Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER – IV • EXAMINATION – WINTER 2012

Subject code: X 41901 **Date: 03/01/2013**

Subject Name: Manufacturing Process – I

Time: 02.30 pm - 05.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Draw neat schematic diagram of lathe machine. Explain function of following lathe parts. **07**

(i) Face Plate
(ii) Apron
(iii) Compound rest
(iv) Lead screw and split nut
(v) Change gears
(vi) Bed

(b) Draw the geometry of milling cutter. Describe up and down milling technique with suitable sketch. **07**

Q.2 **(a)** Define (i) Cutting speed (ii) feed and (iii) depth of cut with their equations and measurement units. Draw relative motion between work piece and cutting tool for following operations. **07**

(i) Turning
(ii) Shaping
(iii) Horizontal face milling
(iv) Drilling

(b) How does a planner differ from a shaper, suggest a job that can't be done on a lathe or a shaper but can be done on a planner. **07**

OR

(b) What are the properties require for a good abrasive? Suggest suitable grinding operations for the following jobs. **07**

(i) Grinding of standard taper pin.
(ii) Grinding of steps on a lathe spindle.
(iii) Hollow shaft with internal diameter of 25 mm and external diameter of 50 mm.

Q.3 **(a)** Explain following drilling operation with sketch. **07**

(i) Step drill (ii) Counter sinking
(iv) Reaming (iv) Counter boring
(v) Tapping (vi) Spot facing

(b) Define boring operation. For what purpose it is done. Compare the basic design feature of a vertical turret type boring machine with those of the standard vertical boring machine. **07**

OR

Q.3 **(a)** A 15 mm diameter hole is to drilled in a 25 mm thick mild steel plate at a speed of 0.55 meter/sec and feed rate of 0.1mm/rev. The point angle of the drill is 118º and approach and over travel may be assumed to be 6mm. calculate : **07**

(i) Time required for the cut.
(ii) Drill thrust and torque.
(iii) Power required if the efficiency of the transmission is 80%.

(b) Explain following terms. **07**

(i) Manufacturing process.
(ii) Cutting fluids.
(iii) Economical production.
(iv) Manufacturing cost.

Q.4 **(a)** A work piece 200 mm in diameter is to be faced down to a 60 mm diameter at the end. The cutting speed suggested for the job-tool material combination is 1.67 meter/sec. If feed rate is 0.2 mm/rev, estimate the time for the facing cut. **07**

(b) How the speed and feed of the band saw blade varied? Explain different types of metal sawing operation. **07**

OR

Q.4 **(a)** Explain plain indexing and compound indexing. Determine suitable plain indexing for cutting 115 teeth on a gear wheel blank. **07**

(b) Define broaching operation. Draw sketch of broach and label on it. What makes broaching particularly well suited for mass production? **07**

Q.5 **(a)** Explain following grinding process with suitable sketch. **07**

(i) Centre less grinding.
(ii) External cylindrical grinding.
(iii) Internal cylindrical grinding
(iv) Surface grinding.

(b) Differentiate between shaper machine and slotter machine. Discuss briefly the crank and slotted quick return motion mechanism for a shaper. **07**

OR

Q.5 **(a)** Enlist different types of boring machine. Discuss, with neat sketch, a horizontal boring machine. **07**

(b) Write a sort note on any two from following. **07**

(i) 3 jaw chuck and 4 jaw chuck.
(ii) Different types of taper turning methods.
(iii) Different types of milling cutters.
(iv) Radial drilling machine.

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