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**[5057]-213**

**S.E. (Mechanical & Automobile)**  
**(First Semester) EXAMINATION, 2016**  
**MANUFACTURING PROCESSES—I**  
**(2012 PATTERN)**

**Time : Two Hours****Maximum Marks : 50**

- N.B. :-** (i) All the four questions should be solved in one answer-book and attach extra supplements if required.
- (ii) Figures to the right indicate full marks.
- (iii) Neat diagrams must be drawn wherever necessary.
- (iv) Use of non-programmable electronic pocket calculator is allowed.
- (v) Assume suitable data, if necessary.
- (vi) Solve Q. No. 1 or 2, Q. No. 3 or 4, Q. No. 5 or 6, Q. No. 7 or 8.

1. (a) Explain any *three* types of patterns used in casting process with neat sketch and application. [6]
- (b) An aluminium billet of length 60 mm and diameter 20 mm is to be extruded by direct extrusion process. It has extrusion ratio of 3. The extrudate has a round cross-section. The work metal has flow curve defined by strength coefficient 380 MPa and strain hardening exponent 0.18. Determine the pressure applied to the end of billet. [6]  
 (At lengths = 60 mm, 40 mm, 20 mm) as the ram moves forward. Take  $a = 0.8$  and  $b = 1.5$  for the Johnson equation.

P.T.O.

*Or*

2. (a) Compare open-die and closed-die forging. [6]  
(b) Calculate the size of cylindrical riser with  $d/h$  ratio as 1.5, required to feed a steel slab casting of  $350 \times 350 \times 50 \text{ mm}^3$ . Assume the volume shrinkage on solidification as 5% for steel and volume of riser is three times that directed by shrinkage consideration done. If required also find corrected volume of riser. [6]
3. (a) Explain stud welding. State the advantages and limitations of the process. [6]  
(b) Explain with sketch extrusion of pipes and state its application. [6]

*Or*

4. (a) Explain with sketch FCAW. State the advantages and limitations of the process. [6]  
(b) Explain with sketch pressure thermoforming process. [6]
5. (a) Explain with neat sketch what is clearance and angular clearance, also explain size calculation of punch and die for blanking and piercing operation. [7]  
(b) Determine force required for manufacturing the washer of 40 mm outer diameter and 20 mm inner diameter by press work from M.S. sheet of 1 mm thickness. Shear strength of material is  $380 \text{ N/mm}^2$ . Calculate die and punch dimensions for piercing operation. Consider clearance of 10% of stock thickness (Assume staggering of punches). [6]

*Or*

- 6.** (a) Explain with sketch any *three* metal forming operations. [7]  
(b) A square washer with 10 mm internal hole and 25 mm outer square is to be made from 1 mm thickness with ultimate tensile strength 250 N/mm<sup>2</sup>. Find : [6]  
(i) Draw strip layout  
(ii) Percentage utilization for the same.
- 7.** (a) Explain with neat sketch back gear cone pulley type headstock. [7]  
(b) Explain the following lathe operations with neat sketch : [6]  
(i) Eccentric turning  
(ii) Grooving  
(iii) Knurling.

*Or*  
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- 8.** (a) List various parts of feed mechanism and explain end of bed gearing with sketch. [7]  
(b) Determine the angle at which the compound rest will be swiveled when cutting a taper on a workpiece having outside diameter 90 mm, length of the tapered portion 60 mm and conicity is 1. Also find small diameter of taper. [6]