**PAPER-ll**

**Total Marks: 100**

Concept of genetics. Role of genetics in crop improvement. Chemical composition of

hereditary material. Molecular basis of genetic code. Basic control system in gene

expression. Variation-basis of plant breeding, its creation and exploitation. Breeding

strategies. Breeding methods of self, cross and asexually propagated crops. Process of

variety development.

Concept of modern breeding; doubled haploid breeding, marker-assisted breeding,

mutation breeding, heteroploid breeding, hybrid breeding and transgenic breeding.

Various techniques of developing transgenic plants and scope of transgenic plants in

plant breeding. Impact of cultivation of transgenic crops on biodiversity. Role of agribiotechnology

in crop improvement. Breeding cultivars for marginal lands. Role of edible

oilseeds in agriculture and economy of Pakistan. Development of low erucic acid and

glucosinolate (double low) varieties in rapeseed and mustard crops.

Resistance breeding. Host-plant genetic resistance. Genetic and physiological

mechanisms of stress tolerance in crop plants. Major insect pests of important

agricultural crops. Principles and methods of insect control. Entomological industries;

Apiculture, Sericulture and Lac-culture. Types of agricultural pollution and its

management. Mode of action, hazards and safety measures of insecticides. IPM and

economics of pest management.

Causes, nature of losses and economic importance of plant diseases, and principles of

their control. Economic importance, transmission and control of plant viruses. Various

methods to control and manage plant diseases. Methods of screening of crop

germplasm for the sources of disease resistance. Physiological requirements and

problems in mushroom cultivation. nutritional value of mushroom and remedial

measures of mushroom poisoning.

Classification, propagation, management practices and post harvest handling of

Horticultural crops. Role of tissue culture in agriculture. Cultivation, production, chemical

and pharmacological properties of medicinal plants. Propagation methods, management

practices and marketing of fruit and ornamental plants nurseries.

Soil formation and Soil profile. Types of soil, salt affected and waterlogged soils, and

their reclamation and management. Factors affecting crop growth and growth

expression models. Sources and significance of organic matter in agriculture. Soil

fertility problems in Pakistani soils. Integrated plant nutritional system. Kinds and levels

of soil survey, and application of GIS and remote sensing in soil survey. Types, control

and management of soil erosion.

**SUGGESTED READINGS**

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*2. Anonymous. 2002 Soil Survey Manual. USDA, Univ. Press of the Pacific,*

*Washington DC, USA.*

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*Pub. CO. Pvt. Ltd, New Delhi, India.*

*4. Atwal, A.S. and S.S. Bains. 2005. Agricultural Pests of Southeast Asia and their*

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*9. Chahal, G.S. and S.S. Gosal. 2002 principles and procedures of plant Breeding:*

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*11. Elzinga, R.T. 2003 fundamentals of Entomology. Prentice Hall, London, UK.*

*12.Grieve, M. 1992. A Modern Herbal. Tiger Book Int., UK.*

*13.Griffiths, A.J.F J.H. Miller, D.T. Suzuki, R.C. Lewontin and W.M. Gelbart. 2005. An*

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*16.Khalid, S. 1999. Research on Plant Virology. APS Press. The Am. Phytopathol.*

*Soc., St. Paul., USA.*

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18. *Klug, W.S. and M.R. Cummings. 2003. Concepts of Genetics. 7th Ed. Pearson Edu.,*

*Singapore.*

19. *Loodish, H. 2004. Molecular Cell Biology. 5th Ed. John Wiley & Sons, NY, USA.*

*20.Lucas, J.A. 1998. Plant pathology and Plant Pathogens. Blackwell Sci., USA.*

*21.Malik, M.N. 1994 Horticulture. NBF, Islamabad, Pakistan.*

22. *Mengel, K. and E.A. Kirkby. 2001. Principles of Plant Nutrition. 5th Ed. Kluwer Acad.*

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*23.Napier, T.A. 2000. Soil and Water Conservation Policies: Successes and failures.*

*CRC Press, Boca Raton, FL, USA.*

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