


Name:			
Enrolment No:			
<b>UNIVERSITY OF PETROLEUM AND ENERGY STUDIES</b> <b>End Semester Examination, December 2022</b>			
<b>Course: Aircraft Materials</b> <b>Program: B. Tech ASE</b> <b>Course Code: ASEG 3005</b>		<b>Semester: VII</b> <b>Time : 03 hrs.</b> <b>Max. Marks: 100</b>	
<b>Instructions: Q.1-3 are True/False</b> <b>Support your answers with illustrations.</b>			
<b>SECTION A</b> <b>(5Qx4M=20Marks)</b>			
S.no.		Marks	CO
Q.1.	a) Finer the grain boundaries lesser the ductility in the materials. b) The major alloying agent of 7 series Aluminium alloy is copper.	4	CO1
Q.2.	a) Amorphous materials are isotropic in nature b) Thermoplastic are recyclable plastics while thermoset not	4	CO2
Q.3	a) Titanium is used as replacement for steel in landing gears. b) CMCs can withstand higher temperature than PMCs	4	CO2
Q.4	2 series Aluminium alloy used for upper wing while 7-series for lower wing justify?	4	CO1
Q.5	State the failure mechanisms in composites, support your answer with illustrations	4	CO2
<b>SECTION B</b> <b>(4Qx10M= 40 Marks)</b>			
Q.6	Derive an expression to determine the longitudinal modulus of composite using the modulus of fiber and matrix and comment on the behavior of the expression.	10	CO3
Q.7	State the main load carried by following aircraft components and mention the suitable metal and composite material for each of these components,  a) Fuselage and wing skin (subsonic and supersonic a/c) b) Wing ribs (subsonic a/c and supersonic a/c)	10	CO4
Q.8	Define composites, state the purpose of fibre and matrix in composites materials and classify the composites on the basis of fibers.	10	CO3
Q.9	State the class of steel used for aerospace application and comment on its superiority over other steels. With the help of figure, highlight the various crystal form of steel with respect to temperature.	10	CO2

**SECTION-C**  
**(2Qx20M=40 Marks)**

Q.10	a) Explain the different class of super alloy used in the gas turbine engines, clearly specify the major composition for each alloys and location where they used in the engine. ( 15 marks) b) Explain the difference between the alloys and composite materials ( 5 marks)	<b>20</b>	<b>CO3</b>
Q 11.	Explain the compression molding and resin transfer molding process of making polymer matrix composite. Comment on the type of reinforcement and matrix in these methods.  <b>OR</b>  Which manufacturing technique is used for making long flat sheet made of polymer composites, Clearly explain the process with schematic diagram and state the advantages and disadvantages of manufacturing process.	<b>20</b>	<b>CO4</b>