Name: Enrolment No:	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

Course : Aircraft Materials **Semester : V**
Course Code : ASEG 336 **Time : 03 hrs.**
Programme : B.tech ASE **Max. Marks : 100**

Instructions:
1. **The Question paper has three sections: Section A, B and C.**
2. **Section B and C have internal choices.**

SECTION A

S. No.		Marks	CO
Q 1	Classify aluminum alloys with suitable example.	**4**	**CO2**
2	Describe the importance of high-temperature nickel alloys in flight structures.	**4**	**CO3**
3	Explain the method of elimination to retained austenite	**4**	**C01**
4	Define different types of finishing operation.	**4**	**C04**
5	Describe the general design principal of Jigs and fixture	**4**	**C01**
	SECTION B		
6	Discribe the corrosion in metal and its prevention technique	**10**	**CO2**
7	Discuss the mechanics of metal cutting of brittle as well as ductile material.	**10**	**C03**
8	Explain the following machining operation in details with suitable example. 1) Turning operation 2) Milling operation 3) Boring operation 4) Broaching operation	**10**	**CO1**
9	Explain the component of CNC m/c and its advantages. Or 1) Write the tool path commands of a CNC machine has to move along a circular arc from (5,5) to (10,10) while performing an operation. The center of the arc is at (10,5). 2) Determine the center of 2-D CAD package in which clockwise circular arc of radius 5, specified from P_1 (15, 10) to P_2 (10, 15). Where P_1 and P_2 is point at 1 and 2.	**10**	**CO4**

	SECTION-C		
10	a) Explain the three types of oxy-acetylene flames. Indicate with the help of sketches the various zones, respective temperature ranges and applications of each type of flame. **[10]** b) Determine the open circuit voltage and short cicuit current for the welding operation in a DC arc welding operation the voltage arc length charcterstics was obtained was Varc = 20 + 5L where the arc length L was varied between 5 mm and 7mm. here V arc denotes the arc voltage n Volts. The arc current was varied from 400A to 500 A. Assuming linear power source charters tics. **[10]**	**20**	**CO4**
11	.A ABC company wants to manufacture some aircraft parts as a Vendor. Company received the order details for the following parts. 1) Combustion chamber 2) Nozzle 3) Diffuser 4) Propellant tanks 5) Leading edge flap Manger select the material engineer to optimize the material for the given order and give the basis for it also suggest the different manufacturing process used to make this part. Also make a complete report chart for a given parts from selection of material to manufacturing. **Or** a) Explain the application of Composite material in aerospace domain and discuss the fiber reinforce composites and laminated composites with suitable example. **[15]** b) Explain the properties and application of nanomaterials. **[5]**	**20**	**C03**

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SECTION A

S. No.		Marks	CO
Q 1	Identify the potential applications of titanium alloys.	**4**	**CO1**
2	Define general method of fabrication process in the aircraft.	**4**	**C02**
3	Describe plasma arc welding, its advantages and disadvantages.	**4**	**C04**
4	Define the suitable welding process for nonferrous alloy with neat sketches.	**4**	**C03**
5	Define carbon fiber reinforced composites with examples.	**4**	**C03**
	SECTION B		
6	Explain alloy steels and the effect of alloying elements on the properties of these alloys.	**10**	**CO2**
7	Describe the following non-conventional machining process with suitable example. 1) Electric Discharge Machining 2) Electrochemical Machining.	**10**	**C04**
8	Discuss in details of mechanics of fusion welding and also discuss the arc and power characteristics.	**10**	**CO3**
9	Discuss types of heat treatment process used for the following application in detail 1) Chisel used in carpentry operation 2) Wire drawing operation 3) Car Body 4) Propeller blade **Or** Discuss the different consequences of normalizing as well as hardening process in terms of mechanical properties in details.	**10**	**CO1**

	SECTION-C		
10	Explain the property possess by cutting tool and compare the HSS, H.C steel tool, Stellite, carbides cutting tool material based on following parameters. a) Hardness b) Hot hardness temperature c) Method of Manufacturing d) Toughness e) Cutting velocity f) Application		**CO4**
11	.Explain Inconel, Monal and K–Monal alloys, their properties and applications to aerospace vehicles. **Or** Describe magnesium alloys, their properties, applications to aerospace vehicles, causes of corrosion and corrosion control methods.		**C03**