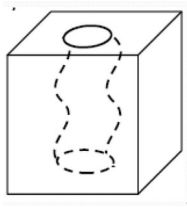
Name: Enrolment No:	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2019

Programme Name: B-Tech Mechanical **Semester : VIII**
Course Name : Advance Manufacturing Technology **Time : 03 hrs.**
Course Code : ADEG 405 **Max. Marks: 100**
Nos. of page(s) : 2
Instructions: Draw neat and clean line diagram/Graph wherever necessary.
Write down abbreviation of symbols used

SECTION A (20 marks)

S. No.		Marks	CO
Q 1	Define mixing ratio & explain its importance.	4	CO2
Q2	List four limitations of USM.	4	CO1
Q3	List out quality issues in EDM process.	4	CO2
Q4.	Discuss the issues related to machining of Sic.	4	CO1
Q5.	Differentiate between transferred arc and non-transferred arc type plasma.	4	CO1
	SECTION B (40 Marks)		
Q6	Compare Electric discharge machining and electrochemical machining.	10	CO1
Q7	Explain advantage, disadvantage and applications of electron beam machining.	10	CO1
Q8	Explain the factors that affect the performance of the process and product quality in AFM process. **OR** Explain the effect of following a) Water pressure on depth of cut in AWJM b) Abrasive flow rate on DOC in AWJM c) Abrasive flow rate and grain size on MRR in AJM	10	CO2
Q9.	Select a suitable process for cutting of zigzag cavity from a slab of high strength alloy  Justify and explain selected process.	10	CO3
	SECTION-C (40) Marks)		
Q10.	Explain the effect of following on MRR in USM a) Effect of Amplitude	4*5	CO2

<table>
<tr><td></td><td>b) Effect of frequency
c) Effect of hardness ratio of the tool & work piece
d) Effect of abrasive grain size
e) Effect of slurry ,tool and work material</td><td></td><td></td></tr>
<tr><td>Q11.</td><td>Derive the expression for MRR
a) ECM (for alloys)
b) AJM (both ductile and brittle materials)
OR
a) A researcher conducts electrochemical machining (ECM) on a binary alloy (density 6000 kg/m3) of iron (atomic weight 56, valency 2) and metal P (atomic weight 24, valency 4). Faraday's constant = 96500 coulomb/mole. Volumetric material removal rate of the alloy is 50 mm3/s at a current of 2000 A. Calculate the percentage of the metal P in the alloy.
b) During the ECM process of iron by using NaCl as electrolyte, the following parameters were observed
<table><tr><td>Current -1800A</td><td>Voltage -18V</td><td>Electrode length 10cm</td><td>Electrolyte density 1.1gm/cc</td></tr><tr><td>Gap -0.03cm</td><td>$\rho_{iron}=7.8\,gm/cc$</td><td>Specific resistance= 3.1 ohm-cm</td><td>Valency -2
Atomic weight of iron – 56gm</td></tr></table>Calculate the maximum metal removal rate and electrode feed rate.</td><td>10*2
8
12</td><td>CO2</td></tr>
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