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D-6546

M.Sc. (IVth Semester) Examination, 2020

ZOOLOGY

(Metagenomics : Epigenetics,

Chromatin Biology)

Time Allowed : Three Hours

Maximum Marks : 70

SECTION - A

Note : Attempt any ten questions. Each question carries one mark. **1×10=10**

Q. 1. Fill in the blanks :

(i) Commonly _____ of histones leads to the silencing of genes.

(ii) If epigenetic changes occur with in _____ cells they can be transmitted from one generation to the next.

(iii) The extent of chromosome coiling in non dividing cells is _____.

(iv) Nucleosome was first described in 1974 by _____.

(v) Epigenetics refers to changes in _____.

Multiple choice type :

(vi) Which of the following is an example of epigenetic inheritance ?

(a) Mismatch mutations

(b) Histone methylation patterns

(c) Coding regions of genes

(d) Purine dimers

(vii) DNA methylation helps to regulate :

(a) How tightly the DNA is bound to histones ?

(b) Which genes are turned on or off ?

(c) How cell division will proceed ?

(d) Which environmental influences will be passed on to the next generation ?

(viii) Protein molecules around which DNA is tightly coiled in chromatin ?

(a) Histones

(b) Casein

(c) Haemoglobin

(d) None of these

(ix) How dosage compensation is achieved in Drosophila ?

(a) One of the X-chromosomes is females is activated.

(b) The activity of the single X-chromosome in males is up regulated.

(c) The activity of the two X-chromosomes in females is down regulated.

(d) The activity of the autosomes in females is down regulated.

(x) Nucleosomes are bend like thickening of interphase chromatin fibers. Each nucleosome includes :

(a) A block of histone protein

(b) A block of genes

(c) A block of histone protein, part of DNA molecule wound around the block

(xi) Histones are rich in :

(a) Histidine and alanine

(b) Arginine and lysine

(c) Glutamine and glutamic acid

(d) Alanine and phenylalanine

(xii) The term epigenetics was coined by :

(a) Conrad H. Waddington

(b) Griffith and Mahler

(c) James Watson

(d) David Baltimore

SECTION - B

Note : Attempt any five questions. Each question carries 2 marks. **2×5=10**

Q. 2. Very short answer type (25-30 words) :

(i) Chromatin

(ii) Nucleosome

(iii) Heterochromatin

(iv) Epigenetic marks

(v) Genome imprinting

(vi) Pluripotent stem cells

(vii) Genome

SECTION - C

Note : Attempt any five questions. Each question carries 4 marks. **5×4=20**

Q. 3. Short answer type (250 words) :

(i) Nucleosome as fundamental particle.

(ii) Brief history of epigenetics.

(iii) Epigenetics of ciliates.

(iv) Heterochromatin assembly

(v) Chromatin remodelling.

(vi) DNA methylation.

(vii) Nuclear transplantation.

SECTION - D

Note : Attempt any three questions. Each question carries 10 marks. **3×10=30**

Q. 4. Essay type (more than 500 words) :

(i) Describe the structure and function of histone.

(ii) Describe the chromatin modifications and their mechanism of action.

(iii) Describe the epigenetic regulation of chromosome inheritance.

(iv) Describe the dosage compensation in drosophila.

Or

Explain the genomic imprinting in mammals.