

國立中央大學 109 學年度碩士班考試入學試題

所別： 機械工程學系 碩士班 製造與材料組(一般生)

共 4 頁 第 1 頁

科目： 機械製造

本科考試可使用計算器，廠牌、功能不拘

*請在答案卷(卡)內作答

單選題共 50 題;每題 2 分

1. Which one of the following engineering materials is defined as a compound containing metallic and nonmetallic elements: (a) ceramic, (b) composite, (c) metal, (d) polymer, (e) sand?
2. What are the processes start with a material that is in a fluid or semifluid state and solidifies the material in a cavity: (a) casting, (b) forging, (c) machining, (d) turning, (e) pressing?
3. Particulate processing of metals and ceramics involves which of the following step: (a) adhesive bonding, (b) deformation, (c) forging, (d) material removal, (e) sintering?
4. Deformation processes include which of the following: (a) machining, (b) drilling, (c) extrusion, (d) sintering, (e) milling?
5. Which of the following are NOT advantages and characteristics of hot working relative to cold working: (a) fracture of workpart is less likely, (b) friction is reduced, (c) isotropic mechanical properties, (d) lower deformation forces is required, (e) more significant shape changes are possible?
6. What rolling mill types are associated with relatively small diameter rolls in contact with the work: (a) cluster mill, (b) continuous rolling mill, (c) three-high configuration, (d) reversing mill, and (e) none of the above?
7. Open-die forging includes: (a) cogging, (b) flashless forging, (c) precision forging, (d) impression-die forging, (e) Mannesmann process?
8. What is the theoretically maximum reduction possible in a wire drawing operation (assumes a perfectly plastic metal, no friction, and no redundant work): (a) zero, (b) 0.63, (c) 1.0, (d) 2.72 (e) 2.92?
9. What causes the springback in a sheet-metal-bending operation: (a) elastic modulus of the metal, (b) elastic recovery of the metal, (c) overbending, (d) overstraining, or (e) yield strength of the metal?
10. Which of the following metal would typically NOT be used in die casting: (a) aluminum, (b) magnesium, (c) zinc, (d) tin, (e) tungsten?
11. What is the correct definition of ultimate tensile strength: (a) the stress encountered when the stress-strain curve transforms from elastic to plastic behavior, (b) the maximum load divided by the final area of the specimen, (c) the maximum load divided by the original area of the specimen, (d) the stress observed when the specimen finally fails (e) none of the above?
12. What is stress-strain relationship best describes the behavior of most metals at room temperature: (a) elastic and perfectly plastic, (b) elastic and strain hardening, (c) perfectly elastic, (d) perfectly plastic (e) none of the above?
13. What is stress-strain relationship best describes the behavior of metals at temperatures above their respective recrystallization points: (a) elastic and perfectly plastic, (b) elastic and strain hardening, (c) perfectly elastic, (d) perfectly plastic (e) none of the above?
14. Which one of the following materials has the highest modulus of elasticity: (a) aluminum, (b) diamond, (c) steel, (d) titanium, (e) brass?
15. Which one of the following manufacturing processes will likely result in the best surface finish: (a) arc welding, (b) grinding, (c) drilling, (d) sand casting, or (e) sawing?
16. A tolerance is which one of the following: (a) clearance between a shaft and a mating hole, (b) measurement error, (c) total permissible variation from a specified dimension, (d) variation in manufacturing (e) none of the above?

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17. Chvorinov's rule states that total solidification time is proportional to which one of the following quantities: (a) (A/V) , (b) H_f , (c) T_m , (d) V , (e) V/A ; where A is surface area of casting, H_f is heat of fusion, T_m is melting temperature, and V is volume of casting?
18. What is a riser in casting: (a) an insert in the casting that inhibits buoyancy of the core, (b) gating system in which the sprue feeds directly into the cavity, (c) metal that is part of the casting, (d) source of molten metal to feed the casting and compensate for shrinkage during solidification, and (e) not a waste metal that is usually recycled?
19. What is the expendable-mold casting: (a) centrifugal casting, (b) die casting, (c) investment casting, (d) low pressure casting, (e) vacuum molding?
20. Shell molding can be described by: (a) casting operation in which the molten metal has been poured out after a thin shell has been solidified in the mold, (b) casting process in which the mold is a thin shell of sand bonded by a thermosetting resin, (c) sand casting operation in which the pattern is a shell rather than a solid form, (d) casting operation used to make artificial sea shells, (e) none of the above?
21. Ferrous metals include which of the following: (a) aluminum, (b) brass, (c) copper, (d) gold, (e) steel?
22. Which of the following are NOT advantages of die casting over sand casting: (a) better surface finish, (b) closer tolerances, (c) higher melting temperature metals, (d) higher production rates, (e) mold can be reused?
23. What is the function of the ejection system in injection molding: (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, (e) none of the above?
24. Which of the following is NOT bulk deformation process: (a) impact extrusion, (b) deep drawing, (c) extrusion, (d) forging, (e) rolling?
25. The average flow stress is the flow stress multiplied by which of the following factors: (a) n , (b) $(1+n)$, (c) $1/n$, (d) $1/(1+n)$, (e) none of the above? where n is the strain hardening exponent?
26. Cutting processes can remove material from the various surfaces of a work-piece by producing which of the following item: (a) chips, (b) tools, (c) cutting fluid, (d) dusts, or (e) none of the above?
27. The ratio of depth of cut to chip thickness is known as which of the following ratio: (a) chip-compression ratio, (b) chip-compression factor, (c) cutting ratio, (d) chip ratio, or (e) material removing ratio?
28. Which of the following method can reduce the build-up edge (BUE): (a) increase the cutting speeds, (b) decrease the depth of cut, (c) increase the rake angle, (d) Use a sharp tool, or (e) all of the above?
29. Next to diamond, which of the following tool materials is the hardest material available: (a) CBN, (b) SiN, (c) Cermet, (d) High-speed steel, or (e) WC?
30. Which of the following forces is NOT considered in the in turning process: (a) thrust force, (b) friction force, (c) cutting force, (d) gravitational force, or (e) all of the above?
31. Which of the following item is NOT the main function of the cutting fluids: (a) reduce friction and wear, (b) increase cutting visibility, (c) reduce forces, (d) flush away the chips from the cutting zone, or (e) remove heat?
32. A typical lathe can perform which of the following operations: (a) polishing, (b) lapping, (c) grinding, (d) drilling, or (e) milling?

