Enrollment No: _____ Exam Seat No: _____

C.U.SHAH UNIVERSITY

Summer Examination-2019

Subject Name: Advanced Material Technology
Subject Code: 5TE01AMT1 Branch: M.Tech Mechanical (CAD/CAM)
Semester: 1 Date: 22/03/2019 Time: 02:30 To 05:30 Marks: 70

Instructions:
(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Section –I

Q-1 Attempt the followings:

	a.	Give electron configuration of the following : (i, ii, iii, iv) i. Chromium ii. Cobalt iii. Copper iv. Zinc	04
	b	Draw and label the metallic bonds in solid materials.	01
	c	Define the term "Property".	02

Q-2	(a)	Draw the standard tension test specimen. Compare and differentiate the ductile and brittle fractures.	07
	(b)	Discuss with neat sketches the Griffith crack theory.	07

OR

Q-2	(a)	Describe in detail the anodic and cathodic reactions stating suitable examples.	07
	(b)	Explain the types of Corrosion testing methods.	07

Q-3	(a)	Prove the equation $\tau_r = \frac{\sigma_x}{2}\sin 2\phi \cos\theta$	07
	(b)	Discuss in detail selection of engineering materials.	07

OR

Q-3	(a)	Explain the role of strength to density and modulus to density ratio on material selection process.	07
	(b)	Enlist the names of Atomic models. Discuss the Bohr's Atomic model.	07

Section –II

Q-4 Attempt the followings:

a	Give full name of ASTM.	01
b	Define the term Slipping.	01
c	Define the term "Steady state condition".	01
d	State two names of Biomaterials.	01
e	Write two names of pure oxides ceramics.	01

	f	Define the term "Specific heat".	02
Q-5	(a)	Define the term "thermal conductivity" and derive the equation for the Wiedemann- Franz ratio.	07
	(b)	Derive an equation $C_v = 3R\left(\frac{\theta_E}{T}\right)^2 e^{-\theta_E/T}$ for the Quantized oscillator model.	07
		OR	
Q-5	(a)	What is the full form of LASER? Discuss the Nd: YAG Laser with necessary sketches.	07
	(b)	Discuss the constant displacement fatigue loading testing machine.	07
Q-6	(a)	Draw and discus the phenomenon of radiation damage and recovery of materials.	07
	(b)	Discuss the concept of atomic bonding in solids in context of bonding forces and energies with clear diagrams.	07
		OR	
Q-6	(a)	How super alloys differ from alloys? Discuss the general properties of ferrous superalloys.	07
	(b)	Discuss the terms (i) Thermal stresses and (ii) Thermal Shock.	07