Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER 2013

Subject Code: 152002 **Date: 16-05-2013**

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.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	(1) List the factors affecting speed and feed (2) Give purpose of cutting fluids (3) Define rake angle and relief angle for single point cutting tool	**07**
	(b)	(1) State advantages and disadvantages of 3 jaw and 4 jaw chuck.	**03**
		(2) Give differences between engine lathe and Capstan/Turret lathe.	**04**
Q.2	**(a)**	(1) Explain different taper turning methods used on Engine lathe.	**05**
		(2) Determine the end gear train required to cut a 3.5 mm pitch single start thread on a lathe with a 6 mm pitch lead screw. The change gear set available with the machine has gears from 20 teeth to 100 teeth in steps of 5 teeth.	**02**
	(b)	(1)Explain any four specification of a lathe machine briefly.	**04**
		(2) A lathe with a 6 mm pitch single start right hand lead is to be set to cut 8 threads per inch. Determine the end gear train to be set up if the lathe is supplied with a change gear set 24 to 76 teeth and a 63 teeth wheel.	**03**
		OR	
	(b)	Give different lathe operations and explain any three with neat sketch.	**07**
Q.3	**(a)**	(1) Explain operation of Radial drilling machine with neat sketch.	**03**
		(2)A 20 mm diameter hole is to be drilled in a 30 mm thick mild steel plate at a speed of 0.5 m/s and feed rate of 0.15 mm/rev. The point angle of drill is 118^0 and approach and over travel may be assumed to be 6 mm. Calculate: (i) Time required for the cut. (ii) Torque. [$T=C_2d^{1.9} f^{0.8}$ N.mm, $C_2=615$] (iii) Power required if the efficiency of transmission is 80%	**04**
	(b)	Illustrate the following operations performed on a drilling machine with neat sketch.(i) Drilling (ii) Tapping (iii) Spot facing (iv) Counter boring.	**07**
		OR	
Q.3	**(a)**	Explain following fits. (i) Clearance fit (ii) Interference fit (iii) Transition fit.	**07**
	(b)	(1) Differentiate between Tolerance and Allowance	**03**
		(2) Explain Hole basis and Shaft basis system	**04**
Q.4	**(a)**	(1) Explain any two milling cutters with neat sketch.	**04**
		(2) Differentiate up milling and down milling on horizontal milling machine.	**03**
	(b)	(1) Explain differential indexing.	**03**
		(2) Explain different work holding devices available on milling machine.	**04**
		OR	
Q.4	**(a)**	Describe column and knee type Milling machine with the help of neat sketch.	**07**
	(b)	(1) Give differences between gang milling and string milling operation	**03**
		(2) Two 80 mm wide x 180 mm long surfaces of cast iron block are to be slab milled with a H. S. S. helical milling cutter 100 mm diameter 125 mm long having 12 teeth. A depth of cut of 8 mm is to be taken with a cutting speed of 0.5 m/s and a feed rate of 0.06 mm/tooth. What is the machining time and metal	**04**

removal rate? Also calculate the power required for cutting if unit power for operation is 2.7 J/mm and efficiency of transmission is 80%.

Q.5	**(a)**	(1) Draw the tooth set of saw and write application of each.	**03**
		(2) Give differences between Shaper and Planer.	**04**
	(b)	(1) Briefly explain lapping and honing operations for finishing external surfaces.	**03**
		(2) What is a broaching operation? Explain the elements of Broaching machine.	**04**

OR

Q.5	**(a)**	(1) A silicon carbide wheel is used to grind C. I. whereas aluminum oxide wheel is used to grind mild steel material-Evaluate.	**03**
		(2) Explain centre less grinding machine operation.	**04**
	(b)	(1) List the factors which influence grinding wheel bond selection.	**05**
		(2) In centre less grinding why is it necessary to support the work piece above the centre line of grinding wheel and regulating wheel.	**02**

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