

(78)

**SARDAR PATEL UNIVERSITY**  
**M.Sc. (Genetics) – Third Semester Examination**  
**Monday, 24<sup>th</sup> October, 2016**  
**02:00 P.M. to 05:00 P.M.**  
**PS03CGEN03: Genetics in Crop Improvement**

**Total Marks: 70**

- Note: (1) Figures to the right indicate marks.  
 (2) Draw a neat and labeled diagram, wherever necessary.

**Q. 1 Choose the most appropriate answer from the four alternatives given: [08]**

- (i). **Johanssen obtained commercially seeds of the..... of French bean.**  
 (a) princess variety (b) golden variety  
 (c) velvet variety (d) dolly variety
- (ii). **In India every seed of Varalaxmi hybrids cotton is produced by.....**  
 (a) hand emasculation (b) pollination  
 (c) both (a) and (b) (d) tissue culture
- (iii). **..... method is most effective for the detection of haploids plants.**  
 (a) morphological marker (b) biochemical marker  
 (c) genetic marker (d) all of them
- (iv). **Spontaneous production of haploids usually occurs through .....**  
 (a) stem culture (b) embryo culture  
 (c) meristem culture (d) parthenogenesis
- (v). **Somaclonal variations are the ones.....**  
 (a) caused by mutagens (b) produced during tissue culture  
 (c) caused by gamma rays (d) induced during sexual embryogeny
- (vi). **The insect toxicity of BT resides in a .....**  
 (a) large protein  
 (b) large lipids  
 (c) glyco lipids  
 (d) hormones
- (vii). **Heterozygous and homozygous dominant individuals cannot be differentiated with.....**  
 (a) AFLP (b) RAPD  
 (c) RFLP (d) AP-PCR
- (viii). **Ideally distance between molecular marker and gene of interest or QTL is.....**  
 (a) <7cM (b) <50 cM  
 (c) <10 cM (d) <5 cM

- Q.2 Answer any SEVEN from the following: [14]**
- (i). Define heterosis.
  - (ii). Write the advantages of back cross method.
  - (iii). What do you mean by mutational breeding?
  - (iv). Define cybrids.
  - (v). Write a short note on pollen culture.
  - (vi). Write any three factors influencing somaclonal variations.
  - (vii). What do you mean by Bt toxin gene?
  - (viii). Define transgenic plants and write a short note on transgenic tomato.
  - (ix). Differentiate between RAPD and RFLP.
- Q.3 (a) Explain in detail about pure line theory and procedure for pure line method. [6]**
- (b) What do you mean by male sterility in crops? Write various types of male sterility studied by you. [6]**
- OR**
- (b) Discuss in detail about importance of heterosis breeding in crop improvement programmes. [6]**
- Q.4 (a) Write a detail note on methods for isolation of protoplast. [6]**
- (b) Explain in detail about uses of haploids and dihaploids in crop improvement. [6]**
- OR**
- (b) Give a detail account on viability and plating density of protoplast. [6]**
- Q.5 (a) What is somaclonal variation? Discuss without *in vitro* scheme used for obtaining somaclonal variations in crop improvement programs. [6]**
- (b) Discuss various applications and disadvantages of somaclonal variation. [6]**
- OR**
- (b) Give a detail account on virus resistance in transgenic crops. [6]**
- Q.6 (a) Explain in detail about transgenic for quality improvement with suitable examples. [6]**
- (b) Write a note on marker assisted selection in crop improvement programs. [6]**
- OR**
- (b) Write a detail note on drought resistance in transgenic crops. [6]**
- .....