

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V • EXAMINATION – WINTER 2013****Subject Code: 152002****Date: 29-11-2013****Subject Name: Manufacturing Technology-I****Time: 10:30 pm to 01:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary and clearly mention the same.
3. Figures to the right indicate full marks.
4. Draw neat diagrams. Shabbily drawn diagrams may not be awarded any credit.

- Q.1 (a)** Draw neat schematic labeled diagrams of the following machining processes and briefly illustrate the relative motions and tooling needed for performing that operation. **07**
1. Grooving operation on lathe machine
 2. Boring operation on lathe machine

- (b)** What are the different methods available to produce a taper on lathe machine? Describe any two of the taper turning methods with neat sketch. **07**

- Q.2 (a)** Explain with the help of neat schematic diagram the mechanism used in the shaper machine for the reciprocation of ram. **07**

- (b)** Illustrate the following alignment tests of lathe machine. **07**
1. Axis of the centers parallel with bed
 2. Cross slide move perpendicular to spindle axis

OR

- (b)** Graphically explain the effect on the value of rake angle and clearance angle of single point cutting tool, when the tool is positioned either above or below the axis of work piece rotation on lathe machine. Also mention the position of single point cutting tool on front and rear tool post on lathe machine, if the direction of work piece is not changed. **07**

- Q.3 (a)** Produce schematic diagrams of drilling, boring and reaming operations on drilling machine. What must be the sequence in which these operations are performed? Give critical reasoning to support your answer. **07**

- (b)** Discuss various work holding devices and tool holding devices, which are used on various conventional machine tools with their schematic diagrams. **07**

OR

- Q.3 (a)** Explain the following milling machine operations with sketch. **07**
String milling; Straddle milling; Gang milling

- (b)** Explain the tooling requirements for broaching operation to cut internal keyway/s. **07**

- Q.4 (a)** Discuss different milling cutters which are used on milling machine with neat sketch. Also briefly mention the function of each milling cutter. **07**
- (b)** Determine the suitable gear train for cutting the following right hand, single start, threads on work piece using a lathe machine equipped with 4 TPI lead screw. The available gears are 20 to 120 teeth in steps of 5 teeth and one additional gear with 127 teeth. Also draw the neat schematic diagram of the gear train in each case to show the relative motions amongst work piece, gears, lead screw and cutting tool. **07**
1. 3 mm
 2. 1.75 mm

OR

- Q.4 (a)** Explain the principle of center less grinding process. Briefly discuss about through feed center less grinding and plunge cut center less grinding. **07**
- (b)** A lathe machine is used to cut 3.5 mm pitch (single start, left hand) thread on workpiece using 3mm pitch lead screw. Following pinions are available with 8 division chasing dial. Determine at which division, the split nut can be engaged to cut the above mentioned thread in each case. **07**
1. 28 teeth pinion
 2. 40 teeth pinion
 3. 70 teeth pinion

- Q.5 (a)** Write a brief note on following in context of a grinding wheel selection. **07**
1. Type of abrasive particles
 2. Size of abrasive particles
 3. Structure of grinding wheel
 4. Hardness of grinding wheel
- (b)** Explain Taylor's gauging principles for maximum and minimum material condition with the help of suitable example. **07**

OR

- Q.5 (a)** Give difference between up milling and down milling process with the help of relative motion between cutting tool and work piece. Also discuss with critical reasons that up milling is safer than down milling. **07**
- (b)** Derive the equation to calculate effective diameter of a thread using floating carriage micrometer. **07**
