B.E. (Aeronautical Engineering) Fourth Semester (C.B.S.)
Aircraft Materials

P. Pages : 2

Time : Three Hours

_____

Notes :   1.   All questions carry marks as indicated.
         2.   Solve Question 1 OR Questions No. 2 .
         3.   Solve Question 3 OR Questions No. 4.
         4.   Solve Question 5 OR Questions No. 6.
         5.   Solve Question 7 OR Questions No. 8.
         6   Solve Question 9 OR Questions No. 10.
         7.   Solve Question 11 OR Questions No. 12.
         8.   Due credit will be given to neatness and adequate dimensions.
         9.   Assume suitable data wherever necessary.
        10.   Illustrate your answers wherever necessary with the help of neat sketches.

1. a) How plain carbon steels are classified. State its applications. **7**

    b) Explain in brief heat treatment of Aluminium and its alloys. **7**

<div align="center">OR</div>

2. a) Write a note on "Descaling & Pickling". **7**

    b) What are the advantages & disadvantages of titanium & its alloys. **7**

3. a) Explain the airframe uses of composites in aircraft constructions. **6**

    b) Describe about the fiber orientation. **7**

<div align="center">OR</div>

4. a) Write short notes on : **6**
       Glass fiber, Aramid fibers, Carbon Graphite fibers, Boron fibers.

    b) Explain about the fabrication of glass fibers. **7**

5. a) Name the methods that are used for the manufacturing of the composites. Explain any one of them. **6**

    b) Explain in detail about "Vacuum bagging". **7**

<div align="center">OR</div>

6. a) Explain in detail about filament winding. **6**

    b) Are pre impregnated materials called as prepregs? If yes, what are prepregs? Write its advantages and disadvantages. **7**

7.	a)	Define creep. Explain the mechanism of creep.	**6**
	b)	Plot the curve between total creep or percentage elongation and time & also explain.	**7**

OR

8.	a)	Write note on "low temperature and high temperature creep".	**6**
	b)	Explain about the mechanism that plays a significant role during the creep of metals.	**7**
9.	a)	Distinguish between "Ductile fracture and brittle fracture".	**5**
	b)	A sample of glass has a crack of half length 2μm. The young's modulus of the glass is 70 GN/m^2 and the specific surface energy is 1 J/m^2. Estimate its fracture strength and compare it with its young's modulus.	**8**

OR

10.	a)	Explain briefly the factors affecting fracture of a materials.	**5**
	b)	The half length of crack in a steel is 2μm. Taking $Y = 200 \, GN/m^2$. Estimate the brittle fracture strength at low temperature, if the true surface energy is 1.5 J/m^2. The actual fracture strength is found to be 1200 M N/m^2. Explain the difference, if any, between this and your result.	**8**
11.	a)	What are super alloys? Give their composition, properties and strengthening mechanism and application.	**9**
	b)	Explain in brief about "grain boundary strengthening".	**5**

OR

12.		Write short notes on :	**14**
		i) Iron base Superalloys.	
		ii) Cobalt base Superalloys.	
		iii) Nickel base Superalloys.	

****