KATHMANDU UNIVERSITY
End Semester Examination [C]
December, 2024

Marks Scored:

Level : B.Tech.
Year : II

Course : BIOT 205
Semester : I

Exam Roll No. :

Time: 30 mins.

F. M. : 20

Registration No.:

Date 17 DEC 2024

SECTION "A"

[10Q. × 1 = 10 marks]

**Choose and mark [X] encircle the most appropriate option from each set of choices**

1. Organisms that need oxygen for cellular respiration are:
   [ ] Facultative aerobes [ ] Obligate aerobes
   [ ] Facultative anaerobes [ ] Obligate anaerobes

2. Which is not a typical advantage of having cell organelles?
   [ ] Incompatible chemical reactions are separated
   [ ] Chemical reactions become more efficient
   [ ] Specific substrates are localized and maintained at high concentrations within organelles
   [ ] Enzymes that work together are distributed on all of the organelles

3. For vertebrates, the sequence of telomere is:
   [ ] AATTCC [ ] ATATGC [ ] TTAGGC [ ] CTACTA

4. Polytene chromosomes are found in cells which are arrested in:
   [ ] Interphase [ ] Metaphase [ ] Diplotene [ ] Anaphase

5. The arrangement of microtubules in cilia follows
   [ ] 9+2 pattern [ ] 11+2 pattern [ ] 9+3 pattern [ ] 11+3 pattern

6. Both first and second chaisma occurs at same non sister chromatids of homologous pair in:
   [ ] Single crossing over [ ] Reciprocal double crossing over
   [ ] Complimentary Double crossing over [ ] Multiple crossing over

7. Chromosome duplication occurs at:
   [ ] G0 phase [ ] G1 phase [ ] S phase [ ] G2 phase

8. During cell cycle checkpoints, errors associated with unreplicated DNA is mediated by:
   [ ] S cyclin-Cdk complex [ ] M cyclin-Cdk complex
   [ ] APC/C complex [ ] G1/S cyclin-Cdk complex

9. Which of the cell signaling inactivation method involves degradation of the receptor?
   [ ] Receptor sequestration [ ] Receptor down regulation
   [ ] Receptor inactivation [ ] Inhibitory protein synthesis

10. Hormones are released into the blood which signal only the specific target cells; this is an example of:

[ ] endocrine signaling
[ ] synaptic signaling
[ ] autocrine signaling
[ ] allosteric signaling

SECTION "B"

[10Q. × 1 = 10 marks]

**Fill in the blanks.**

11. _____ junctions anchor intermediate filament in a cell to the extracellular matrix.

12. Cells in animal can cease division and enter into a quiescent stage of cell cycle called as _____.

13. _____ is the microtubule organizing complex in animal cells.

14. Z discs, at each end of the sarcomere, are attachment sites for the plus ends of _____.

15. An example of anti-apoptotic BCL2 family protein is _____.

16. _____ protein is also known as the guardian of the genome.

17. Phospholipase Cγ has _____ that binds to phosphorylated Tyrosine.

18. Aging induces several cellular changes. One of them associated with ageing involving nucleus is called as _____.

19. Homologous chromosome of bivalent splits longitudinally forming tetrad structure in_____.

20. Philadelphia chromosome is a condition due to chromosomal translocation between _____chromosomes.

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17 DEC 2024

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Semester : I
F. M. : 55

SECTION "C"
[3Q. × 7 = 21 marks]

Attempt *ANY THREE* questions.

1. Explain how does the symmetric distribution of transporters in epithelial cells of Intestine facilitates the transport of solutes from the gut lumen. What role does the Na+ ion play during the glucose transport across the epithelial cell? [4+3]

2. Explain the cisternal maturation model of transport through Golgi body? How are the oligosaccharides processed in those compartments of the Golgi body? [4+3]

3. Explain how Maturation Promoting Factor was discovered. How does the regulation at the Anaphase Promoting Complex lead to chromatin separation? [3+4]

4. How would a target cell become desensitized to an extracellular signal molecule? Explain how the secondary messengers and enzymatic cascades amplify the extracellular signal received? [4+3]

SECTION "D"
[6Q. × 4 = 24 marks]

Attempt *ANY SIX* questions.

5. Differentiate between the Prokaryotic and Eukaryotic cell. What benefits does the organelle bring to the eukaryotic cell?

6. Explain how the DNA is compacted in the solenoid model.

7. Explain how the Myosin II head moves through the actin filament.

8. Explain the various processes by which change in a proto-oncogene can lead to cancer.

9. Explain how the photosystem II and photosystem I are connected.

10. Explain where the cell cycle checkpoints are located with its significance.

11. Explain the extrinsic pathway of apoptosis that acts through Fas death receptors.

SECTION "E"
[5Q. × 2 = 10 marks]

Attempt *ANY FIVE* questions.

12. Telomere shortening leads to aging.

13. Survival factor can inhibit apoptosis.

14. Meiosis promotes genetic variation.

15. Glyoxysomes are essential for germinating seeds.

16. Organization of DNA in giant chromosome.

17. Arrangement of microtubule in cilia.