

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- Vth SEMESTER-EXAMINATION – MAY/JUNE - 2012****Subject code: 152002****Date: 02/06/2012****Subject Name: Manufacturing Technology-I****Time: 02:30 pm – 05:00 pm****Total Marks: 70****Instructions:**

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

- Q.1 (a)** 1. State the conditions under which the following types of chips are formed in metal cutting principles. **06**
(i) Continuous chips
(ii) Continuous chips with built up edge
(iii) Discontinuous chip
Support the answer with neat sketches.
2. Explain the functions of cutting fluids in metal cutting operations. **01**
- (b)** 1. With the help of neat sketches show the effect of tool setting on operating rake and clearance angles in external turning with a single point cutting tool in the following cases. **03**
(i) Tool on center
(ii) Tool above center
(iii) Tool below center
2. With the aid of neat schematic diagrams illustrate the following operations performed on a drilling machine indicating the requirements of each set up and direction of cutting parameters. **04**
(i) Drilling
(ii) Counter boring
(iii) Tapping
(iv) Spot facing
- Q.2 (a)** 1. List out the different types of cutters used on milling machine and mention the operations performed by them. **05**
2. Differentiate between capstan and turret lathe from construction and application point of view. **02**
- (b)** 1. Explain the function performed by fixed steady and traveling steady on a lathe machine during machining operation. **03**
2. Illustrate with the help of neat sketch the taper turning attachment used on engine lathe. **04**
- OR**
- (b)** 1. Explain any four specification of a lathe machine briefly. **04**
2. Differentiate between gang milling and string milling operation with suitable diagrams. **03**

- Q.3 (a)** Draw schematic diagrams and explain following machining operations.
- (i) Drilling operation on lathe machine **02**
 - (ii) Facing operation on lathe machine **02**
 - (iii) Gear cutting on milling machine **03**
- (b)**
1. Evaluate the statement: “Shaper machine is based on intermittent cutting action and lathe machine is on continuous cutting.” **03**
 2. Show the shaper machine set up for following machining operations: **04**
 - (i) Cutting vertical surface
 - (ii) Cutting horizontal surface
 - (iii) Cutting inclined surface
 - (iv) Cutting key way

OR

- Q.3 (a)**
1. Draw and explain milling machine set up for helical (or spiral) milling operation. **03**
 2. Describe the following alignment operations: **04**
 - (i) Spindle axis of lathe parallel to bed
 - (ii) Cross slide movement perpendicular to spindle axis
- (b)**
1. Explain the following terms using neat sketches: **06**
Clearance fit
Interference fit
Transition fit
 2. Define the term: Tolerance **01**
- Q.4 (a)**
1. Evaluate the following statements: **04**
 - (i) A hard grinding wheel is used for soft work material and soft grinding wheel is used for hard work material.
 - (ii) A control wheel (or regulating wheel) is tilted with small angle in center-less grinding process.
 2. Draw and explain plunge cut grinding process with suitable example. **03**
- (b)**
1. What is a broaching operation? Explain the elements of broaching machine and types of components can be produced using it. **03**
 2. Briefly explain lapping and honing operations for finishing external surfaces. **04**

OR

- Q.4 (a)** Determine the end gear train necessary to cut a 1.75 mm pitch single start left hand thread on a lathe machine with a 3 mm pitch lead screw. The set of change gears available with the machine is from 24 to 76 teeth in step of 4 teeth. Draw a schematic diagram of end gear train for this operation showing direction of rotation of all the gears from work piece to lead screw. Explain the need for the chosen gears in the gear train. **07**

- (b) A lathe machine is set to cut single start right hand threads on different work pieces. The lead screw of the machine is specified to have 3 mm pitch. The chasing dial is divided into 8 divisions and is equipped with 40 teeth pinion on it. **07**

Your task:

For the following threads to be cut on different work pieces, mention the position/s of the chasing dial to engage the split nut for successive depth of cuts of thread cutting operation so that the tool follows the same path as was followed in previous cut.

- (i) 10 mm pitch, single start (ii) 4 mm pitch, single start

- Q.5 (a)** 1. What is called a deep-hole drilling? What are the problems associated with deep-hole drilling? **03**

2. Enumerate the different types of drilling machines and related applications that can be performed on them. **04**

- (b) 1. Draw schematic diagrams of up milling and down milling on horizontal milling machine and differentiate between them. **03**

2. Explain the different work holding devices available on milling operation for various applications with suitable examples. **04**

OR

- Q.5 (a)** Evaluate the following statements:

1. HSS material cannot be used to cut hard materials. **02**

2. Capstan lathe perform heavy duty and large production work compared to engine lathe. **02**

3. Helical milling operation to cut helical gear cannot be considered as a high production alternative. **03**

- (b) Draw schematic diagrams of surface grinder and center type cylindrical grinder to differentiate between them. **04**

Explain differential indexing. **03**
