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B.TECH
(SEM IV) THEORY EXAMINATION 2017-18
MANUFACTURING SCIENCE & TECHNOLOGY-I

Time: 3 Hours *Total Marks: 70*

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. **Attempt *all* questions in brief.** **2 x 7 = 14**

   a. What are the major classifications of manufacturing processes?
   b. What is recrystallization temperature?
   c. What is forging? What are the common forging processes?
   d. What is the angle of bite for rolling and on what does it depend?
   e. Distinguish between blanking and punching process.
   f. Compare hot chamber and cold chamber die casting process.
   g. What is the unconventional metal forming process? Enlist unconventional metal forming processes.

SECTION B

2. **Attempt any *three* of the following:** **7 x 3 = 21**

   a. List and explain different defects in rolling process. Also list their causes and remedies.
   b. What is the use of power metallurgy process? Discuss the various steps involved in power metallurgy process.
   c. What is deep drawing? List and explain the different defects in deep drawing operation.
   d. How does compound die differ from progressive die? Explain the compound die with suitable diagram.
   e. What are the advantages of bottom gating system? Derive the expression for the bottom gating system, time taken to fill the mould cavity.

SECTION C

3. **Attempt any *one* part of the following:** **7 x 1 = 7**

   (a) What is centrifugal casting? Explain about different types of centrifugal casting methods.
   (b) Enumerate some common casting defects. Explain their causes and remedies.

4. **Attempt any *one* part of the following:** **7 x 1 = 7**

   (a) Briefly describe with neat sketch, working and application of explosive forming.
   (b) Write short note on: 3-2-1 principle of location & jigs and fixtures.

5. **Attempt any *one* part of the following:** **7 x 1 = 7**

   (a) Define trimming, shaving, notching, lancing and nibbling operations.
   (b) Derive an expression of radial stress in deep drawing of a cup.

6. **Attempt any *one* part of the following:** **7 x 1 = 7**

   (a) What is wire drawing operation? In a wire drawing operation initial wire diameter is 6 mm and final wire diameter is 5 mm, the half die angle $\alpha = 10^0$.

Find the drawing stress considering friction if $\mu = 0.1$ and $K = 18$ MPa. Also calculate the maximum possible reduction.

(b) Briefly explain the principle and mechanism of rolling process. Calculate the bite angle when rolling 15 mm thick plate using rolls of 400 mm diameter. Final thickness of plate is 12 mm.

7. **Attempt any *one* part of the following:** **7 x 1 = 7**

(a) Derive an expression for average pressure for forging of a disc with sticking friction condition.

(b) A strip of lead with initial dimension $24 \times 24 \times 150$ mm is forged between two flat dies to a final size of $6 \times 96 \times 150$ mm and if the coefficient of friction is 0.25, determines the forging force. The average yield stress of lead in tension is 7 N/mm^2.