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33. Which of the following is NOT the important turning parameter in a turning process: (a) rotational speed of the work-piece, (b) feed, (c) width of the chips, (d) depth of cut, or (e) none of the above?
34. Which of the following is an operation used to make an existing boring hole dimensionally more accurate: (a)reaming, (b) turning, (c)milling, (d)drilling, or (e) none of the above?
35. Which of the following milling method has the merit of that the oxide layer on the surface does not adversely affect tool life : (a)up milling, (b) down milling, (c)climb milling, (d)right milling, or (e) none of the above?
36. Which of the following can decrease the surface temperature of the work-piece in grinding : (a)increase the wheel diameter, (b)increase the depth of cut , (c) increase the wheel speed, (d)increase the work-piece speed, or (e) none of the above?
37. Grinding ratio is defined as the proportion between volume of wheel wear and which one of the following item: Grinding ratio is defined as:(a)feed rate, (b) volume of material removed, (c) rotating speed, (d) width of cut ,or (e)depth of cut ?
38. The basic Taylor tool life equation defines the relationship between tool life and which one of the following variable: (a)relief angle, (b) depth of cut, (c) cutting speed, (d) width of the chip, or (e) all of the above?
39. Gears can be manufactured by which of the following machining operation: (a) form cutting, (b) shaving, (c) grindg, (d) burnishing, or (e) all of the above?
40. Vibration and chatter of the cutting tools and the machine components can NOT result in: (a)poor surface finish (b)failure of the cutting tool life(c)damage the machine-tool component(d) poor accuracy of the work-piece(e) none of the above?
41. Which of the following process is basically the reverse of electroplating: (a) electrochemical machining, (b) chemical-mechanical polishing, (c) chemical milling, (d) electrical-discharge machining, or (e) none of the above?
42. Which of the following process can remove the material from the work-piece surface by combined actions of abrasion and corrosion: (a) electrochemical grinding, (b) chemical-mechanical polishing, (c) electrochemical polishing, (d) chemical milling, or (e) none of the above?
43. Which of the following can increase the material-removal rate in electrical-discharge machining process: (a)increase the current, (b) select high melting point of the work-piece , (c) increase the quantities of the dielectric fluid, (d) increase the size of the work-piece, or (e) all of the above?
44. Which of the following is NOT a typical step for integrated circuits fabrication: (a) photolithography, (b)dopin, (c) electric discharge wire cutting , (d) baking, or (e) bonding?
45. Which of the following etching process is NOT belong to dry etching: (a)sputter etching, (b)reactive plasma etching, (c) ion-beam etching, (d)chemically assisted ion-beam etching, or (e) none of the above?
46. Micromachining is used for production of products and components features from μm to : (a) m , (b) mm, (c) sub-mm, (d) Km, or (e) nano ?
47. Which of the following is used in LIGA process: (a)X-ray, (b)UV light, (c) visible light, (d) α -ray , or (e) γ -ray?
48. Which of the following process can be used to deburring operation(a)electropolishing, (b) electrochemical machining, (c)magnetic-abrasive finishing, (d)vibratory finishing , or(e) all of the above?

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49. Which of the following is a coating processes: (a) electroplating, (b) PVD, (c) CVD, (d) LPCVD, or (e) all of the above?
50. Which of the following is the first material used in machine-tool structure and has the advantages of good damping capacity and low cost: (a) Ceramic, (b) composites, (c) gray cast iron, (d) polymer concrete, or (e) granite-epoxy composites ?

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