

# C.U.SHAH UNIVERSITY

## Winter Examination-2018

**Subject Name :Advanced Material Technology**

**Subject Code : 5TE01AMT1**

**Branch: M.Tech Mechanical (CAD/CAM)**

**Semester : 1**

**Date :05/12/2018**

**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:

Give electron configuration of the following : (a, b, c)

- |          |   |    |
|----------|---|----|
| <b>a</b> | Chromium  | 01 |
| <b>b</b> | Cobalt  | 01 |
| <b>c</b> | Copper  | 01 |
| <b>d</b> | Write few characteristics of Aluminium super alloys.                              | 01 |
| <b>e</b> | Draw only the true stress strain diagrams under linear and non linear conditions. | 01 |
| <b>f</b> | Define the term Material Technology.  | 01 |
| <b>g</b> | Define the term – Atomic number.  | 01 |

**Q-2 (a)** Define the term Metallic bond. Discuss the characteristics and formation of metallic bonds in solid materials. 07

**(b)** Draw and discuss the Bohr atomic models. 07

**OR**

**Q-2 (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 the effects of corrosion on S-N diagram with neat sketch. 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)** Discuss in detail the Brittle fracture 07

**(b)** Define the term “thermal conductivity” and derive the equation for the Wrideman-Franz ratio. 07

### Section –II

**Q-4** Attempt the followings:

- |          |  |    |
|----------|--|----|
| <b>a</b> | Give full name of ASTM.                      | 01 |
| <b>b</b> | Define the term slip plane.                  | 01 |
| <b>c</b> | Define the term Isotropy.                    | 01 |
| <b>d</b> | Define the term Crystallographic directions. | 01 |



e	What is smart materials?	01
f	What is radiation damage and recovery?	02
<b>Q-5</b>	(a) Discuss the influence of crystallographic directions on material properties.	04
	(b) Define “thermal shock”. Which is the most important factor?	05
	(c) Compare and differentiate stress-strain curves for ductile and brittle materials.	05
	OR	
<b>Q-5</b>	(a) How single crystalline materials differ from polycrystalline materials? Explain the solidification of polycrystalline materials.	04
	(b) Discuss the constant displacement fatigue loading testing machine.	05
	(c) Discuss the elastic stress-strain relationship.	05
<b>Q-6</b>	(a) What is delayed fracture? Explain the stress corrosion and cyclic fatigue phenomenon.	07
	(b) Draw neat sketch of standard tensile specimen with circular cross. Explain the procedure to conduct tensile stress–strain tests with neat sketch.	07
	OR	
<b>Q-6</b>	(a) Discuss the PAULIE’S Excusive Principle and how the electrons are filled in the shells?	07
	(b) Write a short note on Advanced engineering materials.	07

