ARS NET exam

Question number 1 is compulsory.

1. Answer the following questions briefly

i) What advantage RILs have over DHs in genetic mapping

ii) How an F2 population can be immortalized for dissecting both additive and dominance variation

iii) How MgCl2 concentration affect the efficiency of PCR

iv) What is stuttering and why it happened?

v) During DNA isolation , the temperature of extraction buffer is

maintained at 650C. Why?

vi) Why do we need larger population size for fine mapping of a gene?

vii) What will happen to PCR, if the template DNA concentration is >200 ng.

viii) While constructing a cDNA library, why do we need to isolate RNA from different plant parts and under different stimuli?

ix) Why the nucleotide sequence of 3' end of forward and reverse primers should not be complementary

x) What will happen if the nutrient medium used for the tissue culture is not supplemented with glycine?

xi) Why is it necessary to culture embryos invitro in intergeneric crosses?

xii) Will there be any limitation for releasing glyphosate (herbicide) resistant transgenic rice in Eastern India?

2. What is T-DNA? Differentiate between T-DNA of Ti and Ri plasmids.

Discuss the mechanism of T-DNA transfer to plant cells.

3. What is genetic code? Is genetic code universal? Discuss it with suitable examples?

4. Enlist various approaches used for cloning of genes in eukaryotes. Describe the procedure for map based cloning? What limitation he map based cloning approach has over other methods. Name any five genes that have been cloned in crop plants using map based cloning approach.

5. What is antisense RNA technology? How is it useful in plant improvement? Discuss it with suitable examples?

6. What is binary vector? Discuss the structure and function of binary vector? How it is useful in plant improvement?

7. What are haploids? Discuss various approaches used for the production of haploids in crop plants? What limitations each of these methods have? What uses haploids have in basic genetic studies and in crop improvement?

8. a) What are transgenic crops? Discuss two major approaches used for production of transgenics. What advantages and limitation each of these approaches have over each other?

b) Area under commercial transgenic crops has increased continuously since the year 2000. Still a large number of NGOs are opposing commercialization of transgenics. What are the major concerns for the opposition? Give your view point for or against each of these concerns?

9. What do you understand by nif genes? Now that the genomes of both nitrogen fixing bacteria (Rhizhobium) and legumes (soybean, Pigeon pea) are sequenced, how do you see the possibility of converting the non nitrogen fixing cereals like rice and wheat into nitrogen fixing system?

10. a) What are SSR markers? Enumerate the procedure for how SSR markers are being developed? What advantage SSR markers over RFLP markers?

b) Enlist any four approaches used for labelling? Describe the procedure for 'hexamer primer' labelling of nucleic acids?

11. What are cDNA libraries? Describe the procedure to develop cDNA libraries. What advantage cDNA libraries would have over genomic DNA libraries?

12. What are QTLs? Write down the procedure to map a QTL? How NILs are used for mapping / fine mapping of a QTL. Name any five economically important QTLs so far cloned from crop plants?

13. What is marker assisted selection and how its differs from markers assisted back crossing? If you have the responsibility of pyramiding four genes from four different source into one elite line, which approach will you follow and why?

14. a)Write different steps and enzyme involved in citric acid cycle.

b) How do enzymes catalyze chemical reaction with in a cell? What is Km and how can an enzyme be characterized by this parameter?

15. Promoters are organ specific and extremely important for regulating the expression if a gene. You are given the responsibility of cloning tapetum specific promoter(s) from rice. Write down the procedure in detail?