Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI- EXAMINATION – SUMMER 2016

Subject Code:162503 **Date:17/05/2016**

Subject Name:Metal Forming Processes

Time: 10:30 AM to 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Classify and compare the various metal forming processes with respect to temperature of forming. **07**

(b) What is Tresca's criterion for plastic deformation? A thin walled spherical shell having radius *r* and wall thickness *t* is under internal pressure *p*. The shell is 0.8 meter in diameter and 4 mm thick and made from mild steel having tensile yield stress of 300 MPa. Calculate pressure required to cause yielding of the shell according to Tresca's yield criterion. The state of stress acting on the element of spherical shell is shown in figure below. **07**

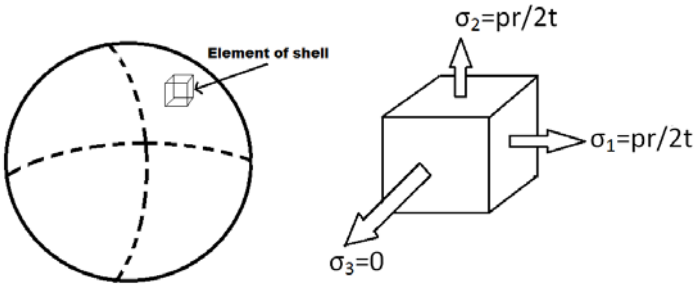

Figure (a) Spherical Shell (b) State of stress on the element

Q.2 **(a)** Differentiate between ductile fracture and brittle fracture. What is difference in ductile fracture take place in pure iron and medium carbon steel? **07**

(b) Surface rolling improve the fatigue property of metal - Evaluate the statement. With suitable figure explain crack initiation stage observed during fatigue failure. **07**

OR

(b) Creep resistance property of metal improved by changing its grain size from finer grain to coarser grain structure - Evaluate the statement. Give possible suggestions to improve service life of the parts operating under constant load at higher temperature. **07**

Q.3 **(a)** For a given thickness reduction of sheet, force required for rolling using 2-high rolling mill is higher than 4-high rolling mill – Evaluate the statement. With suitable figure explain working of planetary rolling mill. **07**

(b) With suitable figure explain open and close die forging process. **07**

OR

Q.3 **(a)** What is the effect of roll deflection on the workpiece in rolling process? Give various methods to control these roll deflection? **07**

(b) It is very important to determine raw material volume in impression die forging process – Evaluate the statement. Briefly explain skew rolling process. **07**

Q.4 **(a)** Compare direct and indirect extrusion process. **07**

(b) What is tube drawing process? Explain the tube drawing process with and without using mandrel. **07**

OR

Q.4	**(a)**	Draw the forces and geometrical relationship in extrusion process and wire drawing in die region.	**07**
	(b)	What is spring back effect observed during sheet metal bending process? Give the various methods to reduce spring back?	**07**
Q.5	**(a)**	Clearly state the difference between sheet metal operations with figure: drawing, deep drawing, redrawing and reverse drawing.	**07**
	(b)	Classify various high energy rate forming processes with their sources of energy. Explain magnetic pulse forming process.	**07**

OR

Q.5	**(a)**	Rocket nose are produce with the spinning process - Evaluate the statement. Determine blank size for the cup to be drawn having cup diameter 40mm, flange diameter 60mm and height 40mm. Ignore sheet thickness. Draw the setup of deep drawing process with blank holder.	**07**
	(b)	With suitable figure explain hydro forming process. Also give its advantage over other sheet metal forming process.	**07**

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