

Name:			
Enrolment No:			
<b>UNIVERSITY OF PETROLEUM AND ENERGY STUDIES</b> <b>End Semester Examination, May 2023</b>			
<b>Course: Manufacturing Processes</b> <b>Program: B.Tech Mechanical</b> <b>Course Code: MECH 2046</b>		<b>Semester: IV</b> <b>Time: 03 hrs.</b> <b>Max. Marks: 100</b>	
<b>Instructions: Attempt all the questions. Assume suitable data if missing.</b>			
<b>SECTION A</b> <b>(5Qx4M=20Marks)</b>			
Q No	Statement	Marks	CO
Q 1	Enlist the pattern allowances. Also explain the draft allowance with neat and clean diagram.	4	CO1
Q 2	Explain the factor affecting the tool life in machining operation.	4	CO1
Q 3	Summarize the idea behind ultrasonic machining.	4	CO1
Q 4	Discuss the physics of soldering process.	4	CO1
Q 5	Give parametric differences hot rolling and cold rolling process.	4	CO2
<b>SECTION B</b> <b>(4Qx10M= 40 Marks)</b>			
Q 6	Describe the fundamentals of rapid prototyping. Also explain the steps involved in the rapid prototyping with the help of a neat and clean diagram.	10	CO2
Q 7	Compare the casting process with other manufacturing processes. Also, discuss in short the various reasons for the casting defects and its remedies.	10	CO2
Q 8	Discuss the working of submerged arc welding with a neat and clean diagram. Also, enlist the various welding defects.	10	CO2
Q 9	<p>Discuss the need for unconventional machining processes. Classify the unconventional machining processes on the basis of energy type, mechanics of material removal and energy source.</p> <p style="text-align: center;">OR</p> <p>Discuss the basic principle of electric discharge machining. Also depict the functioning of solenoid controlled electric discharge machine with a neat and clean diagram.</p>	10	CO2
<b>SECTION-C</b> <b>(2Qx20M=40 Marks)</b>			
Q 10	Analyze the principles of fusion welding on the following governing factors; a. The characteristics of heat source	20	CO3

	<ul style="list-style-type: none"> <li>b. The nature of deposition of filler material</li> <li>c. The heat flow characteristics in the joint</li> <li>d. The gas metal or slag metal reaction</li> <li>e. The cooling of the fusion zone</li> </ul>		
Q 11	<p>Mild steel is being machined at a cutting speed of 2000 m/min with a tool of rake angle <math>10^\circ</math>. The width of cut and the uncut thickness are 2 mm and 0.2 mm, respectively. If the average value of the coefficient of friction between the tool and the chip is 0.5 and the shear stress of the work material is 4000 N/mm<sup>2</sup>. Determine;</p> <ul style="list-style-type: none"> <li>a. The shear angle, and the cutting and thrust components of the machining force</li> <li>b. Also, solve the problem by Merchant second solution by assuming machining constant <math>70^\circ</math> for the work material.</li> </ul> <p style="text-align: center;">OR</p> <p>A 20 mm x 20 mm x 160 mm copper plate is forged is forged between two flat dies to a final size of 10 mm x 40 mm x 160 mm. Determine the peak forging force, assuming the coefficient of friction to be 0.2. The tensile yield stress for copper can be taken as 70 N/mm<sup>2</sup>. Assume no stain hardening.</p>	<b>20</b>	<b>CO3</b>