RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FOURTH SEMESTER EXAMINATION, SEPTEMBER 2020

SECOND YEAR [BATCH 2018-21]

Date : 26/09/2020 **ZOOLOGY (Honours)**

Time : 11.00 am – 7.00 pm **Paper : IV** Full Marks : 100

Answer all the questions **(5×20)**

Group – A

1. a) "Haldane effect is not an entirely reverse Bohr effect"---- justify the statement.

   b) What is the significance of lower intrapleural pressure (756 mmHg) than intra alveolar pressure (760 mm Hg)?

   c) Define 'Dust cell'. [3+1+1]

2. a) Why allometrical equation is a logarithmic straight line equation?

   b) In two allometry equations, the coefficient (α) values are 0.97 and 0.46. What will be your interpretations in terms of growth measure?

   c) What is the difference between type I and type II aloveolar cells? [2+2+1]

3. a) How do the T and R forms of haemoglobins facilitate oxygen carrying capacity?

   b) You are dealing with an inhibitor that blocks the AE1 transporter protein of Hamburger phenomena. What changes will you expect in RBC as well as in lungs?

   c) What is "Ondine's curse"? [2+2+1]

Group - B

4. a) What is JG apparatus?

   b) Describe Renin-Angitensin pathway schematically. [2+3]

5. a) What is GFR? Name the factors controlling GFR.

   b) Describe the role of counter current exchange mechanism in urine formation. [2+3]

Group - C

6. a) How do the sodium and potassium ions maintain and drive the action potential within a neuron?

   b) State the basic difference between sympathetic and parasympathetic modes of nervous system. [3+2]

7. a) You touch a hot object that leads to immediate withdrawal of your hand from that object. Explain the role played by the different components of the nervous system in between the cause (touching hot object) and the consequence (withdrawal of hand).

   b) Name one non-neuronal cell of brain with its function. [4+1]

Group - D

8. a) "Gastric parietal cells are highly specialized for their unusual task of secreting concentrated acid" – elaborate from physiological & biomolecular perspectives.

   b) What are 'Mixed Micelles'? [4+1]

9. a) Mention the roles of different ion transporters in the pancreatic duct cells.

   b) Why the secretion of GIP is considered important? [4+1]

10.a) What molecular disorders ultimately lead to the 'Hertnup disease'?

   b) Why does Cystinuria happen?

   c) Name an 'Apical Membrane Transporter' which plays important role in the intestinal absorption of iron. [2+2+1]

Group - E

11.a) Write down the Fischer projection formula of D-glucose. How many asymmetric carbon does it contain and how many isomers are possible for it?

   b) State the biological functions of polysaccharides.

   c) Give an example of one amino-sugar. [(1+(0.5+0.5)+2+1]

12.a) Write down the NADH producing steps of TCA cycle. Where does it occur?

   b) Write down the step of glycolysis where the substrate level phosphorylation occurs. [(2+1)+2]

13.a) Explain the importance of non-oxidative phase of pentose phosphate pathway.

   b) How is glycogen synthesized from glucose-6-P?

   c) Name one inhibitor of glycolysis. [2+2+1]

Group – F

14.a) What is sphingolipid? Draw its structural diagram.

   b) Discuss the fate of glycerol produced by the breakdown of triglycerides in adipose tissue. [(1+1)+3]

15.a) What are ketone bodies? Explain with examples.

   b) Mention important differences between fatty acid oxidation and fatty acid biosynthesis. [2+3]

Group – G

16.a) What do the amino acids Thr and Tyr have in common?

   b) Water soluble proteins fold into compact structures with non-polar core. Comment on their structure-function aspect giving appropriate examples.

   c) How many different tripeptides are possible out of 20 naturally occurring amino acids? [1+2+2]

Group – H

17.a) Name three neurotransmitters of our body.

b) How do neurotransmitters influence or shape the mood of a person? [2+3]

Group – I

18.a) Define with application of Q_{10} value of an enzyme?

b) Why covalent modification is thought to be an important enzyme action modifier?

c) Why EC numbering is advantageous over orthodox enzyme nomenclature? [2+2+1]

19.a) "Zymogen activation is a sophisticated enzyme action"--- comment on the statement.

b) How does K_M and V_{Max} values of an enzyme tend to change in presence of excessive substrate and an uncompetitive inhibitor?

c) State the advantage of Lineweiver-Burk plot over Michaelis-Menten equation? [2+2+1]

Group – J

20.a) Differentiate between oxidative and non-oxidative deaminations.

b) Why ornithine cycle is called urea bicycle? [3+2]

———— × ————