

**Model Question Paper**  
**QUALIFYING EXAMINATION FOR SUBMISSION OF PH.D**  
**MECHANICAL ENGINEERING**  
**INDUSTRIAL & PRODUCTION ENGINEERING**  
(Effective from the Admitted Batch of 2013-2014)

Time: 3 hours

Max. Marks: 100

Answer any **FIVE** questions  
All Questions carry equal marks

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- 1 a) What are the functions of Operations Planning and Control systems?  
b) What are the steps involved in Aggregate Production Planning?
  
- 2 a) What do you mean by Quality function deployment? Explain  
b) Describes briefly the ISO9000 series standards
  
- 3 a) What do you mean by design of experiments? Explain the process of design of experiments.  
b) What are orthogonal arrays? Discuss in detail.
  
- 4 a) What is the relationship between MRP and MPS?  
b) The cost of parameters and other factors for a production inventory system of automobile pistons are given below. Find (a) optimal lot size, (b) number of shortage and (c) manufacturing time and (d) time between set-ups.  
Demand per year = 6,000 units; Units cost = Rs 40; Set-up cost = Rs 500;  
Production rate per year = 36,000 units; Holding cost per year = Rs 8;  
Shortage cost per year = Rs 20.
  
- 5 a) What are the different work holding devices used in conventional machining process? Mention them with neat diagrams?  
b) How you will differentiate up milling and down milling? Explain them with neat diagram?
  
- 6 a) Explain the principle of EDM process with neat diagram? Mention the advantageous and disadvantageous  
b) Explain the principle of SMAW welding with neat diagram? Mention the applications?
  
- 7 a) What are the different destructive testing methods used for testing of welds? Explain them?  
b) Explain the principle of ultrasonic testing method with neat diagram?
  
- 8 a) How the dye penetration method is used for testing of materials? Explain?  
b) Explain the magnetic particle method used for testing of ferrous materials with neat diagrams?

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