Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – WINTER • 2014

Subject Code: 152002 **Date: 28-11-2014**

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)** Bring out the respective functional requirements of various measuring and gauging instruments available in any industrial workshop. **07**

(b) Compare and contrast different methods of taper turning on lathe machine. Support your answer with the help of clear description and neat schematic diagrams of respective taper turning method. **07**

Q.2 **(a)** Discuss briefly about the working of fixed and travelling steady rests to highlight the differences between them. Bring out the significance of fixed and travelling steady rests with the help of respective neat schematic diagrams. **07**

(b) Evaluate the following statements: **07**

1. Cast iron is always machined dry.
2. Three-jaw independent chuck provides better accuracy than three-jaw self centering chuck to hold and locate cylindrical workpieces.

OR

(b) Briefly describe various functions of cutting fluids used in conventional machining process. Also give examples about the types of cutting fluids available for a specific cutting operation on various machine tools and justify the same. **07**

Q.3 **(a)** Draw neat schematic diagrams of the types of chips produced during machining operation using single point cutting tools on lathe machine. Also discuss about the factors affecting the types of chips produced. **07**

(b) Give complete detail to carry out following alignment operations: **07**

1. Perpendicularity of spindle axis of radial drilling machine to its table.
2. Parallelism between longitudinal table movement and spindle axis on horizontal milling machine.

OR

Q.3 **(a)** With the help of neat schematic diagrams bring out the functional requirements of back gears and tumbling gears on engine lathe. **07**

(b) Lathe machine is required to be set for thread cutting operation. Left hand and single start thread with a pitch of 2.25 mm is to be cut on workpiece. Lead screw is available with 6 mm single start right hand pitch. Moreover, lathe machine is equipped with a chasing dial (3 divisions) and its pinion with 15 teeth. **07**

Your tasks:

Find out the gear train between spindle axis and lead screw axis to cut the above thread on workpiece, if the available gears are from 20 to 80 in steps of four.

Draw schematic diagram of above mentioned thread cutting operation to highlight the relative motions amongst workpiece, lead screw, carriage motion and gears.

Mention at what division of chasing dial, the split nut can be engaged to follow the same tool paths in all successive tool cuts.

Q.4 **(a)** Differentiate between arbor mounted and shank mounted milling cutters. Describe the different cutters used on milling machine with the help of neat diagrams and their functions. **07**

(b) Discuss and describe quick return mechanism and auto feed mechanism of shaper machine. **07**

OR

Q.4 **(a)** Describe the following parameters for grinding wheel selection: **07**

Hardness of wheel; Structure of wheel; Size and shape of wheel; Types of abrasives of wheel

(b) With the help of schematic diagrams, describe helical milling operation on horizontal milling machine. Draw complete labeled diagrams to show the motion transfer from lead screw of table to cylindrical workpiece through gear train and dividing head milling attachment for cutting right hand helix and left hand helix both. Take into consideration the type of cutter and its relative orientation for helical milling operation. **07**

Q.5 **(a)** Explain the following: **07**

1. Dressing and Truing of grinding wheel
2. Plunge cut grinding

(b) Draw complete labeled diagrams of following operations to highlight the tooling requirements and relative motions between tool and workpiece: **07**

1. Parting off operation on lathe machine
2. T-slot milling operation on vertical milling machine

OR

Q.5 **(a)** Draw complete labeled diagrams of following operations to highlight the tooling requirements and relative motions between tool and workpiece: **07**

1. Dovetail guide way machining on shaper
2. Internal keyway machining on slotter

(b) List out different cutting tool materials available to manufacture a cutting tool. Correlate the properties of various cutting tool materials with its field of application. **07**

****