

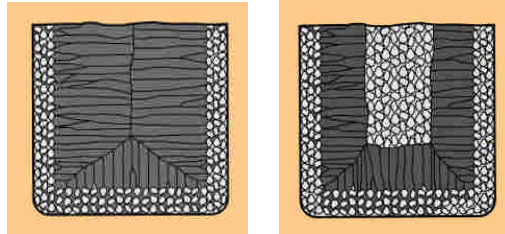
Process and Design for Manufacturing

2nd Examination May 9 2008 (11:10am ~ 12:45pm)

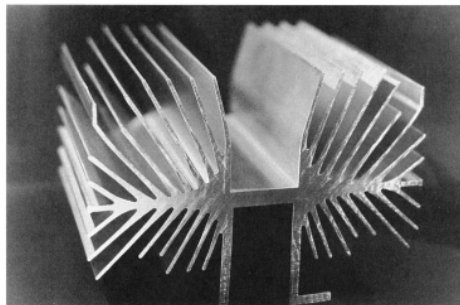
Only one A4 size hand writing notes allowed

Part A. Answer the following questions briefly. (60%)

1. From the following Figures tell what makes the grain structure different in casting? (5%)



2. Briefly describe the injection molding process. (10%)
3. What are the three basic steps in the conventional powder metallurgy (PM) shaping? (5%)
4. What are the advantages of Impregnation in PM? (5%)
5. What are the differences between bulk deformation processes and sheet metal processes? (10%)
6. List some of the products produced on a rolling mill. (5%)
7. What kind of process or processes can make a complex cross-section for a heat sink that illustrate as follows? (5%)



8. Identify the two forces that can be measured in the orthogonal metal cutting model. (5%)
9. What is the difference between threading and tapping? (5%)
10. What are the differences between rotational parts and prismatic parts in machining? (5%)

Part B. Multiple choices: (40%)

1. Sand casting is which of the following types (a) expendable mold, or (b) permanent mold?
2. The flow curve expressed the behavior of a metal in which of the following regions of the stress-strain curve (a) elastic region, or (b) plastic region?
3. Of the three polymer types, which one is the most important commercially: (a) thermoplastics, (b) thermosets, or (c) elastomers?

4. The parting line injection molding is which one of the following: (a) the lines formed where polymer melt meets after flowing around a core in the mold, (b) where the clamping unit is joined to the injection unit in the molding machine, (c) where the two mold halves come together, and (d) the narrow gate section where the parts are separated from the runner?
5. Which one of the following processes or processing steps is not applicable in glass-working (a) annealing, (b) pressing, (c) quenching, (d) sintering, and (e) spinning?
6. Which of the following casting processes are expendable mold operations (four answers) (a) centrifugal casting, (b) die casting, (c) investment casting, (d) low pressure casting, (e) sand casting, (f) shell molding, (g) slush casting, (h) vacuum molding?
7. The principal components of an injection molding machine are which two of the following: (a) clamping unit, (b) hopper, or (c) injection unit, (d) mold, and (e) part ejection unit?
8. A branched molecular structure is stronger in the solid state and more viscous in the molten state than a linear structure for the same polymer: (a) true, or (b) false?
9. In which of the following extrusion operation is friction a factor in determining the extrusion force (a) direct extrusion, (b) indirect extrusion, or (c) both?
10. In sand casting, the volumetric size of the pattern is (a) bigger than, (b) the same size as, or (c) smaller than the cast part?
11. Which of the following cutting conditions has the strongest effect on cutting temperature (a) feed, or (b) speed?
12. The function of the ejection system is which one of the following (a) move polymer melt into the mold cavity, (b) open the mold halves after the cavity is filled, (c) remove the molded parts from the runner system after molding, or (d) separate the part from the cavity after molding.
13. Which of following qualifies as a precision-casting process (two answers) (a) ingot casting, (b) investment casting, (c) plaster-mold casting, (d) sand casting, and (e) shell molding?
14. As particle size increases, interparticle friction (a) decreases, (b) increases, or (c) remains the same?
15. End milling is most similar to which one of the following: (a) face milling, (b) peripheral milling, (c) plain milling, or (d) slab milling?
16. A lathe can be used to perform which of the following machining operations (three correct answers) (a) boring, (b) broaching, (c) drilling, (d) milling, (e) planning, and (f) turning?
17. The holding force in drawing is most likely to be (a) equal to, (b) great than, or (c) less than the maximum drawing force?
18. Which of the following are bulk deformation processes (three correct answers): (a) bending, (b) deep drawing, (c) extrusion, (d) forging, (e) rolling, and (f) shearing?
19. Flash in impression die forging serves no useful purpose and is undesirable because it must be trimmed from the part forming: (a) true, or (b) false?
20. Which of the following manufacturing processes are classified as material removal processes (two correct answers) (a) casting, (b) drawing, (c) extrusion, (d) forging, (e) grinding, (f) machining, (g) molding, (h) spinning?