

امتیاز هر سوال 2 نمره میباشد.

- 1- List the advantages and disadvantages of using lubricant in forging process?
- 2- Calculate the room-temperature forging force for a solid, cylindrical workpiece made of 5052-O aluminum that is 90 mm high and 125 mm in diameter and is to be reduced in height by 30%. Let the coefficient of friction be 0.15.
- 3- Two solid cylindrical specimens, A and B, both made of a perfectly-plastic material, are being forged with friction and isothermally at room temperature to a reduction in height of 25%. Originally, specimen A has a height of 2 in and a cross-sectional area of 1 in², and specimen B has a height of 1 in. and a cross-sectional area of 2 in². Will the work done be the same for the two specimens? Explain.
- 4- Estimate the force required to upset a 0.125-in-diameter C74500 brass rivet in order to form a 0.25-in-diameter head. Assume that the coefficient of friction between the brass and the tool-steel die is 0.2 and that the rivet head is 0.125 in. in thickness? ($Y = 170 \text{ MPa}$)
- 5- A mechanical press is powered by a 30-hp motor and operates at 40 strokes per minute. It uses a flywheel, so that the rotational speed of the crankshaft does not vary appreciably during the stroke. If the stroke length is 6 in., what is the maximum contact force that can be exerted over the entire stroke length? To what height can a 5052-O aluminum cylinder with a diameter of 0.5 in. and a height of 2 in. be forged before the press stalls? (For 5052-O, the yield strength is $90 \text{ MPa} = 13 \text{ ksi}$).
- 6- In comparing forged parts with cast parts, we have noted that the same part may be made by either process. Comment on the pros and cons of each process, considering such factors as part size, shape complexity, design flexibility, mechanical properties developed, and performance in service.
- 7- List the forging defects and show them schematically.
- 8- Describe the advantages of servo presses in forging?
- 9- Which would you recommend, (a) hot forging and heat treating a workpiece or (b) cold forging and relying upon strain hardening for strengthening? Explain.
- 10- We want to produce crank shaft for engine. Compare the advantages and disadvantages of making them by machining and forging?