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Total No. of Pages : 02

Total No. of Questions : 08

Ph.D in Faculty of Engineering (ME)

**PRODUCTION ENGINEERING**

M.Code : 77387

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT question.
2. Each question carry TWENTY marks.

1.
  - a) Elaborate in detail the chemistry involved in ECM process.
  - b) Classify various non-traditional machining processes.
2.
  - a) Discuss the main properties of metal powders. How does each property affect the performance of metal powder compacts?
  - b) Describe the main operations involved in making a powder metallurgy product.
3.
  - a) Discuss the working principle of Linear Variable Differential Transformer used for the measurement for displacement.
  - b) Errors in measurements can be classified as :
    - i) Gross errors
    - ii) Systematic errors
    - iii) Random errorsExplain these errors by going suitable examples. Discuss the means adapted to minimize these errors.
4. Explain the following :
  - a) Laser Trackers
  - b) Micro and Nanotechnology
5.
  - a) A textile manufacturing unit reports 5000 rejected pieces in a total of 15,00,00,00 pieces manufactured. What is the quality in comparison with the excellent in the field? Determine the failure rate, long term and short term capability,
  - b) Define process capability index and explain the concept of six sigma management
6. Discuss in detail the procedural steps for formation of mathematical model to correlate the input parameters and output parameters.

7. Explain the following :

a) Hybrid electro chemical process

b) Progressive solidification

8. 15 samples of size 4 each were taken and the observed values are given below :

Samples	Observed Values			
1.	32	20	33	6
2.	42	36	52	50
3.	25	15	52	63
4.	22	33	34	23
5.	29	30	27	31
6.	30	34	26	16
7.	34	31	28	34
8.	11	21	20	16
9.	11	22	28	31
10.	36	30	35	26
11.	34	16	37	-26
12.	27	36	51	53
13.	16	35	32	37
14.	25	36	37	24
15.	10	28	14	13

Calculate the UCL and  $\bar{LCL}$  for  $\bar{X}$ -chart and R-chart. Also prepare the chart.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.