**ST. JOSEPH’S COLLEGE (AUTONOMOUS), BANGALORE-27**

Register No-

DATE: 12-4-19

**B.Sc. BIOTECHNOLOGY– II SEMESTER**

**SEMESTER EXAMINATION, APRIL 2019**

**BT218: CELL BIOLOGY AND GENETICS**

**Time- 21/2 hrs Max Marks-70**

**This paper contains two printed pages and three parts**

1. **Answer any TEN of the following 10 X 2 = 20 marks**
2. What are the functions of the nuclear lamina?
3. During glycolysis, which are the organic molecules that donate a phosphate group to ADP during substrate-level phosphorylation?
4. Write a note on the endosymbiont theory.
5. Why and how is the lysosomal pH maintained at 5?
6. Write a brief note on Ligand-gated ion channels.
7. Draw a graph that illustrates the cyclin expression cycle.
8. State the Law of Independent Assortment. Give the dihybrid phenotypic and genotypic ratio.
9. What is pleiotropy?
10. State the Lyon hypothesis.
11. What is Allele frequency?
12. What is recombination frequency?
13. What is translocation? What is its genetic effect?
14. **Answer any FIVE of the following 5 X 6 = 30 marks**
15. Using illustrations, describe how *p53* regulates the cell cycle. What are its implications in cancer?
16. Describe the structure of Microtubules. What are their functions in the cell?
17. Write a note on Epinephrine signalling in the cell.
18. What are the different pathways of ATP production in the cell? In a tabular format, compare these pathways.
19. What are *kappa* particles? Outline their inheritance in *Paramecium*.
20. Outline the origin of Breadwheat.
21. Heterozygous black guinea pigs are crossed among themselves. What is the probability the first three offspring are alternately black-white-black or white-black-white?
22. **Answer the following 2 X 10 = 20 marks**
23. Using an example, explain how proteins are targeted to the plasma membrane through the secretory pathway.

**OR**

What modifications of the C3 carbon fixation pathway have plants evolved and why? Explain using appropriate diagrams.

1. Suppose that crossing two homozygous lines of white clover, each with a low content of cyanide, produces only progeny with high cyanide content. When these F1 progeny are crossed to either parental line, half of the progeny as low cyanide content, while the other half has high cyanide content.
2. What type of interaction may account for these results?
3. What phenotypic ratio is expected in the F2?
4. If a 12:4 ratio is obtained in the progeny from parents with high cyanide content, what are the parental genotypes?

**OR**

The recessive gene *sh* produces shrunken endosperm in corn kernels and its dominant allele *sh+* produces plump kernels. The recessive gene *c* produces colourless endosperm and its dominant allele *c+* produces coloured endosperm. Two homozygous plants are crossed, producing an F1, all phenotypically plump and coloured. The F1 plants are testcrossed and produce 149 shrunken, coloured: 4035 shrunken, colourless: 152 plump, colourless, 4032 plump, coloured.

1. What were the phenotypes and genotypes of the original parents?
2. How are the genes linked in F1?
3. Estimate the map distance between *sh* and *c*.

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