


<b>Name:</b>	
<b>Enrolment No:</b>	

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**  
**End Semester Examination, December 2022**

**Course: Aircraft Manufacturing Technology** **Semester: V**  
**Program: B. Tech Aerospace** **Time : 03 hrs.**  
**Course Code: MEPD 3010** **Max. Marks: 100**

**Instructions:** Make use of sketches/plots to elaborate your answer. Brief and to-the-point, answers are expected. Assume suitable data if needed.

**SECTION A**  
**(5Qx4M=20Marks)**

Q. No.	Question	Marks	CO
1	State the potential application of the Casting process in Aerospace.	4	CO1
2	Differentiate between conventional and non-conventional machining based on their merits and demerits.	4	CO1
3	Define the general method of the fabrication process in the aircraft components.	4	CO1
4	Discuss the material removal process in the metal cutting operation.	4	CO3
5	Explain the following machining operation with suitable example. 1) Shaping machine 2) Boring operation	4	CO2

**SECTION B**  
**(4Qx10M= 40 Marks)**

6	Explain the following welding process with neat sketch. A) Submerged arc welding B) Electron Beam welding	10	CO2
7	Explain different types of chips produced during machining with a neat sketch, describe the formation of BUE (build up edge).  <p style="text-align: center;"><b>OR</b></p> Differentiate between up milling and down milling with proper justification of their uses .	10	CO2
8	Discuss the selection criteria of cutting tool material and based on these criteria compare at least 5 cutting tool materials for high production rate criteria.	10	CO3
9	a) Calculate the dimension of the sprue to avoid air aspiration effect to feed liquid metal at the rate of 30 kg/s. height of the sprue is 25 cm and height	10	CO3

	<p>of the pouring basin is 10 cm. assume the density of liquid metal 8000 kg/m<sup>3</sup>. [06]</p> <p>b) In a gating design mould dimensions 60 x 30 x 15 cm. height of liquid metal above the gate is 15 cm. c/s area of gate 5 cm<sup>2</sup>. Determine time required to fill the cavity using top gate. [04]</p>		
<b>SECTION-C</b> <b>(2Qx20M=40 Marks)</b>			
10	<p>a) Discuss the Gas Metal Arc welding and their application with neat sketch. [10]</p> <p>b) Discuss the challenges of manufacturing of aircraft components in the Indian market. [10]</p> <p style="text-align: center;"><b>OR</b></p> <p>a) Discuss the ECM and EDM process with potential applications. [10]</p> <p>b) Select the proper zero manufacturing process for the following application with proper justification.</p> <p>a) Small size gear</p> <p>b) Jet engine parts</p> <p>c) Motor casing</p> <p>d) Gun barrels</p> <p>e) Propeller shaft [10]</p>	20	CO4
11	<p>A XYZ company want to manufacture the following products</p> <p>a. Turbine blade</p> <p>b. Heavy application Gear</p> <p>c. Aircraft Wing</p> <p>d. Cylinder Head for IC engine</p> <p>e. Lathe machine bed</p> <p>f. Small connecting rod</p> <p>Analyze and Prepare the proper manufacturing process with proper justification. ( Assume suitable data to justify the process)</p>	20	CO3