DEPARTMENT OF MECHANICAL ENGINEERING
SYLLABUS FOR QUALIFYING EXAMINATION FOR PH.D SUBMISSION
INDUSTRIAL & PRODUCTION ENGINEERING

SECTION - A

Types of operation and process systems – Functions of operation planning and control – 
Aggregate planning - Master production scheduling - Material requirement planning, MRP-II, 
Scheduling, sequencing, priority rules for dispatching jobs. Capacity planning and control, 
Concepts of just-in-time - Pull and push system, Kanban systems – Inventory systems, Inventory 
control techniques - Project planning, Monitoring and control - Maintenance management. 
TQM: QC tools, Quality circles, Bench marking, Quality function deployment, Standardization, 
ISO 9000 system.

Experiments for process design and improvement: Guidelines for design of experiments, 
factorial experiments, $2^k$ factorial design, addition of centre points, blocking and confounding. 
Introduction to Taguchi Methods: Additive cause-effective model, optimization using signal-to-
noise ratios, use of orthogonal arrays, selecting orthogonal arrays and linear graphs.

SECTION - B

Composite Materials: Elastic behavior of unidirectional and multi directional composites, 
Laminated composites, Nano Composite Materials 
Machining of materials by conventional methods (Turning, Milling and Grinding) and 
unconventional methods (USM, EDM and WJM), welding of materials by SMAW, TIG/MIG, 
Friction, Friction stir processes.

Destructive testing of materials (Hardness, Tensile, Toughness, Fatigue and Creep) and Non 
destructive testing of materials (Dye penetration test, Magnetic particle method, Radiography 
and Ultrasonic method).

Books:

1. Total Quality Management by Besterfield et al., Pearson Education, India
2. Introduction to statistical quality control, 4th Edition by Douglas C Montgomery, John 
   Wiley & Sons, Inc.
4. Manufacturing Engineering and Technology, Kalpakjian, Adisson Wesley
5. Welding technology and design, V. M. Radhakrishnan, New Age International Publishers
9. Production Engineering, P. C. Sharma, S. Chand

Note: Set Four Questions from each Section