

(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 140403

Roll No.

**B.TECH.**

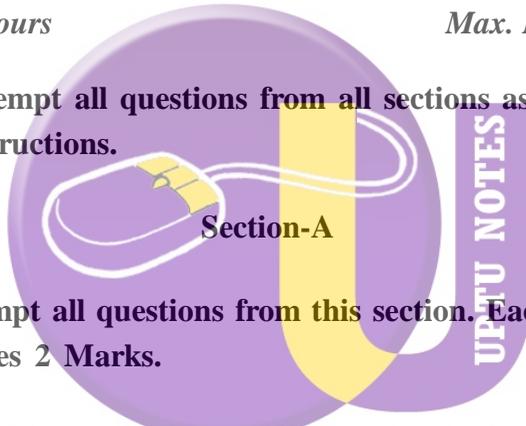
**Theory Examination (Semester-IV) 2015-16**

**MANUFACTURING SCIENCE I**

*Time : 3 Hours*

*Max. Marks : 100*

**Note: Attempt all questions from all sections as per instructions.**



**1. Attempt all questions from this section. Each question carries 2 Marks. (2×10=20)**

- (a) Discuss the factors affecting the plastic deformation.
- (b) Describe the elastic and plastic behavior of metals.
- (c) What is cold working?
- (d) Define ultimate tensile strength of a material.
- (e) Write short notes on resins and adhesives.

- (f) Explain the spring back, in bending of sheet.
- (g) Write short note on welding of platiscs.
- (h) What is the use of riser in casting?
- (i) Explain the functions served by fixture.
- (j) Explain defects in metal forming processes.

### Section-B

2. **Attempt any five questions from this section. Each question carries 10 Marks. (10×5=50)**

- (a) (i) What are the major classifications of basic manufacturing process?
- (ii) What do you understand by yield criteria? Explain Tresca's yield criteria and compare it with Von -Mises yield criteria.
- (b) A metal component 25mm×25mm×150mm long having a yield stress of 7MPa, is to be pressed between flat dies to a size 6mm×100mm×150mm. If  $\mu=0.2$  then calculate the maximum forging load.
- (c) (i) List and explain the defects commonly observed in metal forming processes.

- (ii) Prove that in case of rolling maximum draft= $\mu^2R$ , where  $\mu$  is the coefficient of friction and  $R$  is the radius of roller.
- (d) Derive a relation to determine the forging force of disc with sticking condition.
- (e) (i) Write short notes on Power metallurgy process & Jig and Fixture.
- (ii) Explain the advantages and application of powder metallurgy in brief.
- (f) (i) Explain riser and runner as related to casting and compare riser versus runner.
- (ii) Explain the essential properties of a moulding sand.
- (g) (i) Explain different types of locating and clamping devices.
- (ii) Explain how plastic components are produced by extrusion.
- (h) (i) What are the advantage of open die and closed die forging process? Explain open die forging process in brief.

- (ii) Explain some advantage and disadvantage of cold working and hot working.

### Section-C

**Attempt any two questions from this section. Each question carries 15 Marks. (15×2=30)**

3. A circular disc of lead of radius 130mm and thickness 45mm is reduced to thickness of 25mm by open die forging. if the coefficient of friction between the job and die is 0.2, determine the maximum forging load. The average shear yield stress of lead is 4MPa.
4. (i) Describe the various kinds of patterns used in casting.  
(ii) What are the allowances provided, when making a pattern?  
(iii) Briefly describe with neat sketch, process and application of investment casting process.
5. (i) What are the different types of press? Explain any one.  
(ii) What are the unconventional metal forming processes?  
(iii) Briefly describe with neat sketch electrohydraulic forming process.