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63/2 (SEM-1) ZOO 103

2021

(held in 2022)

ZOOLOGY

(Theory Paper)

Paper Code : ZOO-103

(Endocrinology)

Full Marks – 80

Time – Three hours

The figures in the margin indicate full marks for the questions.

1. Answer *all* the following MCQs : 1×6=6

(i) Which of the following is produced only by large amounts of glucocorticoids ?

(a) Normal responsiveness of fat depots to norepinephrine

(b) Maintenance of normal vascular reactivity

(c) Increased excretion of a water load

(d) Inhibition of the inflammatory response

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(ii) In which of the following conditions is it most likely that the TSH response to TRH will be reduced ?

- (a) Hypothyroidism due to tissue resistance to thyroid hormone
- (b) Hypothyroidism due to disease destroying the thyroid gland
- (c) Hyperthyroidism due to circulating antithyroid antibodies with TSH activity
- (d) Hyperthyroidism due to diffuse hyperplasia of thyrotropes of the anterior pituitary

(iii) Which of the following intracellular or plasma membrane proteins requires Ca_2^+ for full activity ?

- (a) janus kinase (JAK)
- (b) calmodulin.
- (c) cAMP-dependent protein kinase
- (d) guanylyl cyclase

(iv) Which is correct ?

- (a) cAMP-dependent protein kinase phosphorylates tyrosine residues
- (b) Protein kinase C is activated by cAMP
- (c) Lipid-soluble messengers typically act on receptors in the cell cytosol or nucleus
- (d) The subunit of Gs proteins that activates adenylyl cyclase is the beta subunit

(v) Which is true of strenuous, prolonged exercise ?

- (a) It results in an increase in plasma glucagon concentration
- (b) It results in an increase in plasma insulin concentration
- (c) Plasma glucose concentration does not change
- (d) Skeletal muscle uptake of glucose is inhibited

(vi) Which of the following could theoretically result in short stature ?

- (a) Pituitary tumor making excess thyroid-stimulating hormone
- (b) Mutations that result in inactive IGF-1 receptors

(c) Delayed onset of puberty

(d) Decreased hypothalamic concentrations of somatostatin.

2. Answer *all* the following questions : $2 \times 5 = 10$

(a) Differentiate between paracrine and autocrine signalling.

(b) What are insulin lispro and insulin aspart ?

(c) Write the major difference between Endemic goiter and Graves' disease.

(d) What are the role of Bursicon and EH in an insects' life ?

(e) Write the biosynthesis of melatonin hormone.

3. Answer any *six* of the following questions :

$5 \times 6 = 30$

(a) Explain the clinical use of vassopresin agonist and GH as a drug in human health.

(b) Describe the role of the pituitary-adrenal axis in the response to stress.

(c) Write the role of different types of hormones involved in the regulation of ovulation.

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(d) Classify pheromones and mention their functions.

(e) List the sequence of events leading from increased renin secretion to increased aldosterone secretion.

(f) Explain how the hypothalamus regulates both the posterior and anterior pituitary glands.

(g) Compare the major causes of pituitary dwarfism and gigantism.

(h) Explain the signalling mechanism of DAG and IP_3 .

(i) Write the anatomical structure and function of islets of Langerhans. $2.5 + 2.5 = 5$

4. Answer any *two* of the following long type questions : $10 \times 2 = 20$

(a) Explain why protein hormones cannot regulate their target cells without using second messengers. Also explain in a step-by-step manner how cAMP is used as a second messenger in hormone action. $3 + 7 = 10$

(b) Describe the formation and action of 1,25-(OH) $_2$ D. How does parathyroid hormone influence the production of this hormone ?

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- (c) Write the chemical nature of prostaglandins. List some of the different forms of prostaglandins and mention their actions.

5+5=10

5. Answer any *one* of the very long type questions :

14×1=14

- (a) Describe the biosynthesis of adrenal cortical hormones by giving their chemical structure and also mention the role of aldosterone.

9+5=14

- (b) Discuss the structure and function of nuclear receptor.

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