BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: ME **SEMESTER :**
BRANCH: AMS **SESSION : SP/17**

SUBJECT: MPE2007 PRODUCT DESIGN AND MANUFACTURING

TIME: 03:00 **FULL MARKS: 60**

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
6. Nothing should be written on front or back of the question paper except tick marking.

Q.1(a) A ladle hook to be designed .This ladle hook is to be used with the transfer ladles for a steel-melting furnace. Evaluate design criteria's and describe the design process of this product. [6]

(b) Explain the following with suitable example and figures: [6]
- (i) Product Modularity
- (ii) Morphological approach for generation of ideas in design of window pane

Q.2(a) Explain the following with suitable examples: [6]
- (i) Design for Maintainability
- (ii) Design criteria for work holders

(b) Explain steps of building house of quality. Prepare a QFD matrix for any product. [6]

Q.3(a) How are 'preferred numbers' useful in standardization ? Suppose a manufacturer wants to produce containers having between 10- 100 gallons capacity. If manufacturer adopt the Renard series ,what would be capacity ratings and The calculated size according to the geometric progression series given by Renard. [6]

(b) With the help of an example, explain the concept of morphology in design and enumerate and explain the phases of morphology of design. [6]

Q.4(a) Explain the term 'Design for Manufacturing'. State the guidelines to implement it. With suitable examples and figures. [6]

(b) Design Morphological approach for machine element, material and process? [6]

Q.5(a) What are the basic principles of design for assembly (DFA)? Also, enumerate briefly the following: [6]
- (i) Theoretical Part Count Efficiency
- (ii) Cost of Assembly Vs Cost of Part Manufacture

(b) What is product life cycle? Illustrate with a suitable example and figure, the various stages of product life cycle? [6]

Q.6(a) Prepare product design matrix for automated teller machine? [6]

(b) What are the methods for the determination of product platform? Construct the Product-Function Matrix (PFM) and analyze functional similarity for any product. [6]

Q.7(a) Explain Manufacturing Process Selection with respect to following factors : [6]
- (i) Cost of manufacture and life cycle cost
- (ii) Quantity of parts required
- (iii) Complexity

(b) Explain the following with respect to product and process design: [6]
- (i) Robust design
- (ii) Optimization in design

*******03/05/17******E**