with uncomplicated malaria who was treated initially with chloroquine now has relapsed. What is the reason for a chloroquine-treated case of *Plasmodium vivax* relapsing?
- (a) *P. vivax* has a significant level of chloroquine resistance.
 - (b) *P. vivax* has a persistent erythrocytic stage.
 - (c) *P. vivax* has a persistent exoerythrocytic stage (hypnozoite).
 - (d) Chloroquine is not one of the drugs of choice.
99. How is *Leishmania donovani* transmitted?
- (a) *Anopheles* mosquito bite.
 - (b) Black fly bite.
 - (c) *Culex* mosquito bite.
 - (d) Sandfly bite.
100. Which of the following is the tapeworm acquired from eating undercooked pork?
- (a) *Echinococcus granulosus*.
 - (b) *Taenia saginata*.
 - (c) *Taenia solium*.
 - (d) *Trichinella spiralis*.