

B.Sc. 2nd Semester (Honours) Examination, 2021

Subject-ZOOLOGY

Course ID: 22612

Course Code:SH/ZOOH/202/C-4

Course Title: Cell Biology

Full Marks: 25

Time: 1 Hr 15 Min.

*The figures in the right hand margin indicate full marks.
Candidates are required to give their answers in their own words.*

UNIT-I

1. Answer any five from the following questions.

1x5

- a) Most eukaryotic cells require several hours for division, however all prokaryotic cells divide several times in one hour: comment on this statement in brief.
- b) Surface area to volume ratio is the most important factor for quick dispersal of absorbed metabolites and disposal of waste through the cell surface.
The higher the ratio, quicker the phenomena and smaller the cells higher is the ratio. Prokaryotic cells are much smaller than protozoans, even though are capable of performing the job equally efficiently.
What is the mechanism by which unicellular protozoans are capable of doing the same?
- c) What is the role of cholesterol in membrane fluidity?
- d) Mitochondria are solely the maternal contribution in sexually reproducing animals. During embryogenesis mitochondria are observed to be present in different numbers in different cell types, for instance more in muscle and less in skin cells. How does this differential distribution become possible?
- e) Beta-oxidation of fatty acids occurs both in mitochondria and peroxisomes. What are the specific substrates for Beta-oxidation in mitochondria and peroxisomes?
- f) Cell cycle is essentially subdivided into following phases: i) inter-phase, ii) G1, iii) S, iv) G2 and v) M. Just before M phase the cellular components are considered as doubled objects in a single bag. Why it is considered so?
- g) Reception - - Transduction and Response are three important steps for cell signalling. Write down the roles of each step in brief.
- h) What do you mean by C value paradox?

UNIT-II

2. Answer any two of the following questions.

5x2=10

- I) Cell cycle is precisely controlled by micro-miniature cells using check- points. G1 , G2\M, and Metaphase\Anaphase checkpoints are regulated by different Cyclin\CDK complexes. Write down the names of these complexes and their roles. (2+1.5+1.5)
- II) Cellular communications occur through signalling by the ligands received by different receptors on the cell surface or within the cell. On the bases of these prepare a list of signalling pathways and their corresponding receptors. (2.5+2.5)
- III) Both intrinsic and extrinsic pathways are responsible for apoptosis. Elucidate the pathways in brief and justifiable manner. (2.5+2.5).
- IV) P53 gene is located on chromosome 17 in human cell and expresses a key protein that regulates multitude of cellular functions including cancer prevention. Elucidate the role of this gene in cell growth arrest and apoptosis. 5

UNIT- III

3. Answer any one of the following questions.

1X10=10

- A. Ribosomes are essential components for translation of mRNAs into polypeptides. Elucidate the structure of eukaryotic ribosome with diagrammatic figure. Write down the kinds of ribosomal RNAs (rRNAs) found in eukaryotic cells and their roles in translation. 2+2+2+4
- B. Packaging of DNA in chromosomes of eukaryotic nucleus occurs through gradual condensation of 2nM DNA fibre to 1400 nM metaphase chromosome. Vividly explain the packaging process in stepwise manner with diagrammatic configurations.

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