Answer **ALL** Questions

Time: 03 Hours

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1. a) Describe 'Mendelian Population'   (20 marks)

   b) Consider a gene pool of random mating population containing 'A' and 'a' alleles at
   frequencies 'p' and 'q', respectively

     i)   Work out the distribution of possible individuals (genotypes) in th
population   (30 marks)

     ii)   If these individuals undergo random mating, show that the same distributic
can be obtained in the next generation   (50 marks)

2. a) Explain 'Linkage and Crossing over'   (40 marks)

   b) Three recessive genes in linkage group V of tomato are 'a' producing absence of
   anthocyanin pigments, 'hl' producing hairless plants and 'j' producing joint less fruit
   stems. Among 3000 progenies from a tri-hybrid test cross, the following phenotypes
   were observed.

259	hairless	268	anthocyaninless, jointless, hairless
40	jointless, hairless	941	anthocyaninless, hairless
931	jointless	32	anthocyaninless
260	normal	269	anthocyaninless, jointless

  i)   How were the genes originally linked in the tri-hybrid parent

  ii)   Estimate the distance between the genes?

          (show each step clearly) $(30 \times 2 = 60$ marks)

3. Write an account on polygenes and their inheritance with a suitable example (100 marks)

4. Briefly discuss the following:
   a) Translocation in chromosomes
   b) Effect of mutation on genetic equilibrium   (50 x 2 = 100 marks)

5. Explain the following with one example in each:
   a) Dominance and recessiveness
   b) Semi-dominance (Incomplete dominance)
   c) Epistasis
   d) Co-dominance   (25 x 4 = 100 marks)

6. Write short notes on
   a) Polyploidy   (40 marks)
   b) Cell cycle   (30 marks)
   c) Interference and coincidence (30 marks)