Indian Association for the Cultivation of Science

(Deemed to be University under *de novo* Category)

Master's/Integrated Master's-PhD Program/Integrated Bachelor's-Master's Program/PhD Course

End-Semester (Sem- UGII) Examination-Spring 2021

Subject: Biochemistry,Genetics and evolution ***Subject Code(s): BIS1201***

Full Marks: 50 ***Time Allotted: 3 h***

Part 1

Answer all (2X15=30)

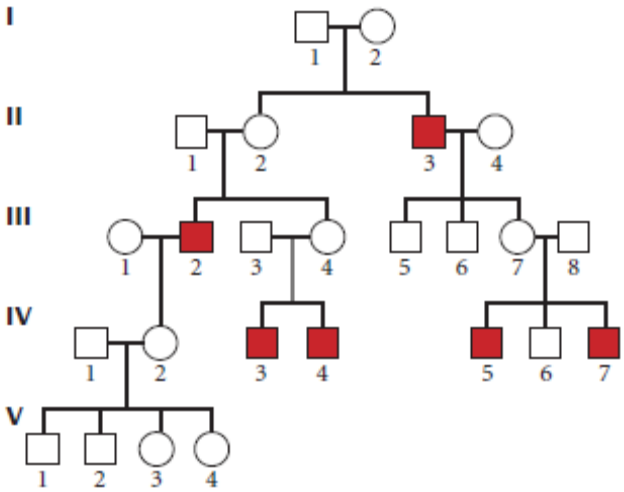
1. Which molecule links between urea cycle and TCA cycle?
2. What are the fates of oxalic acids?
3. Which phosphagen provides as reservoir of high energy phosphate in muscle cells (which provides energy more than ATP)? What is the amount of the energy released by hydrolysis of this molecule?
4. What are ketogenic and glucogenic amino acids? Give two examples of each.
5. What is transamination reaction?
6. What is the role of pyridoxal phosphate in transamination reaction?
7. What is the role of glutamate dehydrogense? Explain in details
8. Name two inborn diseases rose due to defective metabolism of phenylalanine?
9. Explain regarding the energy yield of the TCA cycle.
10. What is carnitine cycle? Explain
11. How ketone bodies get generate from acetyl CoA?
12. Where pentose phosphate pathway takes place?
13. How E Biotine takes part in the process Gluconeogenesis?
14. What are the products generated due to fructose metabolism?
15. Name one alfa amino-acid which does not take part in protein synthesis but plays a crucial part in human metabolism?

Part 2

16.

a) Color blindness in humans is an X-linked recessive trait. Approximately 10% of the men in a particular population are color blind. What percentage of the women in the population is expected to be heterozygous carriers of the color-blind allele?

b) What is likely mode of inheritance of the following pedigree?



c) Why are monozygotic twins genetically identical, whereas dizygotic twins have only 1/2 of their genes in common on average?

d) Define selection co-efficient.

2+1+1+1=5

17.

a) Plant species A has a diploid chromosome number of 12. Plant species B has a diploid number of 16. What would probably be the diploid number for new species, C, arises as an allopolyploid from A and B?

b) What is reinforcement?

c) What is the function of superoxide dismutase?

2+1+2=5

18.

a) In electron transfer, only the quinone portion of ubiquinone undergoes oxidation-reduction; the isoprenoid side chain remains unchanged. What is the function of this chain?

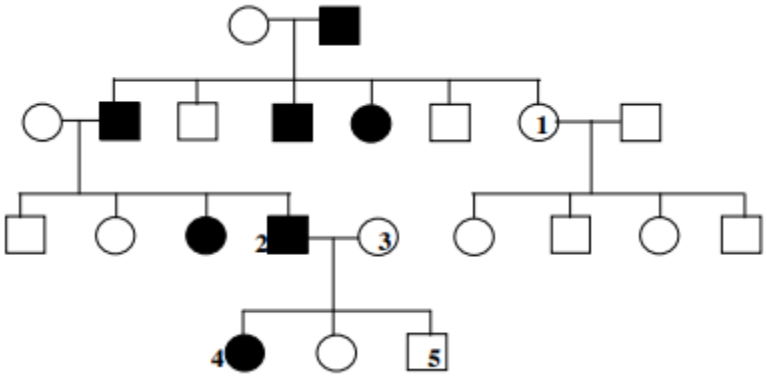
b) Explain why rotenone ingestion is lethal to some insect and fish species?

c) An allele A is being mutated to a. Rate of forward and reverse mutation is $6X10^{-7}$ and $6X10^{-8}$ .What will be the frequencies of *A* and *a* at mutational equilibrium,

2+1+2=5

19.

a) What is the most likely mode of inheritance of the following pedigree? State the genotypes of individuals # 1-5



b) How auto *polyploidy* contribute to the sympatric speciation?

c) Why is genetic drift more significant in small populations?

2+2+1=5