Con. 5752-13. **LJ-10556**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question number **1** is **compulsory**.
(2) Attempt any **four** from remaining **six** questions.
(3) **All** questions carry **equal** marks.
(3) Missing data can be suitably assumed.

1. Write short notes on any **four** :– **20**
   (a) Centee of pressure.
   (b) Types of Rolling Mills.
   (c) Gear hobbing.
   (d) Turning fixture.
   (e) Tool dynamometer.

2. a) Calculate and Design a round pull type broach for machining hole of diameter 35H7 and length 20mm in a work piece of carbon steel. **10**
   Specific cutting force = 4200N/mm^2, IT7 = 0·025mm, Tooth rise = 0·03mm cutting speed in broaching = 8m/min.
   Draw the broach and indicate designed Value.
   b) Determine and design a circular form tool graphically, to cut a Semicircular groove in the cylindrical work piece whose details are given below:– **10**
   Minimum Radius = 60mm
   Maximum Radius = 40mm
   Assume Rake and Relief angle as 10° and 6° Respectively.

3. a) Prove that the relationship $2\phi + \beta - \gamma = \pi/2$ holds good in Orthogonal cutting, where **10**
   ϕ = shear angle, β = frictional angle, γ = Rake angle. Also state your assumptions.
   b) Discuss any tow of the following:– **10**
   (i) Different types of rolling mills.
   (ii) Torque and Power Calculation in rolling.
   (iii) Types of Jig bushes.

4. a) Discuss the steps of designing drill jig. **10**
   b) A Slab milling operation is performed Under the foll conditions. **10**
   Cutter dia = 100mm
   No. of teeth = 30
   Helix angle of cutting Edge = 15°
   Depth of cut = 7·5mm

TURN OVER

5. a) Explain the Various steps involved in the design of circular pull type broach. Draw the neat sketches. **10**

   b) Compare jigs and fixtures and Explain locating and clamping Elements used in Jigs and Fixtures. **10**

6. a) A steel shaft 50mm diameter is required to be turned through distance of 300mm. On an Engine lathe. Depth of cut is 6mm and the rate of feed 0·2mm/rew. Two types of tools are available for this purpose. **10**
   (i) HSS
   (II) Tungsten carbide.
   The following are the data available.

Tool Material	Tool life (min)	Cutting speed (meter/min)	Tool changing Time (min)
H.S.S	20	40	3
	35	31	
Tungsten Carbide	15	125	3
	45	85	

   b) Distinguish between :– **10**
   (i) Compound and progressing die.
   (ii) Drilling and Milling Fixture.

7. a) Draw the nomenclature of plain milling cutter and Explain the procedure of designing a plain milling cutter. **10**

   b) Explain the following :– **10**
   (i) 'C'- clamp and Captive 'C' clamp.
   (ii) Open type jig and channel type jig.
