

**B.Tech. MECHANICAL ENGINEERING  
(COMPUTER INTEGRATED  
MANUFACTURING)**

**BTCLEVI/BTMEVI/BTELVI/BTCSVI/BTECVI**

**Term-End Examination**

00402

**December, 2017**

**BME-003 : MANUFACTURING TECHNOLOGY**

*Time : 3 hours*

*Maximum Marks : 70*

---

**Note :** *Question no. 1 is compulsory. Answer any four from the remaining questions. Use of calculator is allowed. Assume any suitable data, if missing.*

---

1. (a) A seamless tube 32 mm outside diameter is turned on a lathe. Cutting velocity of the tool relative to the workpiece is 10 m/min., rake angle =  $35^\circ$ , depth of cut = 0.125 mm, length of chip = 60 mm, horizontal cutting force of the tool on the workpiece = 200 N, vertical cutting force required to hold the tool against the work = 80 N.

Calculate :

- (i) Coefficient of friction, (ii) Chip thickness ratio, (iii) Shear plane angle, (iv) Velocity of chip relative to the tool, and (v) Velocity of chip relative to the workpiece.

7

- (b) A cup of 50 mm diameter and 20 mm height is to be produced by drawing from a 1.5 mm thick sheet metal. Find the blank diameter and the maximum drawing force. Assume ultimate strength of the sheet metal to be 650 MN. 7
2. (a) Compare the solidification times for castings of three different shapes of same volume : Cubic, Cylindrical (with height equal to its diameter) and Spherical. 7
- (b) Write the advantages, disadvantages and product applications of true-centrifugal casting and semi-centrifugal casting. 7
3. (a) Sketch a common gating system. Label it and explain the functions of its various elements. 7
- (b) Write the advantages and limitations of metal as the pattern material. Discuss the various pattern allowances. 7
4. (a) Discuss the various types of cutting fluids. Briefly explain various methods of applying the cutting fluid at the cutting zone. 7
- (b) Which is the hardest cutting tool material next to diamond ? Discuss why tools are coated. 7

5. (a) Define 'Resistance Welding Process'. How does 'Seam Welding' differ from 'Spot Welding'? 7
- (b) Discuss the metallurgical effects due to thermal gradients in HAZ. Why is tungsten a preferred material for non-consumable electrodes? 7
6. (a) Compare progressive, combination and compound dies. 7
- (b) Differentiate between positive and negative rake angles. Discuss the variables affecting the tool life. 7
7. Write short notes on any *four* of the following :  $4 \times 3 \frac{1}{2} = 14$
- (a) Investment Casting
- (b) Advantages of Mechanical Working of Metals
- (c) Welding Electrode Coatings
- (d) Casting Defects
- (e) Cutting Tool Inserts
- (f) Orthogonal and Oblique Cutting
-