Name: Enrolment No:	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

END Semester Examination, December 2019

Programme Name: B.Tech Mechanical and mechanical spl. **Semester : VII**
Course Name : Advance Manufacturing Processes **Time : 03 hrs**
Course Code : MHEG 411 **Max. Marks: 100**
Nos. of page(s) : 2 **Instructions:**

SECTION A

S. No.		Marks	CO
Q1.	Identify the mechanism of material removal, transfer media and energy source for EDM.	5	CO1
Q2.	Explain the classification of Unconventional machining according to major energy source employed.	5	CO1
Q3.	Name the unconventional machining processes which are i) used to remove maximum material ii) used to remove minimum material iii) Consumes maximum power iv) consumes minimum power.	5	CO4
Q4.	Explain the factors that should be considered during the selection of an appropriate unconventional machining process for a given job.	5	CO1

SECTION B

Q5.	During an ECM operation on an iron work-piece with a square-face copper tool (using brine as the electrolyte), both having a flat surface, a feed rate of 2 mm/min is used. The dimension of the tool face is 25.4 mm X 25.4 mm. the boiling temperature of the electrolyte is 95^{o} C. find out the total force acting on the tool. Use the data Viscosity = 0.876×10^{-3} kg/m-sec Density of electrolyte = 1.088 g/cm^3 Specific heat of electrolyte = 0.997 Ambient temperature (initial temperature of electrolyte) = 35^{o}C Conductivity of electrolyte =$0.2\Omega^{-1}cm^{-1}$ Gram atomic wt A= 55.85 g, valency of the cation Z = 2, density of anode = 7.86 g/cm^3 Neglect the variation in electrolyte conductivity due to the temperature change. The electrolyte is fed from one side of the square-shaped tool.	10	CO3

Q6.	Mention the best suited Unconventional machining process along with the reason for the following operations: a) For producing micro holes b)For machining small holes c) For machining deep holes d) For producing shallow holes e) For Threading operation	**10**	**CO4**
Q7.	Explain the working principle of AWJM. Also list down the various process parameters and explain them with the help of neat sketches. **Or** Explain the working principle of Abrasive flow finishing process. Also list down the various process parameters and explain them with the help of neat sketches.	**10**	**CO1**
Q8.	Discuss the effect of following parameters on the MRR in EDM process: a) Resistance b) Mean current c) Capacitance d) Spark Gap Also plot the curves for variation.	**10**	**CO3**
	SECTION-C		
Q9.	a) Derive the expression for MRR in USM process by different models. Write the appropriate assumptions. b) Explain the functions of Transducer and horns used in USM.	**15** **05**	**CO2**
Q10.	a) What is meant by "optical pumping" briefly explain the "population inversion between energy levels" with respect to laser beam machining? b) Explain the process of PAM with a neat sketch. With respect to principle, equipment process parameter, advantages, disadvantages and applications. Or Explain the following: i. Process characteristics of EBM ii. Why vacuum is need and what is its order in EBM process iii. What is spontaneous emission and what is laser? iv. Comparison between thermal and non-thermal features of electron beam machining	**10** **10** **5*4= 20**	**CO1**