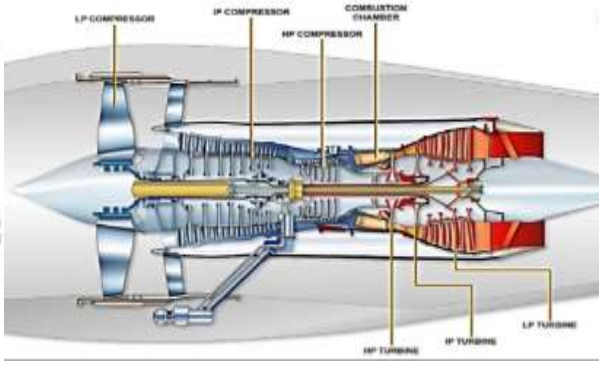
Name: **Enrolment No:**	UPES

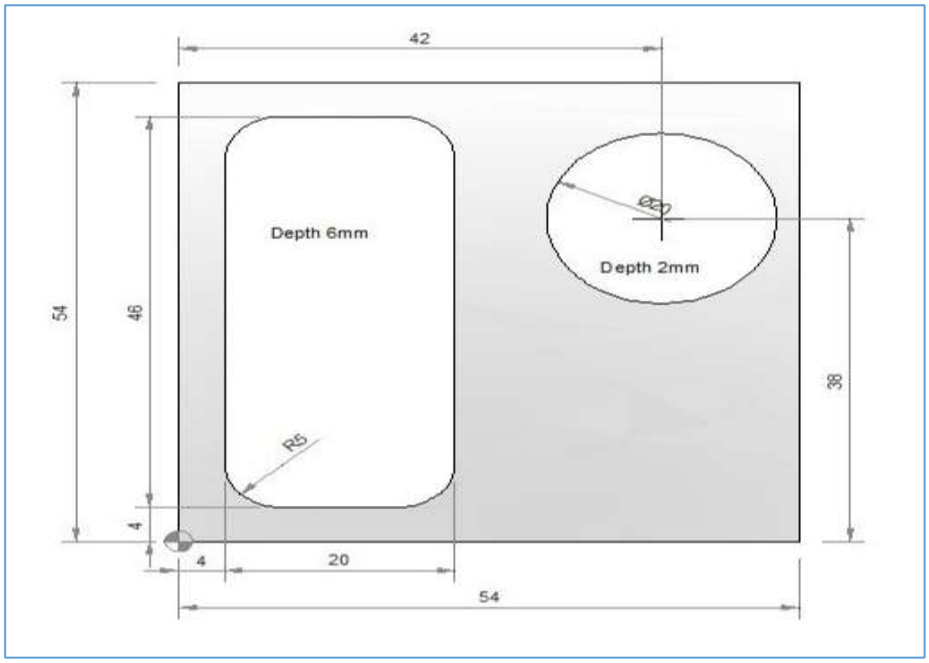
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2019

Course : Aircraft Materials **Semester : V**
Course Code : ASEG 3005 **Time : 03 hrs.**
Programme : B.tech ASE
No. of pages:03 **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 [5 x 4]

Q. No.		Marks	CO
1	Define the factor affecting parameters on which life and selection of the material is dependent.	**4**	**CO2**
2	Discuss the heat treatment process for the high temperature super alloy material.	**4**	**CO3**
3	Explain the suitable welding process for nonferrous alloy with neat sketches.	**4**	**C01,C 04**
4	A lathe machine perform a face turning operation on a circular work piece having outer diameter 50 mm, inner dia 40 mm and length is 60 mm, calculate the total time for maching to convert 60 mm length in to 45 mm. take approach = 5 mm, overrun = 3 mm feed = 1.5 mm/rev, velocity of spindle = 50 m/s	**4**	**CO1,C 04**
5	Define carbon fiber reinforced composites with examples.	**4**	**C03**
	SECTION B [10 x 4]		
6	Discuss the requirements of cutting tool material and compare at least 3 cutting tool material used for high speed application based on performance parameters.	**10**	**CO2,C O3,**
7	Discuss the based suited material and manufacturing process for the following components for light load application and heavy-duty application.  Fig-1  Fig-2	**10**	**CO2,C 03**

8	Define the 3-2-1 Principle of Jig and fixture and explain the advantages of electron beam welding over the conventional welding.	**10**	**CO1,CO4**
9	Explain the requirements of nontraditional machining operation and discuss the Electro chemical machining. Or Write down the CNC G-Code part programming for the following machining operation.  	**10**	**CO1,CO4**
	SECTION-C [20 x 2]		
10	A XYZ company wants to design following items for the different application and try to make major components for the aerospace application. As a engineer what should be the parameters which XYZ has to consider for giving to order for vendor for manufacturing. In the same company, chief engineer has given the same task for two different engineer first one is Mr. Abhay which is material engineer and another one Mr. Yes is genral design engineer and both are come out with the selection with valid justification. As a chief engineer of the company on what basis you select the best material for the following application and what points you have to take care while considering, explore all the view and justify both the sides and select the unique one based on your arguments a) Combustion Chamber, after burner and Turbine of an aircraft engine for supersonic application b) Hypersonic missile: Shaurya (Major components only) Make a complete report chart for all the selection factor and justify the selected material.	**20**	**CO1,CO4**

11	a) Explain the metal forming operation and metal forging operation with suitable example. **[10]** b) Discuss the deep drawing operation and minor operation perform on the sheet metal operation with suitable example. **[10]** **Or** a) Explain Inconel, Monal and K–Monal alloys, their properties and applications to aerospace vehicles. **[15]** b) Explain the properties and application of nanomaterials. **[5]**	**20**	**CO1,C 03,C04**