

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-V EXAMINATION – WINTER 2015

Subject Code: 152002

Date: 17/12/2015

Subject Name: Manufacturing Technology I

Time: 10:30am to 1:00pm

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. Diagrams with inferior quality may not be awarded credit.

- Q.1** (a) List out the operations that are performed on drilling machine with the help of neat schematic diagrams and description. Name the cutting tool used to carry out a specific operation and show relative motion between cutting tool and workpiece. **07**
- (b) How can we perform different operations on slender workpiece on lathe machine? Produce suitable diagrams of the set up to handle slender workpieces on lathe machine for different operations. Bring out the importance of work holding devices used for the same. **07**
- Q.2** (a) Draw neat schematic labelled diagrams of the following machining operations and briefly illustrate the relative motions and tooling needed for performing these operations. **07**
1. Profile milling operation on vertical milling machine
 2. Threading operation on lathe machine
- (b) List out different specifications of lathe machine and describe them in brief. Draw neat diagrams wherever necessary to support your answer. **07**

OR

- (b) Explain the functionality of various work holding devices used on milling machine with the help of suitable diagrams and brief description. **07**
- Q.3** (a) Draw diagrams of the following taper turning processes and differentiate between them. **07**
1. Taper turning by tail stock offset method
 2. Taper turning by compound rest swivelling method
- (b) Explain with the help of neat sketch any one of the spindle speed changing mechanisms available on lathe machine. **07**

OR

- Q.3** (a) Describe the grinding wheel specification used for its selection and bring out **07**

their importance.

- (b) With the help of neat schematic diagrams, illustrate the following alignment tests. **07**
1. Checking spindle run out on lathe machine
 2. Cross slide table moves perpendicular to longitudinal slide table on milling machine

- Q.4 (a)** Determine the suitable gear train for cutting the following right hand, single start, threads on work piece using a lathe machine equipped with 6 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. 9 TPI
 2. 2.75 mm

- (b) With the help of neat diagrams illustrate the functions of the following tool holding devices used on capstan and turret lathe. **07**
1. Knee tool holder
 2. V-steady tool holder

OR

- Q.4 (a)** Bring out the concept of differential indexing process to cut a gear with 63 teeth on milling machine. Dividing head milling attachment is available with a reduction ratio of 40:1 and change gears are available from 20 to 120 teeth in steps of 4 teeth. Support your answer with the help of suitable diagrams and assume suitable data if it is necessary. **07**

- (b) Explain the sequence of operations to produce 'V' shape and central slot on V-block shown in figure 1. The surfaces to be machined are shown hatched in the figure. The operations are to be carried out on shaper machine. Produce a tabular format to show the toolings used and relative motions between cutting tool and workpiece for each sequential operation to be carried out. Assume suitable data and clearly mention the same. **07**

- Q.5 (a)** Describe the procedure to measure the major diameter and minor diameter of the thread of a given thread gauge. Name the instrument used for this measurement and highlight the significance of that instrument for thread measurement. **07**

- (b) Draw neat schematic labelled diagrams of the following machining operations and briefly illustrate the relative motions and tooling needed for performing that operation. **07**
1. Machining equally spaced internal keyways on long cylindrical workpiece with a circular hole
 2. Face milling operation

OR

- Q.5 (a)** Evaluate the following statements. Short and CRISP answer will be appreciated. **07**
1. Wear allowance is omitted while designing NOT GO plug gauges and they are shorter in length than GO plug gauges.
 2. Double clearance angle on single point cutting tool is necessary for boring operation of small diameter holes.
- (b)** Compare and contrast the mechanism providing the reciprocating motion on mechanical shaper and hydraulic shaper. Also compare the quality of surfaces machined on both shapers. **07**

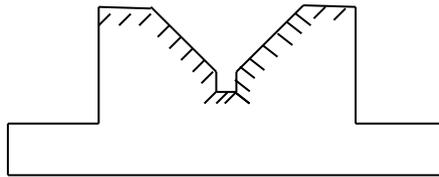


Figure 1. V-block with included angle 90° for V shape
