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SEAT No. _____

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SARDAR PATEL UNIVERSITY
Class SYBSc Semester-III
Subject- Bioinformatics Course: US03CBNF02
CELL BIOLOGY AND GENETICS

Date: 26/11/18 (Monday) Time: 2:00-5:00 pm MAX. MARKS- 70

Q1 Answer the following Multiple Choice Questions. All are compulsory:[1 X 10=10]

[1] Which of the following correctly matches an organelle with its function?

- (a) Mitochondrion . . . photosynthesis (b)Nucleus . . . cellular respiration
(c) Lysosome . . . movement (d)Central vacuole . . . storage

[2] Mitochondria and chloroplasts share several common features, for example,

- (a)both are capable of semiautonomous growth and reproduction.
(b)each contains a small amount of DNA
(c)each organelle synthesises some of its own protein.
(d) all of the above.

[3] Integral proteins:

- (a)are weakly bound to the surface of the membrane.
(b)are strongly bound to the cytosolic surface of the membrane.
(c)are completely embedded within the lipid bilayer.
(d)are amphipathic.

[4] Who proposed the fluid mosaic model of cell membrane structure in 1972?

- (a)Davson and Singer (c). Brown and Goldstein
(b) Singer and Nicholson(d)Davson and Danielli

[5] On which plant Mendel did his experiment

- (a) Wild pea (b) Garden pea (c) Cow pea(d) Pigeon pea

[6] - The ratio 1:1:1:1 is expected in

- (a) Monohybrid cross (b) Dihybrid cross (c) Back cross (d) Test cross

[7] A gene pair hides the effect of another. The phenomenon is

- (a) Dominance (b) Mutation (c) Epistasis (d) None of the above

[8] A dihybrid cross F₂ ratio of 15:1 is due to

- (a) Duplicate gene (c) Dominance epistasis
(b) Recessive epistasis (d) Supplementary gene

[9] Crossing Over promotes:

- (a) Recombination (b) Linkage
(c) Epistasis (d) None

[10] The F₂ ratio for duplicate epistasis is

- (a) 13:3 (b) 15:1 (c) 9:7 (d) 9:6:1

Q2- Short Questions: (answer any six) [10X2=20]

[i] What are passive transport and mention its different types?.

[ii] Why mitochondria is considered the power house of the aerobic cells?

[iii] Why are lysosomes known as "the cleaners" of the cell waste?

[iv] Mendel selected pea plants for his experimental material in hybridization. Why?

①

(P.T.O)

[v] Differentiate between Linkage and crossing over.

[vi] Explain Backcross and Test cross with an example.

[vii] A woman is homozygous dominant for short fingers (SS). She marries a man who is heterozygous for short fingers (Ss). Will any of their children have long fingers (ss)? Explain the result.

[viii] Define Incomplete dominance.

[ix] Define Supplementary gene.

[x] Give the brief history of Mendel.

[xi] Explain Epistasis with example.

[xii] Differentiate between 70s and 80s ribosomes.

Q3 (a) What are the basic constituents of the cell membrane? Explain. [5]

(b) Explain Fluid Mosaic Model of Membrane and its importance. [5]

OR

Q3 (a) Differentiate between impermeable, permeable, and selectively permeable membrane. [3]

(b) Explain unit membrane concept and how it differ from Fluid Mosaic Model. [7]

Q4(a) What is the difference between smooth and rough endoplasmic reticulum? [3]

(b) What is mitochondria? What is the basic morphology and function of this organelles. [7]

OR

Q4 (a) Explain different types of lysosomes. [5]

Q4 (b) Why ribosomes are called as 'factories for protein synthesis'? [5]

Q5 (a) Explain: Law of dominance and Law of Independent assortment. [5]

Q5 (b) Jane and John are expecting a baby and know that they are both carriers (ie heterozygous) of cystic fibrosis (Cc). What is the probability that their child will have cystic fibrosis (cc)? What is the probability that their child will be a carrier of cystic fibrosis? [5]

OR

Q5 (a) Enlist all the seven pairs of contrasting characters of pea studied by the Mendel and why he was successful. [3]

Q5 (b) A pea plant being dominant homozygous for round seed shape and yellow colour was crossed with another plant being recessive homozygous for wrinkled seed shape and green colour. Explain the ratio of the different types expected in the segregating F2 generation with the help of a Punnet's Square. [7]

Q6 Write a short note on following (a) Complementary gene (b) Duplicate gene [10]

OR

Q6 (a) What is penetrance? Discuss its different forms. [5]

Q6 (b) Explain lethal gene with an example. [5]

