KATHMANDU UNIVERSITY
End Semester Examination
February/March, 2019

Level : B. Tech.
Year : II
Course : BIOT 205
Semester : I

Exam Roll No. :
Time: 30 mins.
F. M. : 20

Registration No.:
Date 05 MAR 2019

SECTION "A"
[10 Q. × 1 =10 marks]

Choose and tick [✓] the most appropriate answer.

1. Organisms that use light as energy source and organic compounds as carbon source are
   [ ] photoautotrophs
   [ ] photoheterotrophs
   [ ] chemoautotrophs
   [ ] chemoheterotrophs

2. Which phosphoinositide coat is the membranes of secretory vesicles?
   [ ] PI (4)P
   [ ] PI (4,5)P_2
   [ ] PI (5)P
   [ ] PI (3,4,5)P_3

3. ..... movement of phospholipids occurs rarely.
   [ ] Lateral diffusion
   [ ] Flip-flop
   [ ] Flexion
   [ ] Rotation

4. J or L shaped chromosome with centromere lying near center forming unequal arms is called
   [ ] telocentric
   [ ] sub-metacentric
   [ ] acrocentric
   [ ] metacentric

5. Myosin II are prevented from entering the actin parallel array, when actin is bundled with
   [ ] fimbrin
   [ ] filamin
   [ ] α-actinin
   [ ] tropomyosin

6. Which type of crossing over occurs when first and second chaisma occur at the same non sister chromatid of homologous pair: the second chaisma restoring the order changed by the first one
   [ ] single crossing over
   [ ] reciprocal double crossing over
   [ ] single reciprocal crossing over
   [ ] complimentary double crossing over

7. Signals that are released into the extracellular space and act locally on neighboring cells are
   [ ] contact dependent
   [ ] synaptic
   [ ] paracrine
   [ ] endocrine

8. ..... cGMP are hydrolyzed when one rhodopsin molecule absorbs one photon.
   [ ] 500
   [ ] 250
   [ ] 10^5
   [ ] 1

9. Which of the following is not a characteristics of cancer cell

[ ] loss of intercellular adhesion
[ ] rapid metabolism
[ ] lower Nucleo-cytoplasmic ratio
[ ] metastasis

10. Life span of an individual could be induced by activation of

[ ] DAF-2
[ ] InR
[ ] IGF-1R
[ ] DAF-16

SECTION "B"

[10 Q. × 1 = 10 marks]

Fill in the blanks:

11. In single-stranded RNA viruses, if the genome is complementary to the viral mRNA, then the virus is called as _____.

12. Ubiquinone is an electron accepter for NADH dehydrogenase and _____.

13. _____ connects actin filament bundle in one cell with the next.

14. Polytene chromosome contains 6 arms, the short arm represents _____.

15. _____ factor leads to destabilization and shrinkage of microtubule.

16. G2 cyclins are also called as _____.

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

18. An example of pro-apoptotic BH3 domain only protein is _____.

19. Initially p53 is kept inactive by binding with _____.

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

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SECTION "C"

[5Q. × 7 =35 marks]

Attempt *ANY FIVE* questions.

1. a. Explain endosymbiosis of cell organelles with respect to mitochondrial origin. Draw a well labelled diagram. [4]
   b. Explain transport through Golgi Apparatus by Cisternal maturation. [3]

2. a. Describe Calvin cycle used for carbon fixation. [4]
   b. Explain peroxisome development and its functions. [3]

3. a. Describe the various cell junctions found in vertebrate epithelial cells. [4]
   b. Describe in detail the evolution of sex chromosomes. [3]

4. a. Describe how Myosin II moves along the actin filament. [4]
   b. How DNA replication is regulated such that it occurs only once per cell cycle? [3]

5. a. State the functions of different phases of cell cycle and associated checkpoints. [4]
   b. Extracellular signals can be integrated to produce a unified downstream signal. Explain any one method of signal integration. [3]

6. a. How does Rho GTPases mediate the collapse of growth cone? [4]
   b. Explain the ways by which extracellular survival factors can inhibit apoptosis. [3]

7. a. Describe how chromosomal inversion can form Tyrosine Receptor Kinase (TRK) oncogene. [4]
   b. How does down regulation of insulin signaling pathway can increase lifespan? [3]

SECTION "D"

[5 Q. × 2 = 10 marks]

8. Differentiate between: (*ANY FIVE*)
   a. Prokaryotic and eukaryotic cell
   b. Transporters and channels
   c. Light reactions and dark reactions
   d. Mitosis and meiosis
   e. Intrinsic and extrinsic pathway of apoptosis
   f. Benign and malignant tumor

SECTION "E"

[5 Q. × 2 = 10 marks]

9. Explain How /Why for: (*ANY FIVE*)

a. Sodium gradient facilitates glucose transport.
b. Glyoxysomes are essential for seed germination.
c. APC complex facilitates chromatin separation during Anaphase.
d. Calcium ions are released in response to activated G-protein coupled receptor.
e. Diet calorie restriction can increase longevity.
f. Centrosome is microtubule organizing complex.