Name: Enrolment No:	UPES

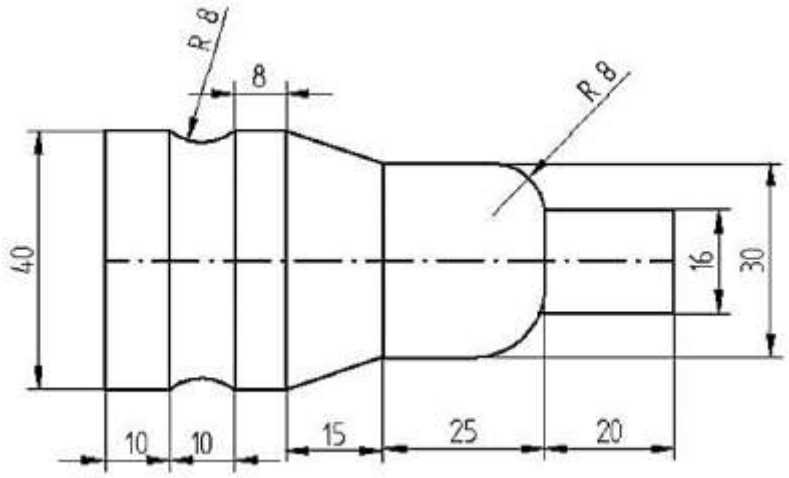
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

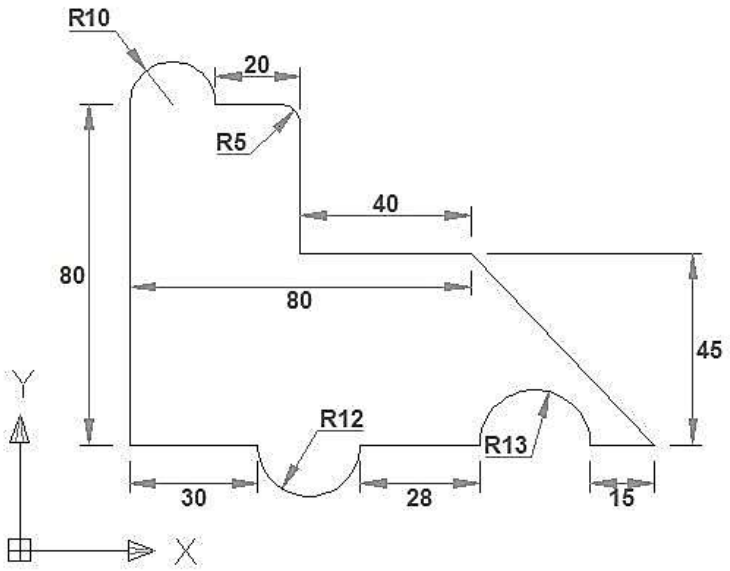
End Semester Examination, December 2019

Programme Name: B.Tech Mechanical Engineering **Semester : V**
Course Name : Manufacturing Technology II **Time : 03 hrs**
Course Code : MEPD 3003 **Max. Marks : 100**
Nos. of page(s) : 3
Instructions:

SECTION A

S. No.		Marks	CO
Q 1	Discuss various types of chips formed in metal cutting operation.	**4**	**CO-1**
Q 2	Differentiate between crater wear and flank wear	**4**	**CO-2**
Q 3	Define BLU in CNC machine. A stepper motor has 150 steps. The output shaft of the motor is directly coupled to a double start screw of pitch 4 mm, which drives a table. If the frequency of the pulse supplied to the motor is 200 Hz. Find the speed of the table.	**4**	**CO-4**
Q 4	A 31.8 mm HSS drill is used to drill a hole in cast iron block 120 mm thick at a cutting speed of 20 m/min and feed of 0.3 mm/rev. If the over travel of drill is 4 mm and approach 9 mm. determine the time required to drill a hole.	**4**	**CO-3**
Q-5	Give the function of below mentioned codes G90, M08, G82, M05	**4**	**CO-5**
	SECTION B		
Q 6	Give method of producing gear of 69 teeth by using a) Simple indexing b) differential indexing, if the nearest available number of holes in the plate is 68 c) compound indexing with brown and shaper dividing head **Plate No.1: 15, 16, 17, 18, 19, 20 holes** **Plate No. 2: 21, 23, 27, 29, 31, 33, holes** **Plate No. 3: 37, 39, 41, 43, 47, 49 holes**	**10**	**CO3**
Q 7	Explain the working principle of electrochemical machining. Calculate the material removal rate and the electrode feed rate in the electrochemical machining of an Iron surface that is 25mm x 25mm in cross section using NaCl in waster as electrolyte. The gap between the electrode and the work piece is 0.25mm. The supply voltage is 12 volt DC. The specific resistance of the electrolyte is 3 ohms-cm for iron. Valence Z= 2, atomic weight is 55.85 amu, density = 7860 kg/m^3.	**10**	**CO3**
Q 8	a) Discuss DDA algorithm for linear interpolation b) Differentiate between open and close loop control in CNC machine.	**10**	**CO4**

Q-9	Discuss the working principle of electro discharge machining. Deduce the expression for charging and discharging time in RC type generator in EDM **OR** Enlist the role of dielectric in electro discharge machining. In an EDM operation with RC circuit, following data is available Supply voltage = 100V Breakdown voltage= 60V Resistance=10 ohms Percentage of discharge energy available for material removal= 40% Calculate the time required to drill a square hole of sides 15mm in steel work piece having thickness of 20mm. also calculate the MRR. Specific energy for melting steel is 2.5 J/mm^3	**10**	**CO-3**
	SECTION-C		
Q 10	a) Derive the expression for optimum cutting speed using minimum cost criterion. b) Turning operation is performed on cylinder of 50mm diameter and 200mm length. Value of the feed is 0.3mm/rev. Taylor's tool life equation for cutting is given by $\mathbf{VT^{0.2}=300}$. Job loading and unloading time is 2 min. tool change time is 2 min. labor cost is 15 Rs./hour and original tool cost 5 Rs/tool. Find i. Optimum cutting speed, tool life, time/piece and cost/piece using minimum cost criteria ii. Optimum cutting speed, tool life, time/piece and cost/piece using maximum production rate criteria	**20**	**CO1** **CO2**
Q-10	a) Write down the CNC turning program for CNC lathe machine. (15)  b) Differentiate between PTP and contour movement is CNC machine OR a) Write down the part programming for profile milling on 5 mm plate with depth of cut of 1mm, revolution of spindle of 1200 rpm and feed of 20mm/min.	**20**	**CO4** **CO5**



b) Differentiate between NC, CNC and DNC.