

National Examinations December 2013
98-Ind-B2-Manufacturing Processes
3 hours duration

Notes:

1. If doubt exists as to the interpretation of any question, the candidate is urged to submit with the answer paper, a clear statement of any assumptions made.
2. This is a Closed Book exam. Candidates may use one of two calculators, the Casio or Sharp approved models.
3. Any five questions constitute a complete paper. Only the first five questions as they appear in your answer book will be marked.
4. All questions are of equal value.
5. Write your answers in point-form whenever possible, but fully. Show all the calculations.

Marking Scheme (marks)

1.	(i) 7,	(ii) 7,	(iii) 6
2.	(i) 8,	(ii) 7,	(iii) 5
3.	(i) 7,	(ii) 7,	(iii) 6
4.	(i) 7,	(ii) 7,	(iii) 6
5.	(i) 6,	(ii) 8,	(iii) 6
6.	(i) 8,	(ii) 6,	(iii) 6
7.	(i) 6,	(ii) 6,	(iii) 8

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1. (i) Explain the major responsibilities of manufacturing engineers in the manufacture of a product. How do they cooperate with industrial engineering when plant floor activities are concerned?
(ii) What are the factors considered in the selection of engineering materials for manufacturing?
(iii) State your understanding of the annealing process. What is the purpose of the annealing process?
2. (i) State the important factors that must be considered in casting operations. Explain the reasons for using casting processes over other manufacturing methods.
(ii) What is a shell molding process? State the advantages and disadvantages of this process.
(iii) What are the advantages and limitations of permanent molds casting processes (die, centrifugal, etc.)?
3. (i) What are the different types of metal chips and which one of them is the best?
(ii) What is a built-up edge and how does it affect the metal cutting operation? How can it be eliminated or minimized?
(iii) In an orthogonal metal cutting operation, the following data are obtained:
Underformed chip thickness = 0.0098 inches
Actual chip thickness = 0.0169 inches
Rake angle = 20°
Determine the shear angle.
4. (i) Explain briefly the factors or parameters that influence the metal cutting processes.
(ii) Briefly state your understanding of: (a) tool wear and failure, (b) surface finish and integrity and (c) machinability.
(iii) What are the current trends in metal cutting processes?
5. (i) State the factors that should be considered in the selection of a welding process for a particular operation.
(ii) Explain the characteristics of the following welding processes including their general chemical expressions or equations, where applicable: (1) oxyacetylene, (2) arc, and (3) resistance.
(iii) What is the basic difference between oxyfuel gas cutting and arc cutting? State the different types of arc cutting.
6. (i) What is the basic difference between the two groups of plastics? State the characteristics of each group of plastics.
(ii) Explain the purpose of employing specific additives in polymers.
(iii) Explain the manner by which the various factors affect the general properties of plastics.

7.
 - (i) What are the elements of statistical process control?
 - (ii) What is acceptance sampling? State your understanding of acceptance quality level (AQL).
 - (iii) Explain the essentials of Deming and Taguchi methods of quality control/engineering.