Exam Seat No:_____ **Enrollment No:_____**

C.U.SHAH UNIVERSITY

WADHWAN CITY

University (Winter) Examination -2013

Course Name :M.Tech(Mech-CAD/CAM)Sem-I **Subject Name: -Advanced Material Technology Duration :- 2:30 Hours**

Date : 15/1/2014 **Marks : 70**

Instructions:-

(1) Attempt all Questions of both sections in same answer book / Supplementary.

(2) Use of Programmable calculator & any other electronic instrument is prohibited.

(3) Instructions written on main answer Book are strictly to be obeyed.

(4) Draw neat diagrams & figures (If necessary) at right places.

(5) Assume suitable & Perfect data if needed.

SECTION-I

Q-1 Attempt the following:

	a)	Give electron configuration of the following :	
		Aluminum	01
		Titanium	01
		Iron	01
		Nickel	01
	b)	Give one example of covalent bond with figure.	01
	c)	What do you mean by polycrystalline material?	01
	d)	Draw only the schematic representation of the relative energies of the electrons for the various shells and sub shells.	01
Q-2	(a)	Define atomic mass and explain isotopes clearly with suitable example.	04
	(b)	Explain in detail the effects of temperature on mechanical properties.	05
	(c)	Write a short note on LASER.	05

OR

Q-2	(a)	Compare the thermal behavior of crystalline and non crystalline materials.	04
	(b)	Write a short note on metallic bonds.	05
	(c)	Give your thoughts on the factors to be considered for selecting materials for engineering application.	05
Q-3	(a)	Discuss in detail the concept of atomic bonding in solids in context of bonding forces and energies.	07
	(b)	Draw and discuss in detail the Mohr's circle of stress in two dimensions.	07

OR

Q-3	(a)	State the assumption made in Einstein classical model and also state what modification Debye has made in his specific heat theory.	07
	(b)	Discuss grain boundary defects in detail with clear sketches.	07

SECTION-II

Q-4 Attempt the following:

	a	Draw elastic stress-strain diagram in tension and compression for a material following Hooke's law.	01
	b	Define stacking fault in crystals.	01
	c	What does happen to specific heat of solid when temperature goes absolute zero?	01
	d	What is the unit of universal gas constant (R)?	01
	e	Write a statement of DULONG-PETTI's law.	01
	f	What is the full name of ASTM?	01
	g	Draw the standard tensile test specimen.	01
Q-5	(a)	Derive an equation for critical resolved shear stress.	04
	(b)	Explain Creep behavior of materials.	05
	(c)	Explain in brief true stress and strain.	05
		OR	
Q-5	(a)	Derive an expression for Schmid's law	04
	(b)	Explain fracture behavior of materials.	05
	(c)	Discuss in detail the Yielding in single crystalline materials.	05
Q-6	(a)	Write a short note on Cathodic protection.	07
	(b)	Write a short note on radiation damage and recovery.	07
		OR	
Q-6	(a)	Write a short note on delayed fracture and explain in details about cyclic fatigue of metal.	07
	(b)	Discuss the importance of strength to density and modulus to density ratio in selection of materials.	07

